WCA 2026

International Society of Audiology ISA

The Korean Audiological Society

KAA Korean Academy of Audiology

37th World Congress of Audiology

May 24 - 27, 2026 Coex Seoul, Korea

Broadening the Horizon of Audiology

Abstract Book



SEOUL METROPOLITAN GOVERNMENT

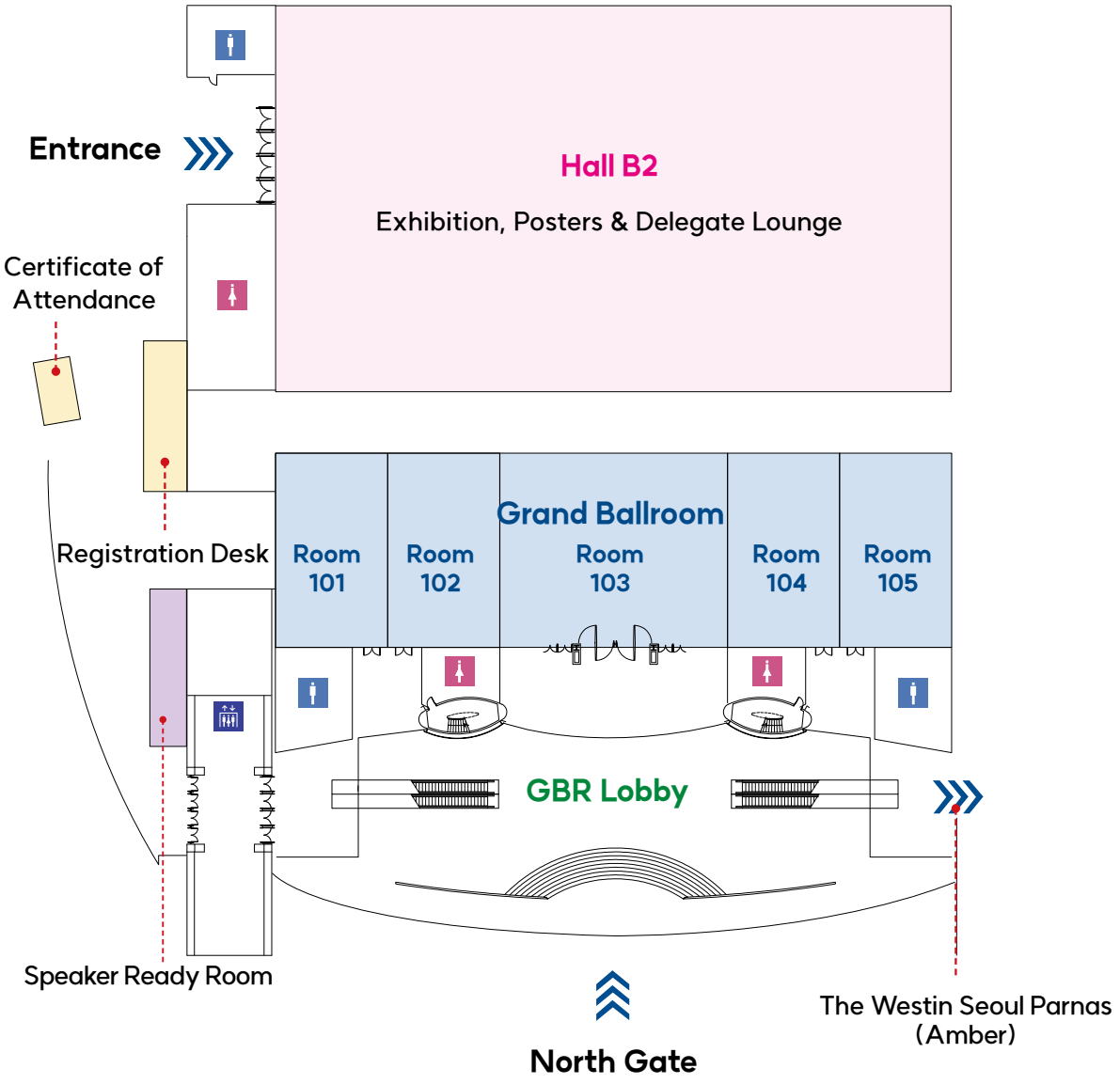
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Contents

Floor Plan	**3**	**Abstracts**	
Program at a Glance	**5**	Aram Glorig Award	74
Official & Social Program	**7**	Plenary Session	75
General Information	**8**	Workshop	82
Scientific Program	**10**	Planned Session	87
May 24	13	Special Session	304
May 25	14	Innovation Session	356
May 26	29	Best Oral Presentation	358
May 27	41	Oral Presentation	380
Posters	46	Posters	573

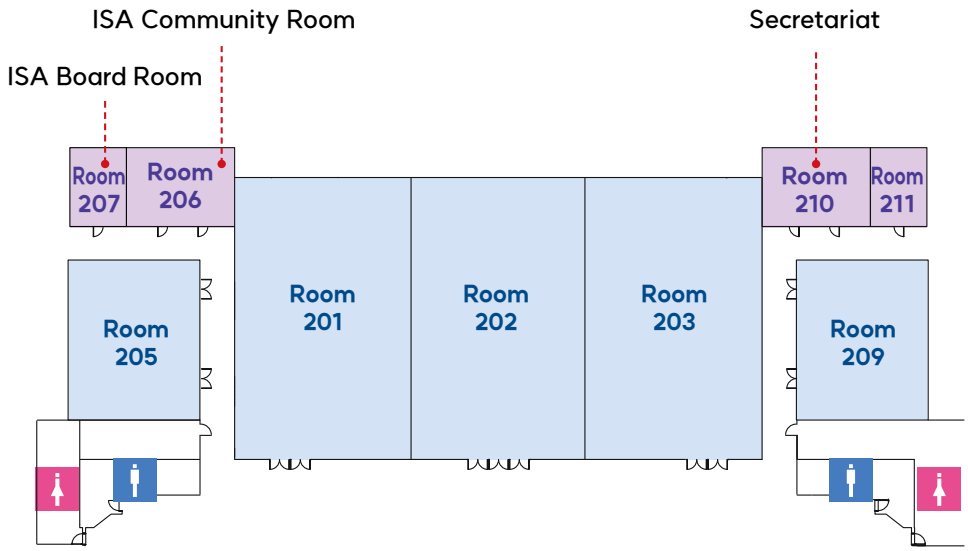
Floor Plan

1F Grand Ballroom(GBR) & Hall B2

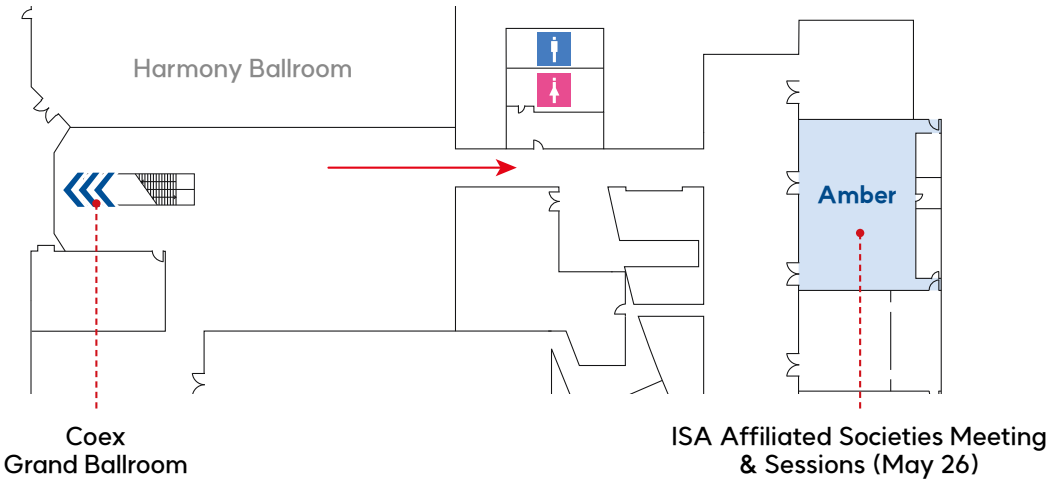


Floor Plan

2F ASEM Ballroom



LL (B1) The Westin Seoul Parnas



Program at a Glance

May 24 (Sun), 2026

Time	101	102	103	104	105
08:00					
09:00			08:50 The 81st Annual Conference of the Korean Audiological Society		
10:00					
11:00					
12:00					
13:00	13:00 WS 01 Acquisition and Analysis of Vestibular Evoked Myogenic Potentials (VEMP)	WS 02 Objective Assessment of Infant Hearing		WS 03 'The Force Awakens: Robots, Avatars and ASR in Clinical Audiology	WS 04 Navigating a Noisy World: Speech in Noise Tests
14:00	Coffee Break			Coffee Break	
15:00	14:40	WS 05 NAL-NL3: A New Era in Hearing Aid Fitting and Clinical Best Practice		WS 06 Approaches and Practical Applications for Psychoacoustic Experiments	WS 07 Management Options and Strategies in Tinnitus Patients
16:00	Break			Break	
17:00	16:20 16:40 SP 01 Pre-Congress Sponsored Symposium (Cochlear)	WS 08 Diagnosis and Treatment of Central Auditory Processing Disorders		WS 09 Functional and Otolith-driven Assessment of Vestibular Function: fHIT and vOCR	WS 10 Is It Time to Move Beyond 226 Hz Tympanometry?
18:00		18:00 Welcome Reception			
19:00					

May 25 (Mon), 2026

Time	101	102	103	104	105	201	202	203	205	209	Time
07:00											07:00
08:00	Exhibition & Posters (Hall B2, 1F)		07:45 Opening Ceremony 08:15 PL 01 Future Perspectives in Audiology and AI, New Technologies								08:00
09:00											09:00
10:00	09:50 PS 01 New Perspectives of Auditory Objective Measures	PS 02 Innovative Auditory Training Approaches for Cognitive Enhancement	PS 03 Candidacy for Auditory Implants: Who Can Benefit?	PS 04 Understanding the Impact of OTC Hearing Aids and PSAPs on Audiological Practice	PS 05 Diagnosis of (C)APD with Diverse Phenotype	PS 06 e-Health	OP 01 Genetics and Implications	SS 01 British Society of Audiology (BSA)	OP 02 Global Audiology and Public Health I	OP 03 09:50 Vertigo and Balance Disorders	10:00
11:00	11:10 PS 07 Hearing Screening	PS 08 The Impact of Early Intervention on Audiological Rehabilitation	PS 09 Auditory Implants: Outcomes & Future Directions I	PS 10 The Role of Hearing Aids in Cognitive Health and Aging	PS 11 (C)APD-Rehabilitation Issue	PS 12 Noise & Hearing	OP 04 Aging and Cognition	SS 02 American Academy of Audiology (AAA)	OP 05 Global Audiology and Public Health II	OP 06 11:10 Tinnitus and Hyperacusis	11:00
12:00	12:30 Lunch	SP 02 Luncheon Symposium (Cochlear)	Lunch							12:30	12:00
13:00											13:00
14:00	13:30 PS 13 Healthy Hearing & Equity	PS 14 Counseling and Psychosocial Support in Audiology Rehabilitation	PS 15 Auditory Implants: Surgical Considerations	PS 16 Patient Engagement and Satisfaction in Teleaudiology Fitting	PS 17 Audition and Neuroplasticity	PS 18 International Best Practices in Audiology	OP 07 Global Audiology and Public Health III	SS 03 Spanish Association of Audiology (AEDA)	OP 08 Auditory Implants I	OP 09 13:30 Future E-Health, Innovative Technology and Therapies I	14:00
15:00	14:50 PS 19 Pediatric Audiological Diagnosis	PS 20 Speech & Language Disorders (Voice Disorders & Hearing Loss)	PS 21 Cognition & Central Plasticity after Auditory Implants	PS 22 Recent Advances in Hearing Aid Technology	PS 23 Cutting-edge Research in Vestibular Function and Disorders	SS 04 International Evoked Response Audiometry Study Group (IERASG)	OP 10 Global Audiology and Public Health IV	SS 05 Brazilian Academy of Audiology (ABA)	OP 11 Auditory Processing I	OP 12 14:50 Future E-Health, Innovative Technology and Therapies II	15:00
16:00											16:00
17:00	16:25 PS 24 Hyperacusis/ Misophonia	PS 25 To Tell or Not to Tell: Navigating Hearing Loss Stigma	PS 26 Programming of Auditory Implants & Advanced Rehabilitation	PS 27 Clinical Applications of Bone Conduction Hearing Aids	PS 28 Vestibular Disorders and Their Impact on Quality of Life	SS 06 French Society of Audiology (SFA)	OP 13 Others	SS 07 German Society of Audiology (DGA)	OP 14 Hearing Disorders I	OP 15 16:25 Auditory Screening and Diagnosis I	17:00
18:00			18:30 K-POP Dance Workshop (Grand Ballroom Lobby)								18:00
19:00											19:00

May 26 (Tue), 2026

Program at a Glance

Time	101	102	103	104	105	201	202	203	205	209	Amber	Time
07:00			07:45 PL 02 When Audiology Meets Auditory Neuroscience: Bridging Clinical Practice and Brain Science									07:00
08:00												08:00
09:00			09:05 Aram Glorig Ceremony									09:00
	Coffee Break											
10:00	10:00 PS 29 Tele-audiology	PS 30 Diagnostic Protocols of SSD and Asymmetric Hearing Loss	PS 31 Auditory Implants: Outcomes & Future Directions II	PS 32 WHO: Deafness & Hearing Loss	PS 33 Measurement of Tinnitus	SS 08 Japan Audiological Society (JAS)	BOP 01 Best Oral Presentation 01	SS 09 New Zealand Audiological Society (NZAS)	OP 16 Hearing Aids I	OP 17 Auditory Processing II	OP 18 10:00 Hearing Disorders II	10:00
11:00	11:20 PS 34 AI/Big Data	PS 35 Innovative Applications of Speech Audiometry	PS 36 Intra- & Post-operative Evaluation for Auditory Implants	PS 37 Bringing WHO Guidance on Community-Level Ear and Hearing Care Programs into Practice	PS 38 Personalized Tinnitus Management	OP 19 Hearing Disorders III	BOP 02 Best Oral Presentation 02	SS 10 Nordic Audiology Society (NAS)	OP 20 Hearing Aids II	OP 21 Auditory Processing III	11:20	11:00
12:00	12:40 Lunch		SP 03 Luncheon Symposium (Alteogen Biologics)	Lunch							12:40 ISA Affiliated Societies Meeting	12:00
13:00												13:00
14:00	13:40 PS 39 Hearing and Social Connection Across Aging	PS 40 Hearing and Other Developmental Disorders	PS 41 AI for the Ear and Beyond (CAN)	PS 42-43 Public Health Planning for Hearing Impairment (PHPHI)	PS 44 Rethinking Tinnitus: Moving Beyond Neural Correlates	SS 11 British Academy of Audiology (BAA)	BOP 03 Best Oral Presentation 03	SS 12 International Bureau for Audiophonologie (BIAP)	OP 22 Auditory Implants II	OP 23 Auditory Rehabilitation and Speech Perception I	PS 45 13:40 Global Outreach & Epidemiology	14:00
15:00	15:00 PS 46 Treatment for Objective Tinnitus	PS 47 Diagnostic Protocols of Hidden Hearing Loss			PS 48 Tinnitus Treatment with Implantable Hearing Device	SS 13 Audiology Australia (AudA)	OP 24 Auditory Screening and Diagnosis II	SS 14 South African Association of Audiologists (SAAA)	OP 25 Auditory Implants III	OP 26 Auditory Rehabilitation and Speech Perception II	PS 49 15:00 Innovative Therapies	15:00
16:00												16:00
	Coffee Break											
17:00						SP 04 Sponsored Symposium (Cochlear)	17:00 ISA General Assembly		IN 01 Innovation Session	OP 27 Auditory Rehabilitation and Speech Perception III	16:35	17:00
18:00												18:00
19:00			18:30 Congress Dinner									19:00
20:00												20:00

Exhibition & Posters (Hall B2, 1F)

May 27 (Wed), 2026

Time	101	102	103	104	105	201	202	203	205	209	Time
07:00											07:00
08:00			07:45 PL 03 Audiology in Low Resource Regions: Diagnostics and Rehabilitation								08:00
09:00	Coffee Break					Coffee Break					09:00
10:00	09:20 PS 50 Speech, Language and Cognition I	PS 51 Epidemiology & Biology of Healthy Aging	PS 52 Genetics of Hearing Disorders	PS 53 New Technologies for Diagnosis and Treatment of Vestibular Disorders	PS 54 Psychoacoustics	SS 15 Indian Speech-Language and Hearing Association (ISHA)	PS 55 Engineering and Device Challenges in Tinnitus Therapy	SS 16 Taiwan Academy of Otology (TAO)	OP 28 Auditory Screening and Diagnosis III	OP 29 09:20 Auditory Implants IV	10:00
11:00	10:40 PS 56 Speech, Language and Cognition II	PS 57 Hearing Loss in Dementia	PS 58 Genetics: Implications and Therapeutics	PS 59 Vestibular Disorders in Special Populations	PS 60 Music Perception	SS 17 Beijing Society of Audiology (BSA)	OP 30 Auditory Neuroimaging and Tinnitus		OP 31 Auditory Screening and Diagnosis IV	OP 32 10:40 Auditory Implants V	11:00
12:00			12:00 Closing Ceremony								12:00
13:00											13:00
14:00											14:00
15:00											15:00
16:00											16:00
17:00											17:00
18:00											18:00
19:00											19:00

Exhibition & Posters

Official & Social Program

Welcome Reception

May 24 (Sun), 2026 | 18:00–19:30 | Grand Ballroom Lobby (1F)

The Welcome Reception marks the beginning of the congress and offers a valuable opportunity to connect with experts from across the globe. This event is included with registration and all registered participants are invited to join.

Opening Ceremony

May 25 (Mon), 2026 | 07:45–08:15 | Grand Ballroom 103

We cordially invite all participants to attend the Opening Ceremony, which formally opens the congress and provides a brief introduction to the days ahead. This gathering offers a moment for the global audiology community to come together and set the tone for an inspiring and meaningful meeting.

K-POP Dance Workshop

May 25 (Mon), 2026 | 18:30–20:00 | Grand Ballroom Lobby (1F)

Experience the energy of K-POP, a global music phenomenon, through our special dance workshop. Learn iconic choreography firsthand and connect with new friends while enjoying light refreshments.

Aram Glorig Ceremony

May 26 (Tue), 2026 | 09:05–09:45 | Grand Ballroom 103

The Aram Glorig Award, presented by the International Society of Audiology (ISA), honors outstanding contributions to the field of audiology. Established in 1982 in memory of Dr. Aram Glorig, it is one of ISA's most respected awards. This year's award recipient is Dr. Kathy Pichora-Fuller of the University of Toronto and Simon Fraser University, Canada.

ISA Affiliated Societies Meeting

May 26 (Tue), 2026 | 12:40–13:40 | Amber, The Westin Seoul Parnas

Representatives from ISA Affiliated Societies around the world will gather to engage in a global exchange of ideas, share their perspectives on emerging trends in audiology, and strengthen international collaboration across the field.

ISA General Assembly

May 26 (Tue), 2026 | 17:00–18:00 | ASEM Ballroom 202

ISA members and WCA attendees are invited to the ISA General Assembly. Attendees will receive key academic updates, engage in discussions on important audiology topics, and review the ISA's achievements, visions, and future global directions. The Assembly will conclude with the ISA Award Ceremony.

Congress Dinner

May 26 (Tue), 2026 | 18:30- | Grand Ballroom 103

Join us for the Congress Dinner, an elegant and highly anticipated highlight of the meeting. Enjoy a memorable evening featuring exceptional dining, engaging entertainment, and meaningful networking with colleagues from around the world.

* This is a ticketed event (USD 120). Tickets are now fully booked and are not available for purchase on-site.

Closing Ceremony

May 27 (Wed), 2026 | 12:00–12:30 | Grand Ballroom 103

Let us celebrate the end of a successful congress and share a gentle goodbye with one another. The Best Oral Presentation Awards, Best Poster Awards, and WCA 2026 Seoul Travel Grants will be presented during this time. The next WCA Congress will also be introduced.

General Information

Registration, Information & Hotel Desk

The registration, information and hotel desks are located in front of Hall B2 (1F), and are open throughout the congress period according to the following schedule.

May 24 (Sun)	11:00-19:00
May 25 (Mon)	07:00-18:00
May 26 (Tue)	07:30-18:00
May 27 (Wed)	07:30-12:30

Badges

Admission to all sessions and events during the congress is permitted by badge, official lanyard, and/or ticket only. Please wear your badge and official lanyard at all times.

Delegate's Registration Includes:

- Congress materials (Congress bag, program book, etc.)
- Welcome Reception, Opening Ceremony and Closing Ceremony
- Access to scientific sessions and exhibition
- Option to purchase workshops
- Option to purchase tickets for Congress Dinner
- Certificate of Attendance (available for self-printing near Registration Desk)

Accompanying Person's Registration Includes:

- Access to Welcome Reception and exhibition
- Option to purchase tickets for Congress Dinner

Coffee Breaks

Coffee breaks are held in the Grand Ballroom (1F) and ASEM Ballroom (2F) lobbies, according to the following schedule.

May 24 (Sun)	14:20-14:40
May 25 (Mon)	09:35-09:50 & 16:10-16:25
May 26 (Tue)	09:45-10:00 & 16:20-16:35
May 27 (Wed)	09:05-09:20

Lunches

Lunches are provided to delegates in session rooms, according to the following schedule.

May 25 (Mon)	12:30-13:30
May 26 (Tue)	12:40-13:40

Exhibition

Exhibition is held in the Hall B2 (1F), according to the following schedule.

May 25 (Mon)	09:00-18:00
May 26 (Tue)	09:00-18:30
May 27 (Wed)	09:00-13:00

Award Presentation

The Best Oral Presentation Awards, Best Poster Awards and WCA 2026 Seoul Travel Grants will be awarded during the Closing Ceremony on May 27 (Wed), 2026.

The ISA Student Scholarship Awards and ISA LMIC Travel Grant Awards will be presented during the ISA General Assembly on May 26 (Tue), 2026.

Congress App

To enhance the congress experience, the WCA 2026 Seoul mobile app provides access to the scientific program, speaker information, abstracts, the exhibitor directory, floor plans, and other general information. Please download the 'WCA 2026 Seoul' app from your mobile app store or scan the QR code provided.

Live Captioning Service

Live captions are available on screen in Room 103. You may also scan the QR Code and receive live captioning and translation directly to your phone. This service is provided only in Room 103.

Wi-Fi

Complimentary Wi-Fi is available at Coex. Please use the following access information.
Wi-Fi connection: Coex Free Wi-Fi Zone

Prayer Room

The Prayer Room is located on the 3rd floor (near Conference Room South 300) and is open according to the following hours.

- Operating hours: 08:30-18:00

Secretariat Office

The secretariat is located in Room 210.

Scientific Program

Session Type	Definition	Presentations
PL Plenary Session	A Plenary Session is a signature roundtable of ISA that brings together leading experts of audiology to explore the most significant advances and developments in the field with no parallel sessions. Three in total, each session is organized by a different body: one by the Local Organizing Committee, one by ISA and one selected through a vote by ISA members.	14
AG Aram Glorig Ceremony	During the Aram Glorig Ceremony, ISA honors an individual who has made a distinguished and lasting contribution to the field of Audiology. This year, ISA presents the Aram Glorig Award to Dr. Kathy Pichora-Fuller.	1
WS Workshop	A Workshop provides a hands-on learning experience, offering practical knowledge and in-depth discussions led by experts in the field. All workshops will be held on May 24 (Sun), 2026, and require a separate registration fee.	10
PS Planned Session	Planned Sessions constitute the core of the academic program, addressing a broad spectrum of topics and issues in audiology. Each 80-minute session is organized in either a symposium or roundtable format, featuring multiple presentations and/or discussions at the end.	276
FT Featured Talk	A Featured Talk may be given at the beginning of a Planned Session and will focus on the leading subject of the session in a 20–30 minute lecture.	6
SS Special Session	Participating ISA Affiliated Societies worldwide host Special Sessions highlighting their recent scientific contributions, innovative studies, and significant progress in the field.	82
BOP Best Oral Presentation Session	The Best Oral Presentation Session is a competitive session in which judges evaluate 25 selected oral presentations for the Best Oral Presentation Awards. The winners will be announced and honored during the Closing Ceremony.	25
OP Oral Presentation Session	An Oral Presentation Session features experts and professionals in audiology from around the world presenting their advanced research and emerging issues in focused 9-minute presentations.	261
PD Poster Display	Posters will be displayed throughout the Congress, featuring high-quality, scholarly work in audiology. Authors may present at their discretion, and participants are welcome to browse the posters at any time during exhibition hours.	337
GA ISA General Assembly	The ISA General Assembly offers ISA members and WCA attendees a platform to receive key academic updates, discuss important audiology topics, and review the ISA's achievements, visions, and future global directions. The Assembly concludes with the ISA Award Ceremony.	1
AS ISA Affiliated Societies Meeting	The ISA Affiliated Societies Meeting serves as a platform for representatives from ISA Affiliated Societies around the world to share insights on emerging trends in audiology, engage in meaningful dialogue, and advance international collaboration.	1
SP Sponsored Program	Leading companies in the audiology sector showcase their latest research, innovations, and technologies through these sessions, offering valuable insights into current industry developments and future directions.	6
IN Innovation Session	The Innovation Session presents rising companies in audiology as they showcase their latest research and innovative solutions, creating an engaging and exciting experience for participants.	3
Total		1,023

Speaker Ready Room

All speakers must visit the Speaker Ready Room, located near the registration desk, to submit the final version of their presentation files and check their presentation materials. The Speaker Ready Room operates according to the following schedule.

May 24 (Sun)	08:00-19:00
May 25 (Mon)	07:00-18:00
May 26 (Tue)	07:30-18:00
May 27 (Wed)	07:30-11:30

Best Oral Presentation & Best Poster Award

WCA 2026 Seoul will present Best Oral Presentation Awards and Best Poster Awards to papers featuring groundbreaking research in the field of audiology. A total of ten winners will be awarded: Five winners for the Best Oral Presentation and five winners for the Best Poster. The award presentation is held during the Closing Ceremony on May 27 (Wed), 2026.

Abstracts

You can download the Abstract Book from the Congress mobile application, as well as from the WCA 2026 Seoul website. Please download the 'WCA 2026 Seoul' app from your mobile app store or scan the QR code provided.

09:50-11:10 | May 25 | Rm. 101

PS 01	New Perspectives of Auditory Objective Measures	
Moderators	Joseph ATTIAS (Israel) Lee-Suk KIM (Korea)	
09:50	**Towards a groundbreaking brain measure: Direct recording of auditory cortical potentials through cochlear implants** Joseph ATTIAS (Israel)	PS 01-1
10:02	**Using fNIRS technology to assist management of auditory neuropathy and candidate selection and post-implant programming of infants with cochlear implants** Colette MCKAY (Australia)	PS 01-2
10:14	**Electrocochleographic patterns predicting increased impedances and hearing loss after cochlear implantation** Stephen O'LEARY (Australia)	PS 01-3
10:26	**Proposal of new hearing preservation criteria based on preoperative hearing evaluations and intraoperative monitoring of auditory brainstem response and dorsal cochlear nucleus action potential in vestibular schwannoma surgery** Naoki OISHI (Japan)	PS 01-4
10:38	**Using machine learning algorithms to detect infant responses to sound using facial behaviour analysis** Anisa VISRAM (UK)	PS 01-5

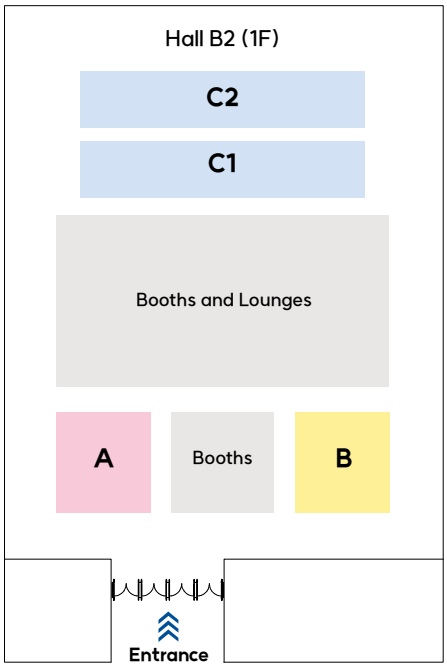
Presentation No.

Posters

Posters are displayed in the Hall B2 (1F) during the congress period, according to the following schedule. Presenters are required to bring their own printed posters, place them on their assigned boards and remove them during the set-up and removal times respectively. There is no mandatory standing time. Authors may present at their discretion, and participants are free to browse the posters at any time.

Display Hours	May 25 (Mon) 09:00–18:00 May 26 (Tue) 09:00–18:30 May 27 (Wed) 09:00–12:00
Poster Set-up	May 24 (Sun) 15:00–19:00
Poster Removal	May 27 (Wed) 12:00–13:00 *Presenters are requested to adhere to the removal schedule. *Posters that remain after 13:00 will be removed without notice and will not be kept.

Topic	Poster Area	Poster Final No.
• Auditory Neuroimaging and Neuroplasticity • Auditory Screening and Diagnosis • Genetics and Implications • Hearing Disorders	A	PD 001 ~ PD 069
• Auditory Processing • Global Audiology and Public Health • Psychoacoustics and Transitional Research	B	PD 070 ~ PD 138
• Aging and Cognition • Auditory Rehabilitation and Speech Perception • Hearing Aids • Vertigo and Balance Disorders	C1	PD 139 ~ PD 237
• Auditory Implants • Future E-Health, Innovative Technology and Therapies • Tinnitus and Hyperacusis • Others	C2	PD 238 ~ PD 357



Scientific Program

13:00-14:30 | May 24 | Rm. 101

WS 01 **Acquisition and Analysis of Vestibular Evoked Myogenic Potentials (VEMP)**

Moderator	Andy J. BEYNON (The Netherlands)	WS 01
Co-Presenter	Karen C. HENDRICK (USA)	

13:00-14:20 | May 24 | Rm. 102

WS 02 **Objective Assessment of Infant Hearing**

Moderator	James W. HALL III (USA)	WS 02

13:00-14:20 | May 24 | Rm. 104

WS 03 **The Force Awakens: Robots, Avatars and ASR in Clinical Audiology**

Moderators	Jan-Willem WASMANN (The Netherlands)	WS 03
	Gloria ARAIZA-ILLAN (The Netherlands)	

13:00-14:20 | May 24 | Rm. 105

WS 04 **Navigating a Noisy World: Speech in Noise Tests**

Moderator	Mridula SHARMA (Australia)	WS 04
Speakers	Fauve DUQUETTE-LAPLANTE (Australia) Suzanne C. PURDY (New Zealand) Greg A. O'BEIRNE (New Zealand) Nan XU (Australia)	

14:40-16:00 | May 24 | Rm. 102

WS 05 **NAL-NL3: A New Era in Hearing Aid Fitting and Clinical Best Practice**

Moderator	Pádraig KITTERICK (Australia)	WS 05
Speaker	Bettina TURNBULL (Australia)	

14:40-16:00 | May 24 | Rm. 104

WS 06 **Approaches and Practical Applications for Psychoacoustic Experiments**

Moderator	Yonghee OH (USA)	WS 06

14:40-16:00 | May 24 | Rm. 105

WS 07 **Management Options and Strategies in Tinnitus Patients**

Moderator	Jae-Jin SONG (Korea)	WS 07
Speakers	Jae-Jin SONG (Korea) In Seok Moon (Korea) In Ki JIN (Korea) Ho Yun LEE (Korea)	

16:20-17:40 | May 24 | Rm. 102

WS 08 **Diagnosis and Treatment of Central Auditory Processing Disorders**

Moderator	William KEITH (New Zealand)	WS 08
Speakers	Suzanne C. PURDY (New Zealand) Joan Huan LEUNG (New Zealand) Leanne MA (New Zealand)	

16:20-17:40 | May 24 | Rm. 104

WS 09 **Functional and Otolith-driven Assessment of Vestibular Function: fHIT and vOCR**

Moderator	Devin L. MCCASLIN (USA)	WS 09

16:20-17:40 | May 24 | Rm. 105

WS 10 **Is It Time to Move Beyond 226 Hz Tympanometry? Why Wideband Acoustic Immittance (WAI) Should Be the New Standard of Care for Middle Ear Assessment Across the Lifespan**

Moderator	Navid SHAHNAZ (Canada)	WS 10

16:40-17:40 | May 24 | Rm. 101

SP 01 **Pre-congress Sponsored Symposium - Cochlear Osia in Practice: Indications, Outcomes, and Surgical Tips**

Moderator	Jun Ho LEE (Korea)	
16:40	**Indications and outcomes of Osia System** Hyung Ho CHO (Korea)	SP 01
17:10	**Clinical experiences of OSI300: Surgical tips and pitfalls** In Seok MOON (Korea)	SP 01

08:15-09:35 | May 25 | Rm. 103

PL 01 Future Perspectives in Audiology and AI, New Technologies

Moderator: Nicky CHONG-WHITE (Australia)

08:15	**Why you shouldn't care about AI in hearing aids** Brent EDWARDS (Australia)	PL 01
08:21	**What is the patient benefit of AI-based signal processing in hearing aids?** Stefan LAUNER (Switzerland)	PL 01
08:27	**AI to enhance the hearing care journey** Maren STROPAHL (Switzerland)	PL 01
08:33	**Future approaches to personalized hearing-aid fitting** Jeppe Høy CHRISTENSEN (Denmark)	PL 01
08:39	**Computer hears NO! An unheard tale of misrepresentation by machines** Jan-Willem WASMANN (The Netherlands)	PL 01
08:45 ~ 09:35	**Panel Discussion**	

09:50-11:10 | May 25 | Rm. 101

PS 01 New Perspectives of Auditory Objective Measures

Moderators: Joseph ATTIAS (Israel), Lee-Suk KIM (Korea)

09:50	**Towards a groundbreaking brain measure: Direct recording of auditory cortical potentials through cochlear implants** Joseph ATTIAS (Israel)	PS 01-1
10:05	**Using fNIRS technology to assist management of auditory neuropathy and candidate selection and post-implant programming of infants with cochlear implants** Colette MCKAY (Australia)	PS 01-2
10:20	**Electrocochleographic patterns predicting increased impedances and hearing loss after cochlear implantation** Stephen O'LEARY (Australia)	PS 01-3
10:35	**Proposal of new hearing preservation criteria based on preoperative hearing evaluations and intraoperative monitoring of auditory brainstem response and dorsal cochlear nucleus action potential in vestibular schwannoma surgery** Naoki OISHI (Japan)	PS 01-4
10:50	**Diagnostic value of wideband acoustic immittance in middle ear pathology: Clinical case evidence** José Juan BARAJAS DE PRAT (Spain)	PS 01-6

09:50-11:10 | May 25 | Rm. 102

PS 02 Innovative Auditory Training Approaches for Cognitive Enhancement

Moderator: Astrid VAN WIERINGEN (Belgium), See-Ok SHIN (Korea)

09:50	**Practising difficult conversations in hearing rehabilitation using virtual patients** Nicky CHONG-WHITE (Australia)	PS 02-1
10:05	**Music rehabilitation to enhance speech-in-noise perception and psychosocial wellbeing in pediatric and geriatric contexts** Chi Yhun LO (Australia)	PS 02-2
10:20	**ALICE: Improved speech in noise understanding with self-guided hearing care** Astrid VAN WIERINGEN (Belgium)	PS 02-3
10:35	**Implementing auditory training in adult cochlear implant rehabilitation** Eun Kyung JEON (USA)	PS 02-4
10:50	**Beyond speech understanding: The benefit dimensions of hearing care** Maren STROPAHL (Switzerland)	PS 02-5

09:50-11:10 | May 25 | Rm. 103

PS 03 Candidacy for Auditory Implants: Who Can Benefit?

Chairperson: Sang-Heun LEE (Korea)

Moderators: Luis LASSALETTA (Spain), Jun Ho LEE (Korea)

09:50	**Long-term hearing preservation in electric acoustic cochlear implant candidates** Thomas MAYR (Austria)	PS 03-1
10:05	**Can an individual with low frequency hearing in the candidate ear benefit from a cochlear implant even if they have normal hearing in the other ear?** Anita OBRYCKA (Poland)	PS 03-2
10:20	**Impact of unilateral vs. bilateral evaluation on CI candidacy and CI outcome** Ulrich HOPPE (Germany)	PS 03-3
10:35	**Cochlear implantation in vestibular schwannoma: Outcomes and realistic candidate selection** Luis LASSALETTA (Spain)	PS 03-4
10:50	**Clinical performance of the Osia® 3 System: Preliminary results in patients with mixed hearing loss** Hyong-Ho CHO (Korea)	PS 03-5

09:50-11:10 | May 25 | Rm. 104

PS 04 Understanding the Impact of OTC Hearing Aids and PSAPs on Audiological Practice

Moderators: Vinaya MANCHAIAH (USA), Sung Hwa HONG (Korea)

09:50 **Sound advice for delivering hearing health care for adults with mild-to-moderate hearing loss** PS 04-1
Vinaya MANCHAIAH (USA)

10:05 **What's in a name? Would a hearing aid by any other name sound as sweet?** PS 04-2
David MAIDMENT (UK)

10:20 **OTC hearing aids : An opportunity to enhance rehabilitative services in audiology practice** PS 04-3
Joseph MONTANO (USA)

10:35 **The benefits of personal sound amplification products on speech perception in noise** PS 04-4
Claude ALAIN (Canada)

10:50 **Clinical efficacy of over-the-counter hearing aids: Indications, performance, and practical considerations** PS 04-5
Young Sang CHO (Korea)

09:50-11:10 | May 25 | Rm. 105

PS 05 Diagnosis of (C)APD with Diverse Phenotype

Moderators: William KEITH (New Zealand), Ji-Hye HAN (Korea)

09:50 Featured Talk **Issues and trends in the diagnosis of central auditory processing disorder** PS 05-1
William KEITH (New Zealand)

10:10 **Auditory processing disorder: Hearing healthcare professionals' knowledge, practices and guidelines** PS 05-2
Doris-Eva BAMIOU (UK)

10:25 **Cortical auditory function in children with APD** PS 05-3
Suzanne C. PURDY (New Zealand)

10:40 **Cortical auditory evoked responses as a measure of auditory processing** PS 05-4
Mridula SHARMA (Australia)

10:55 **Identification and treatment of dichotic deficits in children** PS 05-5
Deborah MONCRIEFF (USA)

09:50-11:10 | May 25 | Rm. 201

PS 06 e-Health

Moderators: Daijin KIM (Korea), Seong-Jun CHOI (Korea)

09:50 **Digital healthcare & health equity: Better world with technology** PS 06-1
Hee HWANG (Korea)

10:05 **Development and clinical evaluation of HearRO: A mobile digital therapeutic for auditory rehabilitation in older adults with age-related hearing loss** PS 06-2
Daijin KIM (Korea)

10:20 **Advancing real-world audiology: Integrating smartphone-based hearing outcomes with passive wearable sensing** PS 06-3
Jeppe Høy CHRISTENSEN (Denmark)

10:35 **An AR game for in-home training of spatial auditory attention** PS 06-4
Sungyoung KIM (Korea)

09:50-11:10 | May 25 | Rm. 202

OP 01 Genetics and Implications

Moderators: Monika OLDAK (Poland), Donggu HUR (Korea)

09:50 **412 families' whole genome sequencing in early onset hearing loss: The French Reference Center's experience** OP 01-1
Sandrine MARLIN (France)

09:59 **Functional characterization of genetic variants using a minigene assay: Elucidating the pathogenic mechanisms of splicing defects in hearing loss genes** OP 01-2
Monika OLDAK (Poland)

10:08 **Differential impact of genetic etiology on speech perception in noise and language in children who use hearing aids** OP 01-4
Ryan MCCREERY (USA)

10:17 **Hearing impairment and vestibular function in patients with a pathogenic splice variant in the LHX3 gene** OP 01-5
Åsa KJELLGREN (Sweden)

10:26 **Deciphering the genetic background of autosomal dominant hearing loss** OP 01-6
Dominika OZIEBLO (Poland)

10:35 **Myhre syndrome revealed by temporal bone CT: An unusual presentation mimicking juvenile otosclerosis** OP 01-7
Delphine DUPIN-DEGUINE (France)

09:50-11:10 | May 25 | Rm. 203

SS 01 — **British Society of Audiology (BSA) - Emerging Clinical Innovation: National Collaboration and Quality**

Moderators: Silvia DI BONAVENTURA (UK), Verity LANGLANDS (UK)

09:50 **Introduction and opening remarks**
Driving innovation through national collaboration — SS 01
Verity LANGLANDS (UK)

10:00 **From evidence to clinical practice: Implementing electrophysiology guidance** — SS 01
Siobhan BRENNAN (UK)

10:20 **Auditory Processing Disorder: Evidence, guidance and emerging practice** — SS 01
Silvia DI BONAVENTURA (UK)

10:40 **Advancing practice for complex audiological needs** — SS 01
Verity LANGLANDS (UK)

11:00 **Closing remarks**
Turning insights into action: Future directions — SS 01
Silvia DI BONAVENTURA (UK)

09:50-11:10 | May 25 | Rm. 205

OP 02 — **Global Audiology and Public Health I**

Moderators: Christopher BRENNAN-JONES (Australia), Chi-Kyou LEE (Korea)

09:50 **Emergency preparedness for natural hazards: A role for the hearing healthcare sector** — OP 02-1
Brigit MAGUIRE (Australia)

09:59 **The recent 5-year implementation and development of person-centred care in hearing rehabilitation in China** — OP 02-2
Mei Dingxiang FENG (China)

10:08 **WHO learning on TAP initiative: New training modules for frontline health workers to deliver hearing aids & assistive products** — OP 02-3
Patricia DUCHESNEAU (Canada)

10:17 **Ear portal: Using asynchronous tele-audiology to improve access to ear, nose and throat services for children with otitis media in an urban area** — OP 02-4
Christopher BRENNAN-JONES (Australia)

10:26 **Benefits of a Spanish-language hearing loss self-management program: Results from a randomized controlled trial** — OP 02-5
Michelle ARNOLD (USA)

10:35 **The CONtroll of VENtilation TUbes (ConVenTu): A randomized clinical non-inferiority trial comparing otolaryngology surveillance to observation in general practice. Audiological results and complication data** — OP 02-6
Rikki Kyle Kotyk YAHIRO (Norway)

10:44 **Capacity development in pediatric audiology in Peru: Integrating hearing aid data into training evaluation** — OP 02-7
Jacqueline DREXLER (Switzerland)
Rosario URDANIVIA MORALES (Switzerland)

10:53 **Expanding the functional profile of hearing disability: Evidence for including balance and mobility categories in the ICF core sets for hearing loss** — OP 02-8
Razan ALFAKIR (USA)

11:02 **Global disparities in hearing care services and infrastructure: Findings from an international provider survey** — OP 02-9
Christopher WATERWORTH (Australia)

09:50-11:10 | May 25 | Rm. 209

OP 03 — **Vertigo and Balance Disorders**

Moderators: Sébastien SCHMERBER (France), Min Young LEE (Korea)

09:50 **Long-term efficacy of dexamethasone treatment via tympanic antrum catheterization for intractable Meniere's disease** — OP 03-1
Yafeng LYU (China)

09:59 **Functional balance in deaf school-aged children** — OP 03-2
Sphilile MBHELE (South Africa)

10:08 **Cognitive load and gaze stability: Exploring the limits of the vestibulo-ocular reflex under dual-task conditions** — OP 03-3
Muhammed AYAS (UAE)

10:17 **Topographic brain mapping of motion sickness using electroencephalography and virtual reality** — OP 03-4
Emel UGUR (Türkiye)

10:26 **The clinical relevance of the skull vibration-induced nystagmus test in minor syndrome** — OP 03-5
Sébastien SCHMERBER (France)

10:35 **Synergistic effects of noisy galvanic vestibular stimulation with rehabilitation on cognitive function in unilateral peripheral vestibulopathy: A dual-task study** — OP 03-6
Mansoureh ADEL GHAHRAMAN (Iran)

10:44 **7-Tesla sodium magnetic resonance imaging of the inner ears in Ménière's disease: An exploratory study** — OP 03-7
Steve CONNOR (UK)

10:53 **Dynamic head tilt enhances the diagnostic accuracy of subjective visual vertical and horizontal in detecting peripheral vestibular disorders** — OP 03-8
Nurul Aisyah MOHD REDUZAN (Malaysia)

11:02 **Long-term efficacy of transtympanic dexamethasone phosphate 4 mg in adults with refractory unilateral Ménière's disease: An 84-month follow-up study** — OP 03-9
Elena Sergeevna YANYUSHKINA (Russia)

11:10-12:30 | May 25 | Rm. 101

PS 07 Hearing Screening

Moderators: Katrin NEUMANN (Germany), Hyunsook JANG (Korea)

11:10	**Global disparities in newborn hearing screening and how to achieve UNHS** Katrin NEUMANN (Germany)	PS 07-1
11:22	**Estimated coverage of universal newborn hearing screening in Brazil (2008–2024): Expansion, regional diversity and sustainability within a universal public health system** Monica Jubran CHAPCHAP (Brazil)	PS 07-2
11:34	**The screening-to-outcome gap in EHDI: Structural and commercial determinants** Vidya RAMKUMAR (India)	PS 07-3
11:46	**The potential value of hearing screening after the newborn period** André GOEDEGEBURE (The Netherlands)	PS 07-4
11:58	**CGHH Hearing Pathways Working Group: Preschool hearing screening and intervention practices around the world** King CHUNG (USA)	PS 07-5
12:10	**Early hearing loss detection in India: Survey insights from a high-burden, low-resource context** Kalyani N. MANDKE (India)	PS 07-6

11:10-12:30 | May 25 | Rm. 102

PS 08 The Impact of Early Intervention on Audiological Rehabilitation

Moderators: Lena WONG (Hong Kong SAR), Jae-Yun JUNG (Korea)

11:10	Featured Talk **A new and only tool to assess and differentiate the effects of hearing and cognitive function on speech understanding in 5-10 minutes** Lena WONG (Hong Kong SAR)	PS 08-1
11:35	**Different time courses of maturation for learning and generalization following auditory training in children** Yael ZALTZ (Israel)	PS 08-2
11:47	**From data to dialogue: How families are redefining hearing outcomes** Jermy PANG (Australia)	PS 08-3
11:59	**Effect of early deafness on the discrimination of pure tone, syllable, and intonation** Fikri Mirza PUTRANTO (Indonesia)	PS 08-4
12:11	**Audiological outcomes of auditory brainstem (ABI) implant in postlingual patients: Malaysian experience** Ing Ping TANG (Malaysia)	PS 08-5

11:10-12:30 | May 25 | Rm. 103

PS 09 Auditory Implants: Outcomes & Future Directions I

Chairperson: Sun O CHANG (Korea)

Moderators: Michael TONG (Hong Kong SAR), Jae Young CHOI (Korea)

11:10	Featured Talk **Toward optogenetic hearing restoration** Tobias MOSER (Germany)	PS 09-1
11:30	**Tailoring cochlear implants : The path to personalization** Michael TONG (Hong Kong SAR)	PS 09-2
11:45	**Quality of life in hearing improvement surgery including cochlear implant** Sho KANZAKI (Japan)	PS 09-3
12:00	**Auditory plasticity through training in children using hearing aids and cochlear implants** Karen A. GORDON (Canada)	PS 09-4

11:10-12:30 | May 25 | Rm. 104

PS 10 The Role of Hearing Aids in Cognitive Health and Aging

Moderators: Susan STRAUSS (South Africa), Jinsook KIM (Korea)

11:10	**Associations of hearing aid use with health-related outcomes** Lauren DILLARD (USA)	PS 10-1
11:25	**Hearing loss, hearing aid use, and risk of dementia in older adults: Can hearing aids mitigate the risk?** Jesper Hvass SCHMIDT (Denmark)	PS 10-2
11:40	**The impact of hearing aids on cognitive health in aging adults** Ga-Young KIM (Korea)	PS 10-3
11:55	**Memory assessment in hearing aid clinics: Is it feasible to implement in a National Health Service(NHS) setting?** Rohani OMAR (UK)	PS 10-4

11:10-12:30 | May 25 | Rm. 105

PS 11 (C)APD - Rehabilitation Issue

Moderator: Hung THAI-VAN (France)

11:10	**Assessment of candidates for CAPD treatment** Jeanane M. FERRE (USA)	PS 11-2
11:22	**Auditory training for auditory processing disorders: Should we do it and what smartphone apps are available?** Doris-Eva BAMIOU (UK)	PS 11-3
11:34	**A comprehensive framework for assessing auditory processing functions in young children with developmental disorders associated with audition, cognition, and spoken language, based on Medwetsky's Spoken Language Processing Mechanisms** Kevin C. P. YUEN (Hong Kong SAR)	PS 11-4
11:46 ~ 12:06	**Panel Discussion**	

11:10-12:30 | May 25 | Rm. 201

PS 12 Noise & Hearing

Moderators: Sarah K. GRINN (USA), Dong-Kee KIM (Korea)

11:10	**Lowering the permissible noise exposure limit for tender ears: A systematic, cost-effective approach** Sarah K. GRINN (USA)	PS 12-1
11:25	**Ototoxicity: Overview of ototoxicity and the International Ototoxicity Management Group** Adrian FUENTE (Canada)	PS 12-2
11:40	**Noise-induced auditory damage affects hippocampus causing memory deficits in a model of early age-related hearing loss** Anna Rita FETONI (Italy)	PS 12-3
11:55	**The impact of occupational noise exposure on hyperacusis: A longitudinal population study of female workers in Sweden** Sofie FREDRIKSSON (Sweden)	PS 12-4

11:10-12:30 | May 25 | Rm. 202

OP 04 Aging and Cognition

Moderators: Ingrid GIELOW (Brazil), Da Jung JUNG (Korea)

11:10	**Developing a core outcome set for co-existing dementia and hearing loss** Nova MATHEW (UK)	OP 04-1
11:19	**The impact of age on attention network connectivity: A comparative study of middle-aged vs. older adults during attentional tasks** Hari Prakash PALANISWAMY (India)	OP 04-2
11:28	**Hearing loss, hearing aids, and cognitive change in older adults: Evidence from the Canadian longitudinal study on aging** Kyla MUNOZ GALARZA (Canada)	OP 04-3
11:37	**Cohort profile: The Chinese hearing solution for improvement of cognition in elders (CHOICE) study** Zaichao WU (China)	OP 04-4
11:46	**The Australian home care study: Prevalence and impact of hearing, vision and cognitive impairment among vulnerable older Australians** Lana WILSON (Australia)	OP 04-5
11:55	**Quantifying central auditory aging: Correlation of LLR responses to cognitive biomarkers** Sahana MURALIKRISHNA (India)	OP 04-6
12:04	**Duration-dependent effects and mediation pathway of auditory training on cognition in mild cognitive impairment: A secondary analysis of a randomized controlled trial** Leelavathi THAMIZHMANI (India)	OP 04-7
12:13	**A web-based, gamified, auditory-cognitive dual-task training for older adults with age-related hearing loss: A pilot randomized controlled trial** Yan Ivy ZHAO (Hong Kong SAR)	OP 04-8

11:10-12:30 | May 25 | Rm. 203

SS 02 American Academy of Audiology (AAA) Special Session

Moderator: Patricia GAFFNEY (USA)

11:15	**Updates on AAA Clinical Guidelines** Patricia GAFFNEY (USA)	SS 02
11:30	**Developing clinical speech recognition tools for children with mild hearing loss** Ryan MCCREERY (USA)	SS 02
11:45	**Automatic speech recognition for scoring of audiologic tests** Matthew FITZGERALD (USA)	SS 02
12:00	**Development of a novel rotational system to assess the vestibular system in infants and neonates** Devin L. MCCASLIN (USA)	SS 02
12:15	**Ear level cooling for otoprotection and otodiagnostics** Christopher SPANKOVICH (USA)	SS 02

11:10-12:30 | May 25 | Rm. 205

OP 05 Global Audiology and Public Health II

Moderators: Woongsang SUNWOO (Korea), Hun Yi Park (Korea)

11:10	**Stakeholder's needs and readiness towards implementation of tele-practice for identification and rehabilitation of children with hearing and speech-language disorders in the public health sector of South India** Neethi JESUDASS (India)	OP 05-1
11:19	**Is noise-induced hearing loss increasing among youth? A generational analysis of the national Swedish audiogram register** Cleo Georges TRAD (Sweden)	OP 05-2
11:28	**Audiology in extreme and recreational sports: Mapping the evidence through a scoping review** Selvarani MOODLEY (South Africa)	OP 05-3
11:37	**Hearing aid uptake and its predictors in the China health and retirement longitudinal study** John NEWALL (Australia)	OP 05-4
11:46	**The untapped frontier: Why preventing occupational hearing loss is audiology's next revolution** Dalia TSIMPIDA (UK)	OP 05-5
11:55	**External relations workstream of the World Hearing Forum** Peter THORNE (New Zealand)	OP 05-6
12:04	**Healthcare and human rights** Ilona ANDERSON (Austria)	OP 05-7
12:13	**Audiology technicians training in Cameroon: Task sharing to strengthen ear and hearing care services** Madison SAUNDERS (Canada) Patricia DUCHESNEAU (Canada)	OP 05-8
12:22	**Prevalence, disparities and associated factors in hearing loss and hearing device uptake across diverse populations: A systematic review** Manikkuge Dumini DE SILVA (Australia)	OP 05-9

11:10-12:30 | May 25 | Rm. 209

OP 06 Tinnitus and Hyperacusis

Moderators: Cilmara Cristina Alves Da Costa LEVY (Brazil), Ji Eun CHOI (Korea)

11:10	**Exploring attention network connectivity in tinnitus through the dual mechanisms of cognitive control framework: An ERP study** Keerthana RAJANBABU (India)	OP 06-1
11:19	**Redefining tinnitus care: The results of the DEFINE (Digital thErapy For Improved tiNnitus carE) randomised controlled trial of smartphone-delivered CBT** Joseph SALEM (UK)	OP 06-2
11:28	**Electric solutions: Using high-definition transcranial direct current stimulation (HD-tDCS) for tinnitus relief** Tharin SAYED (Australia)	OP 06-3
11:37	**A combined therapeutic strategy for tinnitus: Evaluating the efficacy of word-in-noise training and Tinnitus Retraining Therapy** Maryam SADEGHI JAM (Iran)	OP 06-4
11:46	**Bimodal therapy for tinnitus: The influence of cardiorespiratory coupling on treatment effectiveness** Ksenia SAMSONOVA (Russia)	OP 06-5
11:55	**Neural dynamics in tinnitus: Differential effects of hearing status on temporal brain activity variability** Haoliang DU (China)	OP 06-6
12:04	**Economic and social burden of tinnitus in France (2021-2022)** Jean-Charles CECCATO (France)	OP 06-7
12:13	**Neural and behavioral markers of hyperacusis in autism spectrum disorder** Kelly N. JAHN (USA)	OP 06-8

12:30–13:30 | May 25 | Rm. 102

SP 02 Luncheon Symposium – Cochlear
The Future of Hearing Delivered Today: The Cochlear Nucleus Nexa System

Moderator: Stu SAYERS (USA)

12:31	**Welcome from Cochlear** Stu SAYERS (USA)	
12:35	**Introducing innovation: The Cochlear Nucleus Nexa System** Brendan MURRAY (Australia)	SP 02
12:50	**Clinical experiences with the Nucleus Nexa System** Stephen O'LEARY (Australia) Jaime LEIGH (Australia)	SP 02
13:10	**Wrap up and close** Stu SAYERS (USA)	

13:30-14:50 | May 25 | Rm. 101

PS 13 Healthy Hearing & Equity

Moderator: Piers D. DAWES (Australia)

13:30	**Introduction** Piers D. DAWES (Australia)	PS 13
13:32	**Addressing barriers and exploring opportunities for equitable hearing health care** Sara MISURELLI (USA) Maichou LOR (USA)	PS 13-1
13:44	**How do ethnicity and upbringing influence perceptions of public stigma surrounding hearing loss** Suhani PATTANSHETTI (UK)	PS 13-2
13:54	**Barriers and facilitators to culturally responsive paediatric hearing care in England** Sathveeka KASTHURISAMY SOUNDARARAJAN (UK)	PS 13-3
14:04	**What is culturally responsive care and how to promote culturally responsive hearing services?** Mansoureh NICKBAKHT (Australia)	PS 13-4
14:14	**Community-based hearing care** Carrie L. NIEMAN (USA)	PS 13-5
14:24	**Readability and accessibility of online information about hearing/hearing loss treatments** Cailyn FURZE (Australia)	PS 13-6
14:34 ~ 14:50	**Q&A Discussion**	

13:30-14:50 | May 25 | Rm. 102

PS 14 Counseling and Psychosocial Support in Audiology Rehabilitation

Moderators: Inga HOLUBE (Germany), Junghak LEE (Korea)

13:30	**HearChoice: A digital decision tool to educate, engage and empower adults with hearing loss** Barbra TIMMER (Australia)	PS 14-1
13:45	**Ecological momentary assessment** Inga HOLUBE (Germany)	PS 14-2
14:00	**Examining mental fatigue in auditory rehabilitation: Impact of hearing loss and tinnitus** Satu Kristiina TURUNEN-TAHERI (Sweden)	PS 14-3
14:15	**Social-emotional well-being and adult hearing loss: Clinical recommendations** Barbra TIMMER (Australia)	PS 14-4
14:30	**Impact of hearing loss on emotion detection and how hearing aids may help** Catherine M. KWOK (Australia)	PS 14-5

13:30-14:50 | May 25 | Rm. 103

PS 15 Auditory Implants: Surgical Considerations

Moderators: Stephen O'LEARY (Australia), Sung Won CHAE (Korea)

13:30	**Monitoring hearing preservation during CI surgery: 5-stage promontory testing** Andy J. BEYNON (The Netherlands)	PS 15-1
13:45	**Aligning the coiling planes of the cochlea and the electrode array** Nozomu MATSUMOTO (Japan)	PS 15-2
14:00	**Automatic analysis of cochlear response during CI surgery for hearing preservation** Stephen O'LEARY (Australia)	PS 15-3
14:15	**Outcomes of cochlear implantation in patients with far-advanced otosclerosis** Piotr Henryk SKARZYNSKI (Poland)	PS 15-4
14:30	**Cochlear damage: Auditory consequences and clinical significance of the Threshold Equalizing Noise(TEN) test** Vinay SWARNALATHA NAGARAJ (Norway)	PS 15-5

13:30-14:50 | May 25 | Rm. 104

PS 16 Patient Engagement and Satisfaction in Teleaudiology Fitting

Moderators: Rebecca BENNETT (Australia), Chul-Hee CHOI (Korea)

13:30	**Development and implementation of national teleaudiology guidelines** Rebecca BENNETT (Australia)	PS 16-1
13:45	**Synchronous remote fine-tuning in aural rehabilitation: Clinical outcomes, patient engagement, and long-term effects** Milijana M. MALMBERG (Sweden)	PS 16-2
14:00	**Improving access through teleaudiology: Insights from patients and providers** Laura COCO (USA)	PS 16-3
14:15	**Expanding horizons of teleaudiology: Rethinking access and equity in hearing health care** Hye Yoon SEOL (Korea)	PS 16-4

13:30-14:50 | May 25 | Rm. 105

PS 17 Audition and Neuroplasticity

Moderators: Douglas E. H. HARTLEY (UK), Il Joon MOON (Korea)

13:30 **Functional near-infrared spectroscopy as a biomarker for speech perception and listening effort** — PS 17-1
Douglas E. H. HARTLEY (UK)

13:45 **Neural encoding and auditory perception in cochlear implant users** — PS 17-2
Shuman HE (USA)

14:00 **Understanding speech in noise difficulties in cochlear implant users through intracochlear eCAEP cortical measures** — PS 17-3
Joseph ATTIAS (Israel)

14:15 **Neural correlation of tracking speech in adverse listening condition** — PS 17-4
Yoonseob LIM (Korea)

14:30 **Neurofeedback training of auditory selective attention** — PS 17-5
Inyong CHOI (USA)

13:30-14:50 | May 25 | Rm. 201

PS 18 International Best Practices in Audiology

Moderator: James W. HALL III (USA)

13:30 **Introduction** — PS 18
James W. HALL III (USA)

13:35 **UK and European perspective** — PS 18
Verity LANGLANDS (UK)
Silvia DI BONAVENTURA (UK)

13:45 **South Asia perspective** — PS 18
Vidya RAMKUMAR (India)

13:55 **The shifting landscape of Audiology in Africa** — PS 18-3
Lucretia PETERSEN (South Africa)

14:05 **Australia, New Zealand, and Oceania perspective** — PS 18
Alicja MALICKA (Australia)

14:15 **South Korean and Southeast Asia perspective** — PS 18
Soo Hee OH (Korea)

14:25 **South and Central America perspective** — PS 18
Najlla Lopes De Oliveira BURLE (Brazil)

14:35 ~ 14:50 **Panel Discussion with audience participation**

13:30-14:50 | May 25 | Rm. 202

OP 07 Global Audiology and Public Health III

Moderators: Catherine MCMAHON (Australia), Jae Ho CHUNG (Korea)

13:30 **12-month follow-up of hearing screening outcomes among older Korean Americans: The K-HEARS screen study** — OP 07-1
Hae-Ra HAN (USA)

13:39 **Systematically together overcoming racism model** — OP 07-2
Catherine MCMAHON (Australia)

13:48 **Awareness and knowledge of speech, language, and hearing status among Bangladeshi citizens** — OP 07-3
S M TOUFIQ (Bangladesh)

13:57 **What insights can health professionals provide on the delivery of otitis media services in the Far West of South Australia?** — OP 07-4
Lisa CALLAHAN (Australia)

14:06 **Hearing protection under sociopolitical pressure: Barriers to HPD use among Palestinian workers in a fragmented regulatory landscape** — OP 07-5
Adnan M. SHEHABI (Palestine)

14:15 **A global view on hearing aid wearing time in adults** — OP 07-6
Charlotte VERCAMMEN (Switzerland)

14:24 **Hearing aid clinics in rural India** — OP 07-7
Patricia CASTRO (UK)

14:33 **Co-developing sustainable audiology services in low and middle income settings: A case study in Cambodia** — OP 07-8
Kelley GRAYDON (Australia)

13:30-14:50 | May 25 | Rm. 203

SS 03 Spanish Association of Audiology (AEDA) - New Horizons in Audiology Publishing: Towards a Global, Open, and Multilingual Scientific Community

Moderator: Carlos BENITEZ-BARRERA (USA)

13:30 **AUDITIO: Advancing Spanish-language audiology through scientific rigor and open access** — SS 03
Carlos BENITEZ-BARRERA (USA)

13:50 **Development and validation of Spanish-language audiological patient questionnaires: Current state and future directions** — SS 03
Oscar M. CAÑETE (Chile)

14:10 **Feasibility and utility of cognitive screening in Spanish hearing centers: A multicenter MoCA study** — SS 03-3
Raul SANCHEZ-LOPEZ (Denmark)

14:30 **Measurement to decision: ABR reliability and hearing-aid verification - Evidence published in AUDITIO** — SS 03
José Juan BARAJAS DE PRAT (Spain)

13:30-14:50 | May 25 | Rm. 205

OP 08 Auditory Implants I

Moderators: Robert EIKELBOOM (Australia); Young Sang CHO (Korea)

13:30 **Event-related potentials and task-related theta indices of auditory-cognitive coordination after early bilateral cochlear implantation** — OP 08-1
Ola BADARNI-ZAHALKA (Israel)

13:39 **Neural correlates of speech coding strategies for cochlear implants compared to normal hearing.** — OP 08-2
Ilja VENEMA (The Netherlands)

13:48 **Heat map patterns: Predicting array position, map stabilization and outcomes** — OP 08-3
Katie PLUM (USA)

13:57 **Revisiting the 60/60 referral rule for cochlear implant assessment for the Australian context** — OP 08-4
Robert EIKELBOOM (Australia)

14:06 **Verbal versus musical short-term memory in pediatric CI users: A comparison with typical-hearing peers and relation to music perception** — OP 08-5
Ahmet Alperen AKBULUT (Türkiye)

14:15 **Quantitative modeling of cochlear implant electrode impedances for research and clinical applications** — OP 08-6
Julia VELOSO DE OLIVEIRA (Germany)

14:24 **ECAP N1P2 latency may reflect the repolarisation speed of human spiral ganglion cells** — OP 08-7
Jason LIEN (UK)

14:33 **Predicting the feasibility of Matrix test in cochlear implant users using pure-tone audiometry and speech recognition in quiet** — OP 08-8
Jonathan FLAMENT (France)

14:42 **Remotely versus conventionally programmed cochlear implantation: A systematic review and meta-analysis** — OP 08-9
Mohamed Hamouda ELKASABY (Egypt)

13:30-14:50 | May 25 | Rm. 209

OP 09 Future E-Health, Innovative Technology and Therapies I

Moderators: Andreas SEELISCH (Canada); Jinsei JUNG (Korea)

13:30 **Extending the scope of audiologists in ENT service provision–advanced audiology practice in OME management** — OP 09-1
Michelle A. POKORNY (New Zealand)

13:39 **Artificial intelligence to support clinical preparation and documentation for adults with co-occurring hearing loss and post-stroke aphasia** — OP 09-2
Jisook PARK (USA)

13:48 **Sonological engineering in NICUs: Designing ethical AI-driven soundscapes for neonatal development and the active noise cancelling incubator** — OP 09-3
Artur C. JASCHKE (UK)

13:57 **Development and efficacy of virtual reality simulator in training of hearing test for audiologist** — OP 09-4
Yuseon BYUN (Korea)

14:06 **Objective and subjective outcomes of nuance audio glasses in real-world use among adults with perceived mild-to-moderate hearing loss** — OP 09-5
Tami HAREL-ARBELI (Israel)

14:15 **Healthy ears adaptive trial: Outcomes of a paediatric otolaryngology telehealth multidisciplinary review process for otitis media** — OP 09-6
Tanisha CAYLEY (Australia)

14:24 **Development and clinical verification of an AI-based personalized auditory rehabilitation platform for age-related hearing loss** — OP 09-7
Grace Jung Eun SHIN (Korea)

14:33 **Talk town: Game-based psychosocial habilitation for deaf and hard of hearing youth** — OP 09-8
Zoë HECTOR (New Zealand)

14:42 **Molecular biomarkers of neuroplasticity in prelingual deafness treatment by cochlear implantation in plasma (matrix metalloprotease 9 MMP-9) and in perilymph proteome** — OP 09-9
Monika MATUSIAK (Poland)

14:50-16:10 | May 25 | Rm. 101

PS 19 Pediatric Audiological Diagnosis

Moderators: Kevin J. MUNRO (UK); Eun Jin SON (Korea)

14:50 **Optimisation of visual reinforcement audiometry: A scoping review** — PS 19-1
Kevin J. MUNRO (UK)

15:05 **Striking the right balance: Uncovering the best minimal test battery for middle ear assessment in children** — PS 19-3
Navid SHAHNAZ (Canada)

15:20 **Children's DPOAE amplitude differences across countries suggest a hidden public health crisis** — PS 19-4
King CHUNG (USA)

14:50-16:10 | May 25 | Rm. 102

PS 20 Speech & Language Disorders (Voice Disorders & Hearing Loss)

Moderators: Deniz BAŞKENT (The Netherlands), Junghwa BAHNG (Korea)

14:50	**Perception of voice cues in school-aged children with hearing aids** Deniz BAŞKENT (The Netherlands)	PS 20-1
15:05	**Multifaceted voice characteristics in partial deafness individuals** Karol Wojciech MYSZEL (Poland)	PS 20-2
15:20	**The current states of clinical audiology practiced by Speech-Language-Hearing Therapists in Japan** Masae SHIROMA (Japan)	PS 20-3
15:35	**Mandarin fricative-affricate nonsense-word test: From lab to market - Insights from Malaysia** Foong Yen CHONG (Malaysia)	PS 20-4

14:50-16:10 | May 25 | Rm. 103

PS 21 Cognition & Central Plasticity after Auditory Implants

Moderators: Karen A. GORDON (Canada), Seung Hwan LEE (Korea)

14:50	**Cochlear implant in patients with inner ear malformations: Selection, surgery, results** Davide SOLOPERTO (Italy)	PS 21-1
15:05	**Can cochlear implants reduce developmental risks of single sided deafness in children?** Karen A. GORDON (Canada)	PS 21-2
15:20	**Cortical volumetric changes before and after cochlear implantation in postlingually deaf adults: Correlation with speech perception abilities** Hong Ju PARK (Korea)	PS 21-3
15:35	**Functional imaging for diagnostics and prognostics of cochlear implantation** Chen-Chi WU (Taiwan)	PS 21-4

14:50-16:10 | May 25 | Rm. 104

PS 22 Recent Advances in Hearing Aid Technology

Moderators: Paula FOLKEARD (Canada), Chul Won PARK (Korea)

14:50	**Multibeam processing technology improves hearing group conversations in a real-world food court environment** Paula FOLKEARD (Canada)	PS 22-1
15:05	**Speech perception outcomes with microphone & receiver in the ear (M&RIE) hearing aids in individuals with hearing impairment** Manjula PUTTABASAPPA (India)	PS 22-2
15:20	**Speech-in-noise listening in hearing aids with DNN-based real-time sound cleaning** Erol J. OZMERAL (USA)	PS 22-3
15:35	**"Free us from noise": Based on the evolution of deep learning technology** Kang-Hun AHN (Korea)	PS 22-4

14:50-16:10 | May 25 | Rm. 105

PS 23 Cutting-edge Research in Vestibular Function and Disorders

Moderators: Yi-Ho YOUNG (Taiwan), Seok Min HONG (Korea)

14:50	**Potential application of Hydrops MRI in otology** Yi-Ho YOUNG (Taiwan)	PS 23-1
15:05	**Direct assessment of gravity sensors to improve peripheral vestibular diagnosis** Choongheon LEE (USA)	PS 23-2
15:20	**Live imaging of the inner ear in an animal model of Meniere's disease** Akinobu KAKIGI (Japan)	PS 23-3
15:35	**Prospect of gene therapy for vestibular dysfunction** Audrey MAUDOUX (France)	PS 23-4

14:50-16:10 | May 25 | Rm. 201

SS 04 International Evoked Response Audiometry Study Group (IERASG) - The Potential of Potentials: What Auditory Evoked Potentials Can Tell Us About Hearing

Moderator: Andy J. BEYNON (The Netherlands)

14:50	**The International Evoked Response Audiometry Study Group (IERASG)** Andy J. BEYNON (The Netherlands)	SS 04
14:55	**What can we learn from examining cases of mixed hearing loss in infants assessed following newborn hearing screening?** Lisa CALLAHAN (Australia)	SS 04-1
15:05	**Preoperative assessment of auditory function using round-window and intracochlear eABR and the correlation to postoperative outcome** Martin WALGER (Germany)	SS 04-2
15:15	**Intracochlear electrocochleography and electrically evoked auditory brainstem responses in patients with auditory neuropathy spectrum disorders (ANSD)** George A. TAVARTKILADZE (Russia)	SS 04-3
15:25	**Sensitivity to changes in interaural phase as a function of frequency: Comparison of age effects measured with behavioral and electrophysiological tasks** John GROSE (USA)	SS 04-4
15:35	**Use of cortical auditory evoked potentials in cochlear-implanted children** Sabrina BOUZAID (France)	SS 04-5
15:45	**Rhythmic priming of phonetic perception in the context of aural rehabilitation: Electrophysiological responses to a prime that compensates for cochlea delay** David Jackson MORRIS (Denmark)	SS 04-6
15:55 ~ 16:10	**Panel Discussion and Q&A**	

14:50-16:10 | May 25 | Rm. 202

OP 10 **Global Audiology and Public Health IV**

Moderators: Christopher SPANKOVICH (USA); Chang Ho LEE (Korea)

14:50 **Differentiating diabetes mellitus types in association to hearing impairments: Cross-sectional analyses from the Canadian Longitudinal Study on Aging (CLSA)** — Adrian FUENTE (Canada) — OP 10-1

14:59 **Epidemiology of tinnitus** — Christopher SPANKOVICH (USA) — OP 10-3

15:08 **Is TikTok the way to engage? A content analysis of ear and hearing health information on TikTok** — Melinda EDMUNDS (Australia) — OP 10-4

15:17 **Hearing instruments management in crisis: Guideline for preparedness and hearing care during prolonged crises** — Limor LAVIE (Israel) — OP 10-5

15:26 **From exclusion to inclusion: Building cultural competency for deaf sign language users in audiology services** — Celia HULME (UK) — OP 10-6

15:35 **Advanced scope audiology in Western Australia: Expanding impact across tertiary care** — Roberta MARINO (Australia) — OP 10-7

15:44 **High rates of suppurative otitis media among children attending urban clinics in Goroka, Eastern Highlands Province, Papua New Guinea: A cross-sectional study** — Tamara VESELINOVIC (Australia) — OP 10-8

15:53 **Lifting the lid on bias: Audiologists, speech therapists, and the use of South African sign language in serving the deaf community** — Tsakane MATJEKE (South Africa) — OP 10-9

14:50-16:10 | May 25 | Rm. 203

SS 05 **Brazilian Academy of Audiology (ABA) - Ears of Tomorrow: Advances in Child Auditory Behavior Research in Brazil**

Moderator: Cilmara Cristina Alves Da Costa LEVY (Brazil)

14:50 **Integration between auditory processing and executive functions in childhood** — Eliane SCHOCHAT (Brazil) — SS 05-1

15:02 **From structure to function in childhood: How ear development shapes acoustic absorbance and DPOAE components** — Alessandra Spada DURANTE (Brazil) — SS 05-2

15:14 **Overcoming barriers: Strategies to improve early intervention adherence in low-income families with hearing-impaired Infants** — Beatriz C. NOVAES (Brazil) — SS 05-3

15:26 **From detection to intervention in newborns: A Brazilian experience** — Doris Ruthy LEWIS (Brazil) — SS 05-4

15:38 **Hearing and balance in children: Diagnostic challenges in hyperacusis, tinnitus, and vestibular assessment** — Fátima Cristina Alves BRANCO-BARREIRO (Brazil) — SS 05-5

15:50 **Language Environment Analysis (LENA) system as a tool for analyzing turn-talking and home auditory environment** — Cilmara Cristina Alves Da Costa LEVY (Brazil) — SS 05-6

14:50-16:10 | May 25 | Rm. 205

OP 11 **Auditory Processing I**

Moderators: Patricia GAFFNEY (USA); Junhui JEONG (Korea)

14:50 **Neural speech encoding advantages associated with higher socioeconomic status extend to noise conditions with differential susceptibility** — Anthony MARCOTTI (Chile) — OP 11-1

14:59 **Infants listening to stories in noise: A protocol** — Fauve DUQUETTE-LAPLANTE (Australia) — OP 11-2

15:08 **User-Operated Audible Contrast Threshold (U-ACT): An automated approach to assessing aided speech-in-noise performance** — Rezarta BARDHI (Denmark) — OP 11-3

15:17 **Age and sex differences in medial olivocochlear function related to reading acquisition** — Pierre REYNARD (France) — OP 11-4

15:26 **A systematic review and meta-analysis of auditory processing evaluation and interventions in autistic participants** — Vasiliki Maria ILIADOU (Greece) — OP 11-5

15:35 **Uncovering genetic comorbidities related to speech in noise deficits using polygenic risk score from two independent cohorts** — Srividya GRAMA BHAGAVAN (USA) — OP 11-6

15:44 **The new Cantonese Pediatric Monosyllabic-Word Picture Identification Dichotic Listening Test (CaPeMoPiDLT) is sensitive for identifying abnormal auditory processing in young Cantonese-speaking children with specific learning difficulties and ADHD** — Kevin C. P. YUEN (Hong Kong SAR) — OP 11-7

15:53 **Actual and optimal amplification dosage in the treatment of auditory processing disorder** — William KEITH (New Zealand) — OP 11-8

16:02 **Benefits of classroom remote microphone technology for inattentive children** — Lucy SHIELS (Australia) — OP 11-9

14:50-16:10 | May 25 | Rm. 209

OP 12 Future E-Health, Innovative Technology and Therapies II

Moderators: Craig LETT (New Zealand), HyunJung AN (Korea)

14:50	**Applications of augmented and virtual reality in enhancing communication for individuals who are hard of hearing** Ahmadreza NAZERI (Iran)	OP 12-1
14:59	**Evaluation of the hearcare MED-EL App: Remote configuration and technical check performance in cochlear implant users** Adna OMERAGIC BEJDIC (Austria)	OP 12-2
15:08	**Heliaural: Personalised, real-time audio calibration for everyday listening** Balandino DI DONATO (UK)	OP 12-3
15:17	**It's complicated: Predicting the uptake of teleaudiology by clinicians in New Zealand** Craig LETT (New Zealand)	OP 12-4
15:26	**AI-based analysis of tympanic membrane endoscopic images: Development of a diagnostic support model for otolaryngologists** Eun Kyung JEON (Korea)	OP 12-5
15:35	**From simulation to automation: Overcoming barriers and unlocking opportunities with disruptive technologies in audiology** Andreas SEELISCH (Canada)	OP 12-6
15:44	**How Auracast™ broadcast audio will broaden audio accessibility for everyone** Henry WONG (USA)	OP 12-7
15:53	**Speech intelligibility improvement effect of a soundbar equipped with a hearing-aid algorithm** Gianni DEIDDA (France)	OP 12-8
16:02	**The effect of pluronic-coated gold nanoparticles on hearing preservation following cochlear implantation: Pilot study** Alma Aurelia MANIU (Romania)	OP 12-9

16:25-17:45 | May 25 | Rm. 101

PS 24 Hyperacusis/Misophonia

Moderators: Fatima T. HUSAIN (USA), Sungil NAM (Korea)

16:25	**Using resting-state fMRI to understand the differences between hyperacusis and misophonia** Fatima T. HUSAIN (USA)	PS 24-1
16:40	**Characteristics of misophonia in the Korean population** Hyo Jung CHOI (Korea)	PS 24-2
16:55	**Clinical audiology practice patterns for sound hypersensitivity disorders** Kelly N. JAHN (USA)	PS 24-3
17:10	**The effect of hyperacusis and sound-induced auditory fatigue on work ability and sick leave among women** Sofie FREDRIKSSON (Sweden)	PS 24-4

16:25-17:45 | May 25 | Rm. 102

PS 25 To Tell or Not to Tell: Navigating Hearing Loss Stigma

Moderators: Louise HICKSON (Australia), Chang Hyun CHO (Korea)

16:25	**The big picture: Overview of our research on hearing loss stigma** Louise HICKSON (Australia)	PS 25-1
16:35	**Hearing loss stigma: Experiences from adults with hearing loss, families, and professionals** Mansoureh NICKBAKHT (Australia)	PS 25-2
16:45	**Responding to the stigma of hearing loss: The hidden work of adults, families, and clinicians in hearing care** Nerina SCARINCI (Australia)	PS 25-3
16:55	**Capturing real-world interactions: What ecological data reveals about hearing loss stigma** Barbra TIMMER (Australia)	PS 25-4
17:05	**Understanding hearing loss stigma and disclosure: Insights from adults and families across Australia, the United Kingdom, and the United States** Monique WAITE (Australia)	PS 25-5
17:15	**Who do you tell about your hearing loss: A new model for understanding stigma related to hearing loss** Katie EKBERG (Australia)	PS 25-6
17:25 ~ 17:45	**Panel Discussion**	

16:25-17:45 | May 25 | Rm. 103

PS 26 Programming of Auditory Implants & Advanced Rehabilitation

Moderators: George A. TAVARTKILADZE (Russia); Kyoung Ho PARK (Korea)

16:25 **A longitudinal analysis of vowel and consonant perception in quiet and noise using anatomy-based fitting cochlear implant map** — Cila UMAT (Malaysia) — PS 26-1

16:40 **Clinical electro-acoustic management in cochlear implant users: Pediatric considerations** — Son A CHANG (Korea) — PS 26-2

16:55 **Cochlear implant fitting by machine learning** — Hajime KOYAMA (Japan) — PS 26-3

17:10 **Remote programming of cochlear implant in adults: Current status within the French care pathway compared with international practices** — Amel MEKAOUI (France) — PS 26-4

17:25 **Advantages and utilization of telemedicine for cochlear implant users** — Kenichi TAKANO (Japan) — PS 26-5

16:25-17:45 | May 25 | Rm. 104

PS 27 Clinical Applications of Bone Conduction Hearing Aids

Moderators: Piotr Henryk SKARZYNSKI (Poland); Hyong-Ho CHO (Korea)

16:25 **Bone conduction implantation: 20 years of activity in Australia** — Robert EIKELBOOM (Australia) — PS 27-1

16:40 **Bone conductive implants: What to choose and when** — Piotr Henryk SKARZYNSKI (Poland) — PS 27-2

16:55 **Effect of skin on energy transmission of bone conduction transducers** — Namkeun KIM (Korea) — PS 27-3

17:10 **Bone conduction devices and active middle ear implants for adults** — Mimmi WERNER (Sweden) — PS 27-4

17:25 **Comprehensive audiological outcomes of the Osia® 2 system** — Young Joon SEO (Korea) — PS 27-5

16:25-17:45 | May 25 | Rm. 105

PS 28 Vestibular Disorders and Their Impact on Quality of Life

Moderator: Ja-Won KOO (Korea)

16:25 **Development of guidelines for diagnosis of vestibular disorders** — Kelsey HATTON (USA) — PS 28-1

16:40 **The impact of migraine and vestibular migraine on audiometric profiles and quality of life in patients with tinnitus** — Yu-Hsi LIU (Taiwan) — PS 28-2

16:55 **Peripheral and neural correlates of auditory dysfunction in chronic migraine: Clinical and preclinical evidence** — Wafaa KAF (USA) — PS 28-3

17:10 **Improving quality of life through vestibular rehabilitation** — Eun-Ju JEON (Korea) — PS 28-4

17:25 **Vestibular disorders across the lifespan: Impact on quality of life** — Nor Haniza ABDUL WAHAT (Malaysia) — PS 28-5

16:25-17:55 | May 25 | Rm. 201

SS 06 French Society of Audiology (SFA) Special Session

Moderator: Hung THAI-VAN (France) — SS 06

Exploring the mechanisms underlying third window and related abnormalities — Eugen Constant IONESCU (France) — SS 06-1

Contribution of functional and ASL MRI in exploring the central processing of sound information in groups of hearing-impaired children — Arnaud COEZ (France) — SS 06-2

Hearing aids fitting on children with APD: A correlation between PROMs and amplification — Cyrille COUDERT (France) — SS 06-3

Gene therapy for deafness: Current targets and clinical implementation — Natalie Jo LOUNDON (France) — SS 06-4

Cochlear implantation in adults with auditory neuropathy spectrum disorder: Auditory outcomes and prognosis factors — Isabelle MOSNIER (France) — SS 06-5

Efficacy of lip-reading training in adults with acquired hearing loss: A study in single case experimental design — Stéphanie BOREL (France) — SS 06-6

Assessment of listening effort and cognitive fatigue before and after cochlear implantation in adults — Emmanuèle AMBERT-DAHAN (France) — SS 06-7

From data to practice: How machine learning improves hearing aid efficacy in real-world settings — Catherine BOITEUX (France) — SS 06-8

16:25-17:45 | May 25 | Rm. 202

OP 13 Others

Moderators: Dianna VIDAS (Australia); Sung-Won CHOI (Korea)

16:25 **Top 10 research priorities on childhood deafness and hearing loss in the United Kingdom: Developed by children, families and professionals** OP 13-1
Jenny CHAN (UK)

16:34 **The collaborative journey: Supporting children with hearing loss from diagnosis through school** OP 13-2
Yu-Chen HUNG (Taiwan)

16:43 **A longitudinal exploration of hearing, social connection, and wellbeing of ageing adults in Australia** OP 13-3
Dianna VIDAS (Australia)

16:52 **Benefits of community-engaged learning in audiology education from the patient perspective** OP 13-4
Shari EBERTS (USA)

17:01 **Self-esteem and its determinants in cochlear implant recipients: A prospective cohort study** OP 13-5
Yun Ji LEE (Korea)

17:10 **The impact of hearing-related variables on the development of executive function in children with hearing loss** OP 13-6
Chia-Ying CHU (Taiwan)

17:19 **Applying agile learning principles to addressing the needs of the UK audiology workforce** OP 13-7
Siobhan BRENNAN (UK)

16:25-17:45 | May 25 | Rm. 203

SS 07 German Society of Audiology (DGA) - Audiological Care and Cochlear Implant Provision in Germany

Moderators: Uwe BAUMANN (Germany); Ulrich HOPPE (Germany)

16:25 **Prevalence of hearing loss in individuals with intellectual disabilities: A population-based long-term study** SS 07-1
Katrin NEUMANN (Germany)

16:38 **Cochlear implantation in Germany: Standardization of care through guidelines, certifications and registers** SS 07-2
Mark PRAETORIUS (Germany)

16:51 **Objective auditory assessment in CI candidates: Indication, test batteries and quality assurance** SS 07-3
Martin WALGER (Germany)

17:04 **Cochlear implantation, fitting and results in asymmetric hearing loss** SS 07-4
Ulrich HOPPE (Germany)

17:17 **Anatomy-based fitting versus standard mapping of CI-processors: Final results of a crossover randomized controlled intervention study** SS 07-5
Uwe BAUMANN (Germany)

17:30 **Hearing in tune: Music-based psychoacoustic frequency fitting in cochlear implant users** SS 07-6
Tobias RADER (Germany)

16:25-17:45 | May 25 | Rm. 205

OP 14 Hearing Disorders I

Moderators: Lahcen ADERDOUR (Morocco); Myung Hoon YOO (Korea)

16:25 **Auditory processing and its link to phonological awareness in children with a history of otitis media** OP 14-1
Mridula SHARMA (Australia)

16:34 **Neural correlates of post-blast speech-in-noise difficulties: Insights from MEG recordings** OP 14-2
Maxime NIESEN (Belgium)

16:43 **Low serum prestin level as a potential biomarker for sudden sensorineural hearing loss: A cross-sectional study** OP 14-3
Ni Putu Oktaviani RINIKA PRANITASARI (Indonesia)

16:52 **I' wave as a possible indicator of noise-induced cochlear synaptopathy** OP 14-4
Azadeh BORNA (Iran)

17:01 **Incidence, severity, and risk factors of platinum-induced ototoxicity in pediatric oncology patients: A multi-center retrospective study** OP 14-5
Min Young SHIN (Korea)

17:10 **Annual noise exposure among Malaysian young adults** OP 14-6
Onn Wah LEE (Malaysia)

17:19 **Auditory and vestibular dysfunction in New Zealand Friedreich's ataxia patients** OP 14-7
I. Zay MELVILLE (New Zealand)

17:28 **Hearing AIDS: Self-reported hearing loss is Linked to Antiretroviral therapy with and without HIV** OP 14-8
Riley DEBACKER (USA)

17:37 **Plasma cell-free mitochondrial DNA as a novel biomarker predicting treatment outcome in sudden sensorineural hearing loss** OP 14-9
Chao-Hui YANG (Taiwan)

17:46 **Self-perception of hearing health among emergency medical service providers in South Africa** OP 14-10
Selina MOREMOHOLO (South Africa)

16:25-17:45 | May 25 | Rm. 209

OP 15 **Auditory Screening and Diagnosis I**

Moderators: Doris Ruthy LEWIS (Brazil), Jeong-Seo KIM (Korea)

16:25	**Detection of hearing loss in Australian Defence Force personnel using a purpose-built portable diagnostic audiometry system** David SLY (Australia)	OP 15-1
16:34	**A test battery to evaluate solvent-induced auditory dysfunction** Adrian FUENTE (Canada)	OP 15-2
16:43	**Sound or speech? Evaluating stimulus type for pediatric directional hearing tests** Philipp ZELGER (Austria)	OP 15-3
16:52	**Evaluating the effects of an individually-modified chirp stimulus for auditory brainstem response recording** Gaziz TUFATULIN (Russia)	OP 15-4
17:01	**Improving early detection of developmental risk in young infants: Implementing a new screening tool as an indirect measure of post-natal hearing loss** Liat KISHON-RABIN (Israel)	OP 15-5
17:10	**Effect of insertion depth of insert earphones on hearing thresholds** Aksha DAYAL (India)	OP 15-6
17:19	**Echoes of change: Exploring OAE-based hearing screening for early to late teens** Angeline MEERKERK-MEIJER (The Netherlands)	OP 15-7
17:28	**Assessment of ambient noise levels in audiometric booths: A compliance study with ISO 8253-1** Donghyeok LEE (Korea)	OP 15-8

07:45-09:05 | May 26 | Rm. 103

PL 02 When Audiology Meets Auditory Neuroscience: Bridging Clinical Practice and Brain Science

Chairperson: Jong Woo CHUNG (Korea)

Moderators: Karen A. GORDON (Canada), Hyo-Jeong LEE (Korea)

07:45	**Cortical plasticity following congenital single-sided deafness** Andrej KRAL (Germany)	PL 02-1
08:00	**Motor contributions to speech perception: Context-dependent neural mechanisms and behavioural benefits** Claude ALAIN (Canada)	PL 02-2
08:15	**Developmental neuroplasticity in children with cochlear implants: How important is bilateral input?** Karen A. GORDON (Canada)	PL 02-3
08:30	**Neuroimaging markers of auditory processing disorder: Bridging brain and behavior in children with listening difficulties** Suzanne C. PURDY (New Zealand)	PL 02-4
08:45 ~ 09:05	**Panel Discussion**	

09:05-09:45 | May 26 | Rm. 103

AG Aram Glorig Ceremony

Moderator: Astrid VAN WIERINGEN (Belgium)

09:05	**Hearing and healthy aging: The imperative for communication accessibility** M. Kathleen PICHORA-FULLER (Canada)	AG 01

10:00-11:20 | May 26 | Rm. 101

PS 29 Tele-audiology

Moderators: Catherine MCMAHON (Australia), HyunJung AN (Korea)

10:00	**Featured Talk** **Beyond technology: Towards service equity** Vidya RAMKUMAR (India)	PS 29-1
10:20	**Telemedicine experiences at home healthcare clinic in Korea** Sun Young LEE (Korea)	PS 29-2
10:35	**Systems-based approaches to designing ear and hearing care programs: Examples from Australia and Thailand** Catherine MCMAHON (Australia)	PS 29-3
10:50	**Real world integration of remote care: The role of a decision matrix in improving access to care** Rebecca VERHOEF (Australia)	PS 29-4

10:00-11:20 | May 26 | Rm. 102

PS 30 Diagnostic Protocols of SSD and Asymmetric Hearing Loss

Moderators: Anna Rita FETONI (Italy), Woojae HAN (Korea)

10:00	**Clinical topic on the SSD management** Anna Rita FETONI (Italy)	PS 30-1
10:15	**From screening to candidacy: Practical CI assessment in pediatric SSD** Lisa R. PARK (USA)	PS 30-2
10:30	**HRTF individualization to optimize spatial perception in virtual environments** Hyo-Jeong LEE (Korea)	PS 30-3
10:45	**Behavioral and neural markers of speech-in-noise processing assessed by the digit-in-noise test** Ji-Hye HAN (Korea)	PS 30-4

10:00-11:20 | May 26 | Rm. 103

PS 31 Auditory Implants: Outcomes & Future Directions II

Moderators: Hubert LIM (USA), Sung Wook JEONG (Korea)

10:00	**Featured Talk** **Virtual cochlear implantation: Clinical outcomes** Andrej KRAL (Germany)	PS 31-1
10:30	**A retrospective study for binaural speech perception patterns in adult listeners with hearing aids and/or cochlear implants** Yonghee OH (USA)	PS 31-2
10:45	**Future of auditory prostheses beyond the cochlear implant: First-in-human results for a novel auditory nerve implant** Hubert LIM (USA)	PS 31-3
11:00	**When the sound stops: Psychosocial and clinical impacts of cochlear implant obsolescence – A qualitative sub-study** Jermy PANG (Australia)	PS 31-4

10:00-11:20 | May 26 | Rm. 104

PS 32 WHO: Deafness & Hearing Loss

Moderators: Andrew SMITH (UK), Shelly CHADHA (Switzerland)

10:00	**The World report on hearing: An integrated people centered approach** Shelly CHADHA (Switzerland)	PS 32-1
10:15	**Ear and hearing care accessible for all: WHO's role** Mario BUSTOS-RUBILAR (The Philippines)	PS 32-2
10:30	**World Hearing Day and related advocacy initiatives** James SAUNDERS (USA)	PS 32-3
10:45	**Make listening safe: Setting global standards for safe listening** Katya FREIRE (Brazil)	PS 32-4
11:00	**World Hearing Forum: Uniting to advocate for hearing care** Lauren DILLARD (USA)	PS 32-5

10:00-11:20 | May 26 | Rm. 105

PS 33 **Measurement of Tinnitus**

Moderators: Mehdi ABOUZARI (USA); Jae-Jin SONG (Korea)

10:00	**Standardizing tinnitus patient assessment: A Delphi consensus approach** Jae-Hyun SEO (Korea)	PS 33-1
10:15	**Comparing modified and standard tinnitus functional indices** Mehdi ABOUZARI (USA)	PS 33-2
10:30	**Audiological and psychological assessment of tinnitus patients with normal hearing** Ho Yun LEE (Korea)	PS 33-3
10:45	**Tinnitus and psychological aspects (biomarker)** Sho KANZAKI (Japan)	PS 33-4
11:00	**Objective measurement of tinnitus using functional near-infrared spectroscopy and machine learning** Mehrnaz SHOUSHTARIAN (Australia)	PS 33-5

10:00-11:20 | May 26 | Rm. 201

SS 08 **Japan Audiological Society (JAS) - Recent Advances in Japan Audiology Research**

Moderator: Tatsuo MATSUNAGA (Japan)

10:00	**Four-year changes identified through a municipal survey for early detection of hearing loss in older adults** Yasue UCHIDA (Japan)	SS 08-1
10:15	**Establishing standardized conditions for clinically available sound-localization tests: A multicenter approach** Tadao YOSHIDA (Japan)	SS 08-2
10:30	**Current status of auditory rehabilitation with hearing aids in Japan** Tadashi NISHIMURA (Japan)	SS 08-3
10:45	**Development of Japan's first comprehensive guidelines for LiD/APD based on stakeholder needs** Hirokazu SAKAMOTO (Japan)	SS 08-4
11:00	**Precision medicine for genetic hearing loss revamped by advances in information technology** Tatsuo MATSUNAGA (Japan)	SS 08-5

10:00-11:20 | May 26 | Rm. 202

BOP 01 **Best Oral Presentation 01**

Moderators: In Ki JIN (Korea); Kyung Wook HEO (Korea)

10:00	**Rare mutations in the PRKRA gene linked to mild cognitive impairment and tinnitus** Mai T. PHAM (Australia)	BOP 01-1
10:09	**Robotic insertion of cochlear implants helps preserve vestibular function in children** Enrica FABIANO (France)	BOP 01-2
10:18	**Economic evaluation of hearing rehabilitation strategies among older adults in Korea: Comparative cost-effectiveness of hearing aids and low-cost hearing technologies** Heonjeong OH (Korea)	BOP 01-3
10:27	**Population Hearing Health Care (PopHHC): Advancing global collaboration in population-based hearing research** Michelle ARNOLD (USA)	BOP 01-4
10:36	**Automating hearing assessments for all: ATHENA project** Gloria ARAIZA-ILLAN (The Netherlands)	BOP 01-5
10:45	**Automated question and answering based speech-in-noise test using large language models** Mohsen FATEHIFAR (UK)	BOP 01-6
10:54	**Auditory sensory gating in misophonia: A neurophysiological evaluation** Palaniandi Rajasekaran SUJEETH (India)	BOP 01-7
11:03	**Subcortical–cortical electrophysiological interrelationships** So Eun PARK (USA)	BOP 01-8

10:00-11:20 | May 26 | Rm. 203

SS 09 **New Zealand Audiological Society (NZAS) - Innovations and Insights from Audiology in Aotearoa New Zealand**

Moderator: Katrina LIGHT (New Zealand)

10:00	**Audiology in Aotearoa New Zealand: An overview from NZAS** Katrina LIGHT (New Zealand)	SS 09
10:10	**Exploring the New Zealand Audiological Society's journey towards honouring Te Tiriti o Waitangi and enabling a future of equitable healthcare in Aotearoa** Tare LOWE (New Zealand)	SS 09
10:20	**Indigenous audiology in Aotearoa New Zealand** Greg A. O'BEIRNE (New Zealand)	SS 09
10:30	**Tailoring care and supporting workforces in our unique environment** Zoë HECTOR (New Zealand) Katherine JEPSEN (New Zealand)	SS 09
10:40	**Eisdell Moore Centre: Supporting development of ear and hearing care service capacity in the Pacific** Peter THORNE (New Zealand)	SS 09
10:50	**Teleaudiology in New Zealand: Development and future direction** Craig LETT (New Zealand)	SS 09-6
11:00	**Extending the scope of audiologists: A new paradigm of clinical excellence** Michelle A. POKORNY (New Zealand) Erin KEACH (New Zealand)	SS 09
11:10	**Equity and access for cochlear implant services in New Zealand** Holly Fb. TEAGLE (New Zealand)	SS 09-8

10:00-11:20 | May 26 | Rm. 205

OP 16 Hearing Aids I

Moderators: Stefan LAUNER (Switzerland); Jiwon CHANG (Korea)

10:00 **Converging behavioral and neurophysiological hearing aid benefits of deep-neural-network based noise reduction** OP 16-1
Stefan LAUNER (Switzerland)

10:09 **Better measurement of hearing aid use** OP 16-2
Dominic GATELY (UK)

10:18 **Do premium hearing aids offer better outcomes than basic models? A systematic review and meta-analysis** OP 16-3
Nausheen DAWOOD (South Africa)

10:27 **Comparison of real-ear aided response and target deviation between AirPods Pro 2 and hearing aids in Japanese listeners: A verification-based evaluation** OP 16-4
Toshiki SATOH (Japan)

10:36 **Geographic distance and hearing aid adherence in 2,091 adults: Datalogging evidence from a Chilean public hospital** OP 16-5
Oscar M. CAÑETE (Chile)

10:45 **Clinical efficacy of binaural beamforming (front focus) in patients with bilateral sensorineural hearing loss** OP 16-6
Seung Hyun JANG (Korea)

10:54 **Motion-aware hearing aid noise management reduces listening effort and stress: Evidence from heart rate and pupillometry** OP 16-7
Jeppe Høy CHRISTENSEN (Denmark)

11:03 **Hearing aid parameters for enhanced music sound quality: A literature review** OP 16-8
Sarah Elizabeth SWANN (Australia)

10:00-11:20 | May 26 | Rm. 209

OP 17 Auditory Processing II

Moderators: André GOEDEGEBURE (The Netherlands); June CHOI (Korea)

10:00 **Neural representation of spatial release from masking** OP 17-1
Heesung PARK (USA)

10:09 **Cognitive and linguistic influences on dichotic listening: A study across the lifespan** OP 17-2
Eliane SCHOCHAT (Brazil)

10:18 **Exploring the effects of acoustic characteristics and meaningful sounds on medial olivocochlear system activation: Evidence from otoacoustic emission suppression studies** OP 17-3
Sarah RAHMAT (Malaysia)

10:27 **Association between MoCA scores and auditory processing improvements following transcutaneous auricular vagal nerve stimulation** OP 17-4
Ayberk Aydın TUNÇ (Hungary)

10:36 **Exploring the relationship between speech-in-noise recognition and academic performance in primary school children** OP 17-5
Dani TOMLIN (Australia)

10:45 **Effect of audiometric configuration on binaural temporal fine structure sensitivity in adults with sensorineural hearing loss** OP 17-6
Parisa RASOULI FARD (Iran)

10:54 **A questionnaire that can help diagnose auditory processing disorder and quantify degree of disability** OP 17-7
Suzanne C. PURDY (New Zealand)

11:03 **Development of a behavioral test battery for assessing spatial auditory cue processing and directional speech perception in children: Preliminary findings** OP 17-8
Sevgi KADIHANOGLU (Türkiye)

11:12 **Biophysical modeling of auditory neuronal excitability: In silico insights into temporal processing in the cochlear nucleus** OP 17-9
Chitaranjan MAHAPATRA (India)

10:00-11:20 | May 26 | Amber

OP 18 Hearing Disorders II

Moderator: Chang-Hee KIM (Korea)

10:00 **A different pattern of cross-modal plasticity in single-sided deafness: Enhanced audiovisual integration** OP 18-1
Yingying SHANG (China)

10:09 **Evaluating hidden hearing loss in combat-exposed patients: Spectro-temporal modulation detection assessment using the audible contrast thresholds test** OP 18-2
Shai CHORDEKAR (Israel)

10:18 **Threshold equalizing noise test in normal-hearing patients with speech-in-noise complaints** OP 18-3
Akiko AMANO (Japan)

10:27 **High-frequency audiometry for early detection and monitoring of hearing loss in musicians** OP 18-4
Angelica PEREZ FORNOS (Switzerland)

10:36 **Association between age-related hearing loss, frailty, and fall risk among older adults: Evidence from a national population-based study** OP 18-5
Sang-Yoon HAN (Korea)

10:45 **Extended high-frequency hearing loss disrupts neural encoding of speech** OP 18-6
Sajana ARYAL (USA)

10:54 **When diagnosis doesn't predict outcome: Insights from children with auditory neuropathy spectrum disorder** OP 18-7
Katie NEAL (Australia)

11:03 **Hearing conservation coverage in undergraduate mining engineering curriculum: A case study of Witwatersrand University** OP 18-8
Nomfundo MOROE (South Africa)

11:12 **When culture meets cochlea: 'Sound Horeg' as an emerging auditory health crisis in developing Southeast Asia - A scoping review and clinical case from Indonesia** OP 18-9
Atika Sri RAHARJANI (Indonesia)

11:20-12:40 | May 26 | Rm. 101

PS 34 AI/Big Data

Moderators: Robert EIKELBOOM (Australia); Sung-Il CHO (Korea)

11:20	**Beyond the audiogram: Using patient-reported outcomes and speech-in-noise to uncover hearing loss** Perrine MORVAN (France)	PS 34-1
11:35	**Age-related changes in hearing and speech perception and their impact on dementia risk: Evidence from clinical big data in Japan** Koichiro WASANO (Japan)	PS 34-2
11:50	**Hearing loss compensation using auditory models and deep neural networks** Lars BRAMSLØW (Denmark)	PS 34-3
12:05	**Audiometrically normal, but attending an audiology clinic: What do we know about these clients? Using machine leaning to model the demographic and hearing characteristics of individuals with subjective hearing loss** Robert EIKELBOOM (Australia)	PS 34-4
12:20	**How AI is shaping the future of hearing care** Stefan LAUNER (Switzerland)	PS 34-5

11:20-12:40 | May 26 | Rm. 102

PS 35 Innovative Applications of Speech Audiometry

Moderators: Masae SHIROMA (Japan); Heil NOH (Korea)

11:20	**Speech-in-noise assessment in the routine audiologic test battery: Relationship to perceived auditory disability** Matthew FITZGERALD (USA)	PS 35-1
11:35	**Novel speech-recognition test with synthetic speech** Inga HOLUBE (Germany)	PS 35-2
11:50	**The Audible Contrast Threshold (ACT™): A clinical measure of aided hearing-in-noise ability** Johannes ZAAR (Denmark)	PS 35-3
12:05	**Development of the Mandarin digit-in-noise test, the effects of the number of digits and real-life implementation** Lena WONG (Hong Kong SAR)	PS 35-4
12:20	**Cognitive abilities of individuals with listening difficulties in noisy environments** Chie OBUCHI (Japan)	PS 35-5

11:20-12:40 | May 26 | Rm. 103

PS 36 Intra- & Post-operative Evaluation for Auditory Implants

Moderators: Gunesh RAJAN (Switzerland); Hong Ju PARK (Korea)

11:20	**How to perform structure preservation surgery in cochlear implantation** Gunesh RAJAN (Switzerland)	PS 36-1
11:35	**Intraoperative EABR testing predicts the strength of CI stimulation optimized after long-term use in pediatric malformation ears** Hiroshi YAMAZAKI (Japan)	PS 36-2
11:50	**Advancing hearing research using Functional Near-Infrared Spectroscopy(fNIRS)** Onn Wah LEE (Malaysia)	PS 36-3
12:05	**Feasibility of speech testing using wireless connection in single-sided cochlear implant users** Jae Young CHOI (Korea)	PS 36-4
12:20	**The current status and future of using computational models to individually optimise cochlear implant stimulation** Johan H. M. FRIJNS (The Netherlands)	PS 36-5

11:20-12:40 | May 26 | Rm. 104

PS 37 Bringing WHO Guidance on Community-level Ear and Hearing Care Programs into Practice

Moderators: Carrie L. NIEMAN (USA); Gi Jung IM (Korea)

11:20	**Integrating ear and hearing care into primary health care: Policy to practice** Shelly CHADHA (Switzerland)	PS 37-1
11:32	**WHO guidance on hearing aid fitting in low- and middle-income settings: Overview of WHO's guidance, including findings and lessons learned from South Africa and India** Lauren DILLARD (USA)	PS 37-2
11:44	**Enhancing hearing aid services through community partnerships: A focus on high-income countries** Carrie L. NIEMAN (USA)	PS 37-3
11:56	**WHO-led hearing aid prequalification: An approach for improving access to services** Isabelle BOISVERT (Australia)	PS 37-4
12:08	**Empowering primary health workers for ear and hearing care in LMICs: A review of WHO resources and training** Mario BUSTOS-RUBILAR (The Philippines)	PS 37-5
12:20	**Hearing aid use in South Korea: An overview of national support policies and current trends** Jae Ho CHUNG (Korea)	PS 37-6

11:20-12:40 | May 26 | Rm. 105

PS 38 Personalized Tinnitus Management

Moderators: Jose Antonio LOPEZ-ESCAMEZ (Australia); Moo Jin BAEK (Korea)

11:20	**Genetic contribution to tinnitus and cognitive decline** Jose Antonio LOPEZ-ESCAMEZ (Australia)	PS 38-1
11:35	**Evidence and innovation: Digital therapeutics for tinnitus management** Maren STROPAHL (Switzerland)	PS 38-2
11:50	**Adapting personal therapies using a mobile application for tinnitus rehabilitation** Mehdi ABOUZARI (USA)	PS 38-3
12:05	**Bimodal neuromodulation for personalized tinnitus treatment: Clinical evidence and real-world outcomes** Hubert LIM (USA)	PS 38-4
12:20	**Multi-modal virtual reality system for tinnitus treatment methods and validation: Multicenter study** June CHOI (Korea)	PS 38-5

11:20-12:40 | May 26 | Rm. 201

OP 19 Hearing Disorders III

Moderators: José Juan BARAJAS DE PRAT (Spain); Takashi NAKAGAWA (Japan)

11:20	**The role of hyperbaric oxygen therapy in sudden sensorineural deafness: Serial case report and a 5-years patients' overview in Kasih Ibu Hospital Saba Bali** I Gusti Ngurah Kompiang WIRIADI PUTRA (Indonesia)	OP 19-1
11:29	**Clinical analysis of 50 cases with the symptom of difficulty in listening** Chikako SHINKAWA (Japan)	OP 19-2
11:38	**Altered cochlear compressive nonlinearity in individuals with extended high-frequency loss despite normal audiograms** Srikanta MISHRA (USA)	OP 19-3
11:47	**Prognosis and risk factors of ototoxic hearing loss in children undergoing platinum based chemotherapy** Inkyeong CHOI (Korea)	OP 19-4
11:56	**The use of hearing protection devices by workers at an aluminum manufacturing company** Asibonge SHANDU (South Africa)	OP 19-5
12:05	**High-frequency hearing loss, estimated as noise-induced, in adolescents and young adults in Sweden** Eva WESTMAN (Sweden)	OP 19-6
12:14	**A preliminary study on translating, adapting, and assessing nursery teachers' knowledge and attitudes towards childhood hearing loss in Malaysia** Cheu Lih AW (Malaysia)	OP 19-7
12:23	**Graft uptake success and determinants of surgical outcome in myringoplasty: A systematic review and meta-analysis of evidence from the South Asia** Prayash PAUDEL (Nepal)	OP 19-8

11:20-12:40 | May 26 | Rm. 202

BOP 02 Best Oral Presentation 02

Moderators: Thais C. MORATA (USA); Seog-Kyun MUN (Korea)

11:20	**Development and standardization of a new test for the evaluation of the development of sound localization abilities in children using the immersion 360° system** Angelica PEREZ FORNOS (Switzerland)	BOP 02-1
11:29	**Refining bone-conduction ABR in infants: Establishing normative thresholds and interaural attenuation for NB CE-Chirp stimuli** Liron KARIV (Israel)	BOP 02-2
11:38	**Concurrent alterations in brain hemispheric asymmetry of structural and functional networks in single-sided deafness** Saiyi JIAO (China)	BOP 02-3
11:47	**Excitotoxicity induces a dual process of synaptic loss and functional adaptation of remaining auditory nerve fibers** Jean-Luc PUEL (France)	BOP 02-4
11:56	**Assessment of auditory sensory gating in children with auditory processing disorder (APD) using auditory brainstem response (ABR) with a cognitive task** Nur Hafizah SULAIMAN (Malaysia)	BOP 02-5
12:05	**Consonant production in Cantonese-Mandarin bilingual children with cochlear implants: Effects of hearing age, age at implantation, and language exposure** Jiaying LI (UK)	BOP 02-6
12:14	**Generalization of perceptual learning in noise: The critical role of stimulus variability during training** Liping ZHANG (China)	BOP 02-7
12:23	**The diagnostic value of wideband typanometry in the perioperarive management of adenoid hypertrophy** Kristina A. OGANYAN (Russia)	BOP 02-8
12:32	**Impact of air pollution and rising temperature from climate change on incidence and gene expression in children with hearing disabilities** Firdian MAKRUFARDI (Indonesia)	BOP 02-9

11:20-12:40 | May 26 | Rm. 203

SS 10 Nordic Audiology Society (NAS) - "New Technologies and Prioritization" How to Balance Resources and Demands in an Audiological Setting

SS 10

Moderator: Jesper Hvass SCHMIDT (Denmark)

11:20	**Implementing national quality requirements and digital visitation in adult HA treatment in Denmark** Rikke Skovsted Schnack PETERSEN (Denmark)	SS 10-1
11:40	**Implementing user-operated audiometry in Denmark** Carl Christian PEDERSEN (Denmark)	SS 10-2
12:00	**Effective implementation of automated audiometry in clinical practice** Sofia JANSON (Sweden)	SS 10-3
12:20	**Tinnituskaka: A model for digital, resource-saving tinnitus care** Dag Lyngve SUNDE (Norway)	SS 10-4

11:20-12:40 | May 26 | Rm. 205

OP 20 Hearing Aids II

Moderators: Nicky CHONG-WHITE (Australia); Sungmin LEE (Korea)

11:20	**Exploring patient preferences in hearing aid features and models of service delivery** Preeti PANDEY (USA)	OP 20-1
11:29	**Accessibility update: Comparing sound quality differences between auracast and hearing loop transmissions** Jill MECKLENBURGER (Denmark)	OP 20-2
11:38	**Changes in social frailty after optimal hearing aid fitting: Characteristics of older adults who improve** Masaomi MOTEGI (Japan)	OP 20-3
11:47	**COVID-19 related challenges facing patients with hearing loss who were prescribed hearing aids and patients awareness of tele-healthcare** Ahmad ALRASHEED (Saudi Arabia)	OP 20-4
11:56	**Hearing aid remote microphone verification and real-world outcomes** Mohamed RAHME (Canada)	OP 20-5
12:05	**Sound-related, contextual and individual factors in hearing aid sound preferences: Clinical implications** Laura Winther BALLING (Denmark)	OP 20-6
12:14	**AirPods Pro 2 as hearing support: Laboratory findings and real-world research approach** Nicky CHONG-WHITE (Australia)	OP 20-7
12:23	**The effect of a third in-ear microphone on user satisfaction, speech intelligibility, and the real-ear gain of hearing aids at a conversational level in patients with moderate hearing loss** Sanghyun KWAK (Korea)	OP 20-8

11:20-12:40 | May 26 | Rm. 209

OP 21 Auditory Processing III

Moderators: Greg A. O'BEIRNE (New Zealand); Young Joon SEO (Korea)

11:20	**Exploring the relationships between auditory processing, speech sound identification, language, cognition and reading in children with listening difficulties** Alisha Isaac GUDKAR (Australia)	OP 21-1
11:29	**Comparative study on the effect of hormonal variations on temporal processing and working memory in early and late adolescent females** Prajna BHAT J (India)	OP 21-2
11:38	**A behavioral paradigm to assess selective auditory attention across adulthood using frequency-shifted speech stimuli** Yagmur UNAL (Türkiye)	OP 21-3
11:47	**Development and validation of the Taiwanese Mandarin hierarchical speech-in-noise test: Integrating speech, tone, temporal, and spatial hearing assessments** Greg A. O'BEIRNE (New Zealand)	OP 21-4
11:56	**Auditory processing profiles in autistic children** Silvia DI BONAVENTURA (UK)	OP 21-5
12:05	**Auditory sensory factors contributing to ear differences in speech perception in noise among older adults** Alejandro Gabriel IANISZEWSKI GÓMEZ (Chile)	OP 21-6
12:14	**Arterial spin labeling brain MRI and functional MRI in children with isolated auditory processing disorder (APD)** Natalie Jo LOUNDON (France)	OP 21-7
12:23	**Auditory and language-related listening skills of English Second Language (ESL) learners: Do we have a role to play?** Lidia POTTAS (South Africa)	OP 21-8
12:32	**The diagnostic contribution of OAE suppression and auditory evoked potentials in auditory processing disorder: A systematic review and meta-analysis** Nikos ELEFTHERIADIS (Greece)	OP 21-9

12:40-13:40 | May 26 | Rm. 103

SP 03 Luncheon Symposium – Alteogen Biologics Clinical Utility of Recombinant Hyaluronidase for Minimizing Postoperative Distress in Auditory Surgery

Speaker: Joong Ho AHN (Korea) — SP 03

13:40-15:00 | May 26 | Rm. 101

PS 39 Hearing and Social Connection Across Aging

Moderators: Katie EKBERG (Australia); Seung Geun YEO (Korea)

13:40	**Multidisciplinary approaches to managing hearing loss and cognitive decline** Keith N. DARROW (USA)	PS 39-1
13:55	**Depression and hearing loss in older adults: Geographies of health in a rapidly ageing world** Dalia TSIMPIDA (UK)	PS 39-2
14:10	**Social connectedness and well-being of adults with acquired hearing loss** Katie EKBERG (Australia)	PS 39-3
14:25	**Hearing aids to support the cognitive functions of older adults at risk of dementia: The HearCog trial results** Dona M. P. JAYAKODY (Australia)	PS 39-4

13:40-15:00 | May 26 | Rm. 102

PS 40 Hearing and Other Developmental Disorders

Moderators: Suzanne C. PURDY (New Zealand); Sunghee KIM (Korea)

13:40	**Hearing screening, assessment, and intervention programs for vulnerable populations: Persons with intellectual disability** Katrin NEUMANN (Germany)	PS 40-1
13:52	**Hearing assessment and hearing aid use in children with hearing loss and intellectual disabilities** Kae KITAGAWA (Japan)	PS 40-2
14:04	**Improving emotion perception in autistic children with computer-based training and hearing amplification** Joan Huan LEUNG (New Zealand)	PS 40-3
14:16	**Holistic management of children with congenital cytomegalovirus (cCMV)** Holly Fb. TEAGLE (New Zealand)	PS 40-4
14:28	**Influence of visual deprivation on auditory performance and neuroplasticity** Hyun Joon SHIM (Korea)	PS 40-5
14:40	**Difficult clinical cases: Multidisciplinary approach necessary** Christian Vinberg THORUP (Denmark)	PS 40-6

13:40-15:00 | May 26 | Rm. 103

PS 41 AI for the Ear and Beyond (CAN)

Moderators: Gloria ARAIZA-ILLAN (The Netherlands); Shangqiguo WANG (Hong Kong SAR); Jan-Willem WASMANN (The Netherlands) — PS 41

13:45	**AI-driven virtual personas for clinician communication training in audiology** Nicky CHONG-WHITE (Australia)	PS 41-1
13:57	**Piloting AI-assisted otoscopy in primary care: A digital innovation to transform childhood ear disease diagnosis in aotearoa New Zealand** Michelle A. POKORNY (New Zealand) Erin KEACH (New Zealand)	PS 41-2
14:09	**VR-based fine-tuning of hearing device settings** André GOEDEGEBURE (The Netherlands)	PS 41-3
14:21	**Art of hearing: A digital dialogue between audiology and creativity** Selvarani MOODLEY (South Africa)	PS 41-4
14:33 ~ 15:00	**Panel Discussion including all speakers**	

13:40-16:20 | May 26 | Rm. 104

PS 42-43 Public Health Planning for Hearing Impairment (PHPHI)

Moderators: Moo Kyun PARK (Korea); Donghee LEE (Korea)

13:40	**Introduction to Public Health Planning for Hearing Impairment** Andrew SMITH (UK)	PS 42-1
13:55	**Principles and practice of public health applied to hearing impairment** Andrew SMITH (UK)	PS 42-2
14:10	**National policy for prevention and treatment of hearing loss: South Korea** Moo Kyun PARK (Korea)	PS 42-3
14:25	**Prevention of hearing loss** Andrew SMITH (UK)	PS 42-4
14:40	**Hearing loss in South Korea: A global perspective** Gi Jung IM (Korea)	PS 42-5
14:55	**Inside and beyond WHO: Personal reflections on its role and use in global hearing care** Young Ah KU (Korea)	PS 42-6
15:10	**Primary Ear and Hearing Care(PEHC), and role of Community-Based Rehabilitation(CBR)** Andrew SMITH (UK)	PS 42-7
15:25	**Public hearing health in South Korea** Donghee LEE (Korea)	PS 42-8
15:40	**Early detection for early intervention in South Korea: Moving beyond screening toward timely and equitable rehabilitation** Jiwon CHANG (Korea)	PS 42-9
15:55	**National program for control of hearing loss & deafness** Andrew SMITH (UK)	PS 42-10

13:40-15:00 | May 26 | Rm. 105

PS 44 Rethinking Tinnitus: Moving Beyond Neural Correlates

Moderator: Nathan WEISZ (Austria)

13:40	**Understanding tinnitus in humans: What is holding us back?** Nathan WEISZ (Austria)	PS 44-1
13:50	**Maladaptive threat and safety learning in tinnitus: Neural mechanisms of aversive generalization and threat regulation** Markus JUNGHÖFER (Germany)	PS 44-2
14:10	**Neural aging as a tinnitus risk factor** Fabian SCHMIDT (Austria)	PS 44-3
14:30	**The Bayesian brain and the free-energy principle in tinnitus, phantom pain, Mal de Débarquement syndrome, and visual snow syndrome** Jae-Jin SONG (Korea)	PS 44-4
14:50	**Closing remarks** Shi Nae PARK (Korea)	

13:40-15:00 | May 26 | Rm. 201

SS 11 British Academy of Audiology (BAA) - Quality Assurance in Paediatric Audiology: Who is Looking?

Moderator: David MAIDMENT (UK)

13:40	**Beyond the audiogram: Empowerment, governance, and psychological safety in paediatric cochlear implant care** Nicole EGLINTON (Australia)	SS 11-1
14:00	**Righting the wrongs: The journey to improvement in UK paediatric audiology** Claire BENTON (UK)	SS 11-2
14:20	**Developing a safe, effective and sustainable workforce for high quality audiology services** Saima Luxmi RAJASINGAM (UK)	SS 11-3
14:40	**Panel Discussion: Facing the challenges of quality assurance in audiology** David MAIDMENT (UK)	SS 11-4

13:40-15:00 | May 26 | Rm. 202

BOP 03 Best Oral Presentation 03

Moderators: Jong Dae LEE (Korea), Hyo-Jeong LEE (Korea)

13:40	**Clinical performance of nuance audio hearing glasses in adults with mild to moderate hearing loss** Bettina TURNBULL (Australia)	BOP 03-1
13:49	**Are over-the-counter hearing aids user-friendly?** Laura COCO (USA)	BOP 03-2
13:58	**Effect of hearing aids on cognitive function in elderly patients with hearing loss: A functional near-infrared spectroscopy study** Jiwon CHOI (Korea)	BOP 03-3
14:07	**Benefit of an Individualized EAS Strategy** Adam WALKOWIAK (Poland)	BOP 03-4
14:16	**Receptive and expressive language trajectory for children implanted younger than 9 months compared with children implanted between 9 and 24 months** Jaime LEIGH (Australia)	BOP 03-5
14:25	**Effectiveness of individualized mapping procedures for cochlear implant recipients with hearing preservation** Margaret DILLON (USA)	BOP 03-6
14:34	**Neuroacoustic modeling of cochlear fatigue: Bridging biomechanics and clinical audiology** Thiago MATHIAS DE OLIVEIRA (Brazil)	BOP 03-7
14:43	**A directed evolution novel adeno-associated virus mediated gene therapy restores hearing in OTOF mutation-related deafness, from animal models to patients** Ying CHEN (China)	BOP 03-8

13:40-15:00 | May 26 | Rm. 203

SS 12 International Bureau for Audiophonologie (BIAP) - BIAP Recommendations in Review: Updates in Hearing and Vestibular Assessment and Intervention

Moderator: Ioan CURCA (Canada)

13:40	**Introduction** Ioan CURCA (Canada)	SS 12
13:50	**Early assessment and intervention in hearing impaired children: A timeline of BIAP recommendations** Monica Jubran CHAPCHAP (Brazil)	SS 12-1
14:05	**Auditory neuropathy spectrum disorder** Sebastian COZMA (Romania)	SS 12-2
14:20	**Bimodal stimulation: Hearing aid and cochlear implant, how does the brain respond to this combination?** Edilene BOECHAT (Brazil)	SS 12-3
14:35	**Vestibular disorders in children** Hung THAI-VAN (France)	SS 12-4
14:50 ~ 15:00	**Closure and Q&A**	

13:40-15:00 | May 26 | Rm. 205

OP 22 Auditory Implants II

Moderators: Lisa R. PARK (USA), Woo Seok KANG (Korea)

13:40	**Audiological outcome after ultra early activation of a cochlear implant followed by early rehabilitation in bilateral deafness** Philipp GLOCKNITZER (Austria)	OP 22-1
13:49	**Predictors of self-perceived sound quality outcomes in adult cochlear implant recipients** Robert EIKELBOOM (Australia)	OP 22-2
13:58	**Contralateral routing of signals with user-adjusted settings enhances speech intelligibility for cochlear implants users** Anne VAN ALPHEN (The Netherlands)	OP 22-3
14:07	**Evaluating the benefits of integrating connected care to reshape the cochlear implant care pathway: A multicentre randomised non-inferiority study** Amel MEKAOUI (France)	OP 22-4
14:16	**Low-frequency pitch sensitivity and speech perception performance in adult FS4 cochlear implant users** Patrizia MANCINI (Italy)	OP 22-5
14:25	**Cochlear Implant outcomes in adults with short duration single sided deafness** Andrew Jonathan SOULBY (UK)	OP 22-6
14:34	**Spatial release from masking in congenitally deaf children following sequential bilateral cochlear implantation** Anita OBRYCKA (Poland)	OP 22-7
14:43	**Voice pitch perception primarily relies on amplitude modulation cues for most cochlear-implant users** Deniz BAŞKENT (The Netherlands)	OP 22-8
14:52	**Programming cochlear implants in very young children: A practical approach using objective physiologic measures** Lisa R. PARK (USA)	OP 22-9

13:40-15:00 | May 26 | Rm. 209

OP 23 Auditory Rehabilitation and Speech Perception I

Moderators: Tamara Christine VAN ZYL (South Africa); Myung-Whan SUH (Korea)

13:40	**A framework of neuroplasticity changes via cortical auditory evoked potential following hearing aids and auditory training intervention in post-lingual adults with hearing impairment** Wan Madihah W. EMBONG (Malaysia)	OP 23-1
13:49	**The impact of hearing loss on musical sophistication and psychological well-being: Evidence from late-deafened adults** Chi Yhun LO (Australia)	OP 23-2
13:58	**ReDi: An intelligent, scalable approach to personalized hearing rehabilitation** Michal ZAREMBA (Austria)	OP 23-3
14:07	**A study of the relationship between auditory developmental stage and cochlear implanted children's first word period using the Japanese LittlEARS Auditory Questionnaire** Maki YAZAKI (Japan)	OP 23-4
14:16	**The lived experience of hearing loss: An individualised responsibility** Saira HUSSAIN (UK)	OP 23-5
14:25	**Sound localization in cochlear implant users: A retrospective analysis across cochlear implant configurations** Martin Richard DELIGNY (Germany)	OP 23-6
14:34	**Speech-in-Noise (SIN) abilities in pediatric unilateral cochlear implant users** Gladys Prathiba DAWSON (India)	OP 23-7
14:43	**Development of a standardized Korean consonant-nucleus-consonant monosyllabic word test for speech recognition** Sumin CHO (Korea)	OP 23-8

13:40-15:00 | May 26 | Amber

PS 45 Global Outreach & Epidemiology

Moderators: Thais C. MORATA (USA); Hyung-Jong KIM (Korea)

13:40	Featured Talk **Health management of workers exposed to ototoxic chemicals** Thais C. MORATA (USA)	PS 45-1
14:00	**Enhancing remote audiology care through person- and context-centered practices** Danielle GLISTA (Canada)	PS 45-2
14:15	**Addressing the global gap: Mapping audiology workforce and training disparities towards pathways of equitable access** Christopher WATERWORTH (Australia)	PS 45-3
14:30	**Hearing care for all: An opportunity to globally unite and address inequities in hearing health** Catherine MCMAHON (Australia)	PS 45-4
14:45	**Patient-reported outcome measures(PROMs) in audiology: A case study from South Korea** Chul Young YOON (Korea)	PS 45-5

15:00-16:20 | May 26 | Rm. 101

PS 46 Treatment for Objective Tinnitus

Moderators: Yue-Lin HSIEH (China); Shi Nae PARK (Korea)

15:00	**Etiology-based surgical treatment for managing pulsatile tinnitus** Jae-Jin SONG (Korea)	PS 46-1
15:15	**Novel surgical interventions for pulsatile tinnitus of venous origin** Yue-Lin HSIEH (China)	PS 46-2
15:30	**Middle ear myoclonic tinnitus: A step-by-step diagnostic and therapeutic approach toward cure** Shi Nae PARK (Korea)	PS 46-3
15:45	**Biphasic eustachian tube dysfunction after head and neck radiotherapy** Cheng Yu HSIEH (Taiwan)	PS 46-4

15:00-16:20 | May 26 | Rm. 102

PS 47 Diagnostic Protocols of Hidden Hearing Loss

Moderators: Adrian FUENTE (Canada); Yong-Ho PARK (Korea)

15:00	**Hidden hearing loss: Insights from animal models vs. human evidence - A case of failed translation?** Srikanta MISHRA (USA)	PS 47-1
15:15	**Rethinking diagnostic protocols for subclinical hearing difficulties: Lived experience and data-driven candidacy** Rebecca BENNETT (Australia)	PS 47-2
15:30	**The hidden intersection of hearing loss, multimorbidity, and reduced hearing-related quality of life in adults with intellectual disability: Evidence from 1,053 on-site assessments** Philipp MATHMANN (Germany)	PS 47-3
15:45	**Feasibility of developing a clinical protocol to diagnose hidden hearing loss in normal hearing young adults with excessive noise exposure** Jeong-Seo KIM (Korea)	PS 47-4
16:00	**Scaling the likelihood of noise-induced cochlear synaptopathy in humans** Sarah K. GRINN (USA)	PS 47-5

15:00-16:20 | May 26 | Rm. 105

PS 48 **Tinnitus Treatment with Implantable Hearing Device**

Moderators: Chao-Yin KUO (Taiwan); Hyun Joon SHIM (Korea)

15:00 **Cochlear implantation for tinnitus: Clinical effects and mechanisms** — PS 48-1
Chao-Yin KUO (Taiwan)

15:15 **The signal processing and numerical analysis to assess auditory conduction based on biomechanics** — PS 48-2
Tang-Chuan WANG (Taiwan)

15:30 **Prognostic factors of tinnitus improvement after stapes surgery** — PS 48-3
Hsing-Mei WU (Taiwan)

15:45 **The impact of cochlear implantation on tinnitus: Insights from data-logging analysis** — PS 48-4
Tadao YOSHIDA (Japan)

16:00 **Tinnitus outcomes of middle ear implants in tinnitus** — PS 48-5
In Seok MOON (Korea)

15:00-16:20 | May 26 | Rm. 201

SS 13 **Audiology Australia (AudA) - Research Innovations from Australia: Shaping the Future of Audiology**

Moderator: Barbra TIMMER (Australia) — SS 13

15:00 **UQ CHEAR: Delivering effective, equitable and sustainable solutions for hearing loss - Examples from culturally responsive hearing services and aged care** — SS 13-1
Piers D. DAWES (Australia)

15:15 **Addressing the social and communication impacts of hearing loss** — SS 13-2
Louise HICKSON (Australia)

15:30 **Revolutionising hearing healthcare with AI: From industry trends to NAL's clinical solutions** — SS 13-3
Brent EDWARDS (Australia)

15:45 **Advancing equity in ear and hearing health for Aboriginal and Torres Strait Islander children: Outcomes from two National Ear Summits** — SS 13-4
Catherine MCMAHON (Australia)

16:00 ~ 16:20 **Panel Discussion**

15:00-16:20 | May 26 | Rm. 202

OP 24 **Auditory Screening and Diagnosis II**

Moderators: Rikke Skovsted Schnack PETERSEN (Denmark); Min-Hyun PARK (Korea)

15:00 **A comparison of CE-chirp auditory brainstem response thresholds and behavioural hearing thresholds in infants and young children** — OP 24-1
Emily Jane COUTTS (Australia)

15:09 **Normal values for cervical and ocular vestibular-evoked myogenic potentials: A comparison of Air-Conducted (AC) and Bone-Conducted (BC) stimuli** — OP 24-2
Navid SHAHNAZ (Canada)

15:18 **Predicting five-year hearing in normal-hearing individuals: Integrating audiometry, deep learning, and national claims** — OP 24-3
Chul Young YOON (Korea)

15:27 **National quantitative assessment of process quality in newborn hearing screening across different birth settings in Germany** — OP 24-4
Romina Jasmin FRENZEL (Germany)

15:36 **Comparison of response parameters of electrocochleography acquired using different stimuli** — OP 24-5
Sanjeev MR (India)

15:45 **Assessing the effectiveness of a tablet-based hearing screening device for school hearing screening** — OP 24-6
Chae-Yeon YU (Korea)

15:54 **Hearing screening among Down syndrome children in Malaysia: Insights from wide band immittance and otoacoustic emissions testing** — OP 24-7
Foong Yen CHONG (Malaysia)

16:03 **Prevalence of ear and hearing concerns among waste collectors in Ragama** — OP 24-8
Prashani KAVINDYA (Sri Lanka)

16:12 **Inter-rater reliability and validation of nurse-administered infant hearing screening: Evidence for equitable early detection in LMICs** — OP 24-9
Mukovhe PHANGUPHANGU (South Africa)

15:00-16:20 | May 26 | Rm. 203

SS 14 **South African Association of Audiologists (SAAA) - Necessity is the Mother of Invention: The South African Story**

Moderator: Lucretia PETERSEN (South Africa)

15:00 **This does not make sense, or does it? Cases of sudden idiopathic hearing loss** — SS 14-1
Liepollo NTLHAKANA (South Africa)

15:15 **Does one size fit all? Exploring the effect of hearing aid impulse noise reduction on isiXhosa click sounds: A pilot study** — SS 14-2
Heinrich STEPHAN (South Africa)

15:30 **Cochlear implantation in South Africa: Strengths, disparities, and lessons from a dual healthcare system** — SS 14-3
Tamara Christine VAN ZYL (South Africa)

15:45 **The development, adaptation and validation of contextually relevant audiology tools** — SS 14-4
Lucretia PETERSEN (South Africa)

16:00 ~ 16:20 **Panel Discussion and Q&A**

15:00-16:20 | May 26 | Rm. 205

OP 25 Auditory Implants III

Moderator: Johan H. M. FRIJNS (The Netherlands)

15:00 **NeuroVoc: A biologically plausible vocoder framework for auditory perception and cochlear implant simulation** OP 25-1
Johan H. M. FRIJNS (The Netherlands)

15:09 **Effect of frequency-to-place factors on perception and adaptation in cochlear implant users** OP 25-2
Louis VILLEJOUBERT (UK)

15:18 **Implementing person-centered preoperative counseling for adult cochlear implant candidates: A framework and practical tools** OP 25-3
Carol PANG (China)

15:27 **Simultaneous auricular reconstruction and hearing restoration using active bone conduction implants in patients with microtia: Part I** OP 25-4
Andro KOŠEC (Croatia)

15:36 **Simultaneous auricular reconstruction and hearing restoration using active bone conduction implants in patients with microtia: Part 2** OP 25-5
Ivan RAŠIĆ (Croatia)

15:45 **Designing a national survey of Australian healthcare professionals in managing hearing loss in adult patients with limited benefits from hearing aids** OP 25-6
Michelle LE (Australia)

15:54 **Does anatomy-based fitting enhance on auditory outcomes and music perception in cochlear implant users? Evidence from within-subject analysis** OP 25-7
Luis LASSALETTA (Spain)

16:03 **Reconstructing perceptually integrated sounds between cochlear implant and hearing aid ears** OP 25-8
Yang-Soo YOON (USA)

16:12 **Optimizing speech-in-noise perception with the sky HS auditory system in pediatric cochlear implant users** OP 25-9
Sabrina BOUZAID (France)

15:00-16:20 | May 26 | Rm. 209

OP 26 Auditory Rehabilitation and Speech Perception II

Moderators: Lia TRAVES (Australia), Munyoung CHANG (Korea)

15:00 **The value of co-design in hearing healthcare: Redeveloping the Active Communication Education (ACE) program** OP 26-1
Nerina SCARINCI (Australia)

15:09 **Benefit of spatial, voice, and visual cues for speech recognition with competing talkers in cochlear implant recipients and typical-hearing listeners** OP 26-2
Hartmut MEISTER (Germany)

15:18 **Understanding patient experience in hearing care: The role of Patient-Reported Experience Measures (PREMs) and the validation of 'My Hearing PREM'** OP 26-3
Georgina BURNS-O'CONNELL (UK)

15:27 **Audiological profile and speech, communication, and verbal intelligence outcomes in hearing-impaired children with different ages of initial hearing aid fitting** OP 26-4
Ekaterina GARBARUK (Russia)

15:36 **An ICT-based auditory temporal resolution training application: Development and establishment of clinical application foundation** OP 26-5
Hongseok YANG (Korea)

15:45 **Lost in transition: Rethinking paediatric-to-adult hearing healthcare pathways through youth voices** OP 26-6
Jermy PANG (Australia)

15:54 **A comparison of remote microphone technologies for pediatric hearing aid users** OP 26-7
Min Cheol ROH (Switzerland)

16:03 **Tactile assistant system for CI users in spatial hearing training** OP 26-8
Sangyeob BAEK (Germany)

15:00-16:20 | May 26 | Amber

PS 49 Innovative Therapies

Moderators: Marcelo RIVOLTA (UK), Jae-Jun SONG (Korea)

15:00 **Recent progress of inner ear organoid** PS 49-1
Min Young LEE (Korea)

15:15 **Developing a pluripotent stem cell-based therapy for hearing loss: Paving the way towards clinical trials** PS 49-2
Marcelo RIVOLTA (UK)

15:30 **Towards a cure for hearing loss: The pharmacologic frontier** PS 49-3
Kyu-Yup LEE (Korea)

15:45 **A novel intratympanic injection: Dexamethasone nanocrystals embedded in hydroxypropyl methylcellulose hydrogel** PS 49-4
Dong-Kee KIM (Korea)

16:35–17:35 | May 26 | Rm. 201

SP 04 Sponsored Symposium - Cochlear
Goodbye X-ray? SmartNav and the Dawn of Wireless Intraoperative Navigation in Cochlear Implantation

Moderator: Ja-Won KOO (Korea)

16:35 **Clinical experience with SmartNav in CI** SP 04
Byung Yoon CHOI (Korea)

16:35–17:55 | May 26 | Rm. 205

IN 01 **Innovation Session**

Moderator: Joong Ho AHN (Korea)

16:35	**Innovating objective diagnostic hearing assessment with SOFI by MindAffect: Rapid, sedation-free diagnostic audiograms within 10 minutes** Jennifer GOODALL (The Netherlands)	IN 01-1
16:50	**Audiso: Building an ecosystem for intelligent hearing screening and tele-consultation via kiosks** Young Joon SEO (Korea)	IN 01-2
17:05	**From hearing rehabilitation to cognitive protection: AI-driven acoustic stimulation as a digital therapeutic** Grace Jung Eun SHIN (Korea)	IN 01-3

16:35-17:55 | May 26 | Rm. 209

OP 27 **Auditory Rehabilitation and Speech Perception III**

Moderators: Limor LAVIE (Israel), In Seok MOON (Korea)

16:35	**Audible contrast threshold test: Mandarin norms, reliability, and speech-in-noise links** Wen JIANG (China)	OP 27-1
16:44	**Insights on rehabilitation services from young deaf people with cochlear implants** Isabelle BOISVERT (Australia)	OP 27-2
16:53	**The language accessibility index: Measuring real-world language access in children who are deaf of hard of hearing** Carlos BENITEZ-BARRERA (USA)	OP 27-3
17:02	**Social support and parenting stress in cochlear implant rehabilitation of children with hearing loss** Tang Zhi LIM (Malaysia)	OP 27-4
17:11	**Listening comprehension in noise: Clinical evaluation of a new assessment tool for young children with unilateral and mild bilateral hearing loss** Vicky ZHANG (Australia)	OP 27-5
17:20	**Assessment of Music Perception (AMP) and Music Rehabilitation Program (MRP) with web-based platform** Yerim SHIN (Korea)	OP 27-6
17:29	**A randomized controlled trial of the effects of an online support program for audiological rehabilitation aimed at first-time hearing aid users** Sandra AHLBERG (Sweden)	OP 27-7

07:45-09:05 | May 27 | Rm. 103

PL 03 Audiology in Low Resource Regions: Diagnostics and Rehabilitation

Moderator: Vidya RAMKUMAR (India) — PL 03

Audiology in low-resource regions: Diagnostics and rehabilitation in Bangladesh — PL 03-1
S M TOUFIQ (Bangladesh)

Audiology in low-resource regions: Diagnostics and rehabilitation in Sri Lanka — PL 03
Lakmali Dinukshi ILEPERUMA (Sri Lanka)

Audiological diagnostics and rehabilitation practices in China — PL 03
Shangqiguo WANG (Hong Kong SAR)

Audiological diagnostics and rehabilitation practices in South Africa — PL 03
Samantha GOVENDER (South Africa)

Audiological diagnostics and rehabilitation practices in Nepal — PL 03
Dilli Raj PAUDEL (Nepal)

Panel Discussion

09:20-10:40 | May 27 | Rm. 101

PS 50 Speech, Language and Cognition I

Moderators: Misun YOON (Korea), Soo Hee OH (Korea)

09:20 **Theory of mind and children with cochlear implants** — PS 50-1
Misun YOON (Korea)

09:32 **Cognitive and mental health outcomes in early-implanted cochlear implant users: Results from the TAYACI-study** — PS 50-2
Ulrika LÖFKVIST (Sweden)

09:44 **Social-emotional development of children with cochlear implants in Japan** — PS 50-3
Kyoko SHIRAI (Japan)

09:56 **Cochlear implant outcomes in children with additional disabilities** — PS 50-4
Cila UMAT (Malaysia)

10:08 **Distinct and overlapping language and listening profiles in children with mild bilateral sensorineural hearing loss and dyslexia: A comparative study** — PS 50-5
Anna KAM (Hong Kong SAR)

10:20 **Why early intervention matters: Linking listening skill development and language outcomes in DHH children** — PS 50-6
Katie NEAL (Australia)

09:20-10:40 | May 27 | Rm. 102

PS 51 Epidemiology & Biology of Healthy Aging

Moderators: Kelly TREMBLAY (Canada), Beomcho JUN (Korea)

09:20 **Aging and hearing health: The life-course approach** — PS 51-1
Kelly TREMBLAY (Canada)

09:35 **Early signs of auditory aging** — PS 51-2
Srikanta MISHRA (USA)

09:50 **Aging and its effects on the auditory and cognitive systems: Anatomical and physiological insights** — PS 51-3
Keith N. DARROW (USA)

10:05 **The association between hearing loss and degeneration of the brain in older adults** — PS 51-4
André GOEDEGEBURE (The Netherlands)

10:20 **Transforming the narrative on adult-onset hearing loss and dementia** — PS 51-5
Kevin J. MUNRO (UK)

09:20-10:40 | May 27 | Rm. 103

PS 52 Genetics of Hearing Disorders

Moderators: An BOUDEWYNS (Belgium), Kyu-Yup LEE (Korea)

09:20 **Use of whole genome sequencing for genetic hearing loss diagnosis** — PS 52-1
Sandrine MARLIN (France)

09:35 **Genetic landscape of prelingual hearing loss: Diagnosis and implications** — PS 52-2
An BOUDEWYNS (Belgium)

09:50 **Genetic landscape of postlingual sensorineural hearing loss: Diagnose and implications** — PS 52-3
Hidekane YOSHIMURA (Japan)

10:05 **Genetic predisposition for adult-onset hearing loss** — PS 52-4
Jinsei JUNG (Korea)

10:20 **Genetic testing for auditory neuropathy spectrum disorder** — PS 52-5
Byung Yoon CHOI (Korea)

09:20-10:40 | May 27 | Rm. 104

PS 53 New Technologies for Diagnosis and Treatment of Vestibular Disorders

Moderators: Angelica PEREZ FORNOS (Switzerland); Gyu Cheol HAN (Korea)

09:20 **Advancing vestibular neuroprosthetics: Key contributions of the Geneva-Maastricht team to human vestibular implant development** — PS 53-1
Angelica PEREZ FORNOS (Switzerland)

09:35 **The vestibular implant: Updates by the Geneva-Maastricht team** — PS 53-2
Stan VAN BOXEL (The Netherlands)

09:50 **Effectiveness of a vibrotactile feedback device for improving balance in older adults with hearing loss: A randomized controlled trial** — PS 53-3
Wayne WILSON (Australia)

10:05 **Tackling the spin: Impact of telenystagmography for vertigo or dizziness** — PS 53-4
Gunesh RAJAN (Switzerland)

09:20-10:40 | May 27 | Rm. 105

PS 54 Psychoacoustics

Moderators: Claude ALAIN (Canada); Inyong CHOI (USA)

09:20 **Integration of electric and acoustic inputs in bimodal hearing: How it happens and why it matters** — PS 54-1
Inyong CHOI (USA)

09:35 **The impact of temporally coherent visual and vibrotactile cues on speech recognition in noise** — PS 54-2
Yonghee OH (USA)

09:50 **The effect of interaural level differences on binaural fusion in the presence of interaural frequency dissimilarity in normal hearing listeners** — PS 54-3
Justin M. ARONOFF (USA)

10:05 **Investigation of an effective noise masker for narrowband chirps** — PS 54-4
Emmelie KNAUTH (Germany)

10:20 **Music training mitigates age-related changes in auditory perception** — PS 54-5
Claude ALAIN (Canada)

09:20-10:40 | May 27 | Rm. 201

SS 15 Indian Speech-Language and Hearing Association (ISHA) - Pediatric Hearing Loss Management Pathway in India

Moderator: Vidya RAMKUMAR (India) — SS 15

Policy and access from family and recipient perspectives in the pediatric hearing loss management in India — SS 15
Sanjay Kumar MUNJAL (India)

Need for ongoing assessment of progress using indigenous tests — SS 15
Gladys Prathiba DAWSON (India)

Overview of intervention protocols in India: Amplification and implantation — SS 15
Kalyani N. MANDKE (India)

Rehabilitation services availability and challenges — SS 15
Neethi JESUDASS (India)

Q&A — SS 15

09:20-10:40 | May 27 | Rm. 202

PS 55 Engineering and Device Challenges in Tinnitus Therapy

Moderator: Sangmin LEE (Korea)

09:20 **Updates of devices for tinnitus management** — PS 55-1
In Seok MOON (Korea)

09:35 **Clinical experience with tinnitus treatment devices** — PS 55-2
Jae-Hyun SEO (Korea)

09:50 **Personalized strategies for tinnitus masking** — PS 55-3
Sangmin LEE (Korea)

10:05 **Neuromodulation for tinnitus: Development and clinical efficacy of an integrated non-invasive Vagus Nerve Stimulation (taVNS) and sound therapy system** — PS 55-4
Jae-Jun SONG (Korea)

10:20 **Regulatory issues in tinnitus device approval** — PS 55-5
Changmin KIM (Korea)

09:20-10:40 | May 27 | Rm. 203

SS 16 Taiwan Academy of Otology (TAO) - Precision Audiology: From Whole Exome Diagnostics to Gene Therapy and AI Prognosis—A Taiwan Perspective

Moderators: Chen-Chi WU (Taiwan); Yen-Fu CHENG (Taiwan)

09:20 **Introduction**
Chen-Chi WU (Taiwan)

09:23 **The diagnostic yield and genetic spectrum of whole exome sequencing for hearing loss in a tertiary Taiwanese cohort** — SS 16-1
Chao-Hui YANG (Taiwan)

09:35 **Genetic underpinnings and management of late-onset and adulthood hearing loss** — SS 16-2
Ting-Ting YEN (Taiwan)

09:47 **AI-based predictive modeling for clinical course and prognosis in hereditary hearing impairment** — SS 16-3
Pey-Yu CHEN (Taiwan)

09:59 **Preclinical gene therapy for hereditary hearing loss: Lessons from SLC26A4 and PJVK models** — SS 16-4
Yen-Fu CHENG (Taiwan)

10:11 **Clinical trial site experience: Advances in gene therapy for otoferlin-mediated hearing loss** — SS 16-5
Chen-Chi WU (Taiwan)

10:23 ~ 10:40 **Panel Discussion and Q&A**

09:20-10:40 | May 27 | Rm. 205

OP 28 Auditory Screening and Diagnosis III

Moderators: Mirko ALDÈ (Italy), Young Joon SEO (Korea)

09:20 **Spontaneous resolution of conductive hearing losses following referral from newborn hearing screening: When is the best time to review?** OP 28-1
Rachelle RILEY (Australia)

09:29 **Analysis of three-dimensional wideband absorbance immittance in patients with otosclerosis and development of artificial intelligence models for clinical diagnosis** OP 28-2
Fei ZHAO (UK)

09:38 **Clinical equivalence of virtual reality and conventional speech audiometry in normal-hearing listeners** OP 28-3
Wenliang ZHANG (China)

09:47 **Comparative analysis of click-, tone-burst-, and chirp-evoked auditory brainstem responses in young children** OP 28-4
Kasra ALIASGHARZADEH (Iran)

09:56 **Long-term hearing outcomes in children with a history of recurrent acute otitis media** OP 28-5
Mirko ALDÈ (Italy)

10:05 **Influence of external auditory canal morphology on tympanometric classification in young healthy adults** OP 28-6
Jennifer KOEHLER (Germany)

10:14 **Distortion Product Otoacoustic Emission (DPOAE) with tympanometry and Conditioned Play Audiometry (CPA) protocols for preschool hearing screening: A comparative study** OP 28-7
Rhodieleen Anne Roque DE LA CRUZ (The Philippines)

10:23 **Establishment of a nationally standardized Korean normal-hearing dataset and the need for accredited calibration in audiometry** OP 28-8
Young Joon SEO (Korea)

10:32 **Exploring the perceived barriers and facilitators for accessing audiology services in Malaysia by adults with hearing loss: A qualitative study using the COM-B model** OP 28-9
Maziah ROMLI (Australia)

09:20-10:40 | May 27 | Rm. 209

OP 29 Auditory Implants IV

Moderators: Sarah RAHMAT (Malaysia), Ho Yun LEE (Korea)

09:20 **Feasibility of recording cortical auditory responses using cochlear implant electrodes** OP 29-1
Adam WALKOWIAK (Poland)

09:29 **Effects of cochlear implant electrical stimulation rate in children with genetically confirmed pre- and post-synaptic auditory neuropathy** OP 29-2
Mohsen AHADI (Iran)

09:38 **Single sided deafness and asymmetrical hearing loss: How daily CI usage impacts functional outcomes** OP 29-3
Dayse TAVORA-VIEIRA (Australia)

09:47 **The relationship between spatial hearing and social life in cochlear implant users** OP 29-4
Berna HOŞGÖR (Türkiye)

09:56 **Assessing the quality of life and subjective ratings of the anatomy-based fitting map among experienced, adult cochlear implant users** OP 29-5
Pelden WANGCHUK (Bhutan)

10:05 **Functional and surgical outcomes in subtotal petrosectomy and cochlear implants in patients with chronic otitis media** OP 29-6
Alessandra PANTALEO (Italy)

10:14 **The time course of expended listening effort for cochlear implant users differs when listening to Matrix sentences or digit triplets** OP 29-7
H. Christiaan STRONKS (The Netherlands)

10:23 **Scalar position characteristics and scalar translocation rates of different lateral wall electrodes within the cochlear basal turn: A cone beam computed tomography study** OP 29-8
Irumee PAI (UK)

10:40-12:00 | May 27 | Rm. 101

PS 56 Speech, Language and Cognition II

Moderators: Ulrika LÖFKVIST (Sweden), Youngmee LEE (Korea)

10:40 **Multidisciplinary follow-up of teenagers and young adults with cochlear implants: Study approach and baseline characteristics** PS 56-1
Ulrika LÖFKVIST (Sweden)

10:55 **Modelling the contributions of auditory, speech, language, and cognitive processes to speech-in-noise perception in school-aged children: Diagnosing children's listening difficulties** PS 56-2
Alisha Isaac GUDKAR (Australia)

11:10 **The role of general intelligence in individual differences in speech-in-noise performance** PS 56-3
Ronak MOHAMMADI (Canada)

11:25 **Predictive factors of the benefit of sequential bilateral cochlear implant in patients with post-lingual hearing loss** PS 56-4
Andreia RIOS DE SOUZA (Brazil)

10:40-12:00 | May 27 | Rm. 102

PS 57 Hearing Loss in Dementia

Moderators: Piers D. DAWES (Australia); Carrie L. NIEMAN (USA)

10:40 **SENSEcog care Australia: Supporting hearing and vision needs of people with dementia in long-term care** — PS 57-1
Piers D. DAWES (Australia)

10:55 **Supporting hearing aid use for people with dementia who are living in the community** — PS 57-2
Emma HOOPER (UK)

11:10 **Hearing rehabilitation for people living with dementia in residential care** — PS 57-3
Marilyn REED (Canada)

11:25 **Hearing loss in dementia: What does hearing loss mean for patients who already have cognitive impairment? How do we address it?** — PS 57-4
Carrie L. NIEMAN (USA)

11:40 ~ 12:00 **Panel Discussion and Q&A**

10:40-12:00 | May 27 | Rm. 103

PS 58 Genetics: Implications and Therapeutics

Moderators: Chen-Chi WU (Taiwan); Byung Yoon CHOI (Korea)

10:40 **Genetic hearing loss: Updates on genetic diagnosis and inner ear gene therapy** — PS 58-1
Sang-Yeon LEE (Korea)

10:55 **Clinical situations where genetic testing for deafness is strongly recommended and informative** — PS 58-2
Chen-Chi WU (Taiwan)

11:10 **Genetic landscape in undiagnosed syndromic hearing loss: Insights from whole-exome sequencing and phenotype similarity analysis** — PS 58-3
Tatsuo MATSUNAGA (Japan)

11:25 **Efficacy and safety of DB-OTO gene therapy in children with profound deafness: Updates and early speech results from the phase 1/2 CHORD trial** — PS 58-4
Tera QUIGLEY (USA)

11:40 **Genetic vasculopathy of the inner ear in Fabry disease: Cochleovestibular phenotypes and implications for precision audiology** — PS 58-5
Yen-Fu CHENG (Taiwan)

10:40-12:00 | May 27 | Rm. 104

PS 59 Vestibular Disorders in Special Populations

Moderators: Karen C. HENDRICK (USA); Sung Huhn KIM (Korea)

10:40 **Meniere's disease and vestibular migraine: Genetic and immune perspective** — PS 59-1
Jose Antonio LOPEZ-ESCAMEZ (Australia)

10:55 **Vestibular function testing in pediatric population** — PS 59-2
Salma JBYEH (France)

11:10 **Pediatric vestibular monitoring recommendations for high-risk populations** — PS 59-3
Karen C. HENDRICK (USA)

11:25 **Vestibular assessment in pediatric hearing loss: An overlooked clinical necessity** — PS 59-4
Audrey MAUDOUX (France)

11:40 **Vestibular phenotypes in the patients with genetic hearing loss** — PS 59-5
Seonghoon BAE (Korea)

10:40-12:00 | May 27 | Rm. 105

PS 60 Music Perception

Moderators: William MARTENS (Australia); Jae-Hyun SEO (Korea)

10:40 **New directions in speech and music perception** — PS 60-1
Psyche LOUI (USA)

10:55 **Assessing the music appreciation skills of cochlear implant recipients through their differential assessment of musical instrument tones** — PS 60-2
William MARTENS (Australia)

11:10 **Listening beyond hearing: Neural responses to emotions in music and implications for cochlear implant users and AI-generated music** — PS 60-3
Kyung Myun LEE (Korea)

11:25 **Hearing health in higher music education: Changing culture, changing outcomes** — PS 60-4
Kris S. CHESKY (USA)

11:40 **From timbre perception to auditory scene analysis: Effects of musicianship across auditory and tactile modalities** — PS 60-5
Loonan CHAUVETTE (Canada)

10:40-12:00 | May 27 | Rm. 201

SS 17 Beijing Society of Audiology (BSA) - Digital Hearing Healthcare: Technology Innovations, Implementation, and Future Directions

Moderators: Fei ZHAO (UK), Qinglin MENG (China)

10:40	**Opening & Introduction** Fei ZHAO (UK)	SS 17
10:43	**Reimagining hearing care: How artificial intelligence and digital therapeutics are transforming rehabilitation pathways** Vinaya MANCHAIAH (USA)	SS 17-1
10:57	**Towards next-generation brain-inspired hearing technology** Xiang HAO (Hong Kong SAR)	SS 17-2
11:11	**Using artificial intelligence for training and suggesting aural rehabilitation activities** Lena WONG (Hong Kong SAR)	SS 17-3
11:25	**Toward scalable hearing evaluation: A sparse auditory representation based on atomic speech** Qinglin MENG (China)	SS 17-4
11:39 ~ 12:00	**Panel Discussion - The next 5 years: Key directions and challenges in digital hearing healthcare**	

10:40-12:00 | May 27 | Rm. 202

OP 30 Auditory Neuroimaging and Tinnitus

Moderator: Se-Joon OH (Korea)

10:40	**Auditory-spatial perceptual limitations and audiovisual weighting adjustment in cochlear implant users under conditions of audiovisual conflict** Xiang TANG (China)	OP 30-1
10:49	**Investigating neural responses to active noise cancellation during auditory tasks in noisy environments using fNIRS** Hee Jung YUN (Korea)	OP 30-2
10:58	**Characteristics of tinnitus patients in an audiology clinic and the effectiveness of Cognitive-Behavioral Therapy (CBT) and mindfulness techniques: Reflections from a 4.5-year clinical practice** Ha-Yoon JAE (Canada)	OP 30-3
11:07	**Psychotherapeutic interventions in tinnitus management: Cognitive-behavioral and mindfulness approaches** Giovani DE OLIVEIRA E SILVA (Brazil)	OP 30-4

10:40-12:00 | May 27 | Rm. 205

OP 31 Auditory Screening and Diagnosis IV

Moderators: James W. HALL III (USA), Hyun Jin LEE (Korea)

10:40	**Validating the lateralized readiness potential as an objective measure of nonorganic hearing loss** David Jackson MORRIS (Denmark)	OP 31-1
10:49	**Comparative study of click-evoked auditory brainstem response vs. auditory steady-state response hearing thresholds: A systematic review and meta analysis** Monik ALAMANDA (Indonesia)	OP 31-2
10:58	**Theoretical analysis of wideband tympanometry absorbance: Identifying and modeling the contribution of ear canal acoustics** Takuji KOIKE (Japan)	OP 31-3
11:07	**Modeling digit-specific correction levels for monotic and dichotic stimulation: Implications for developing new language versions of the Digit Triplet Test** Marcin MASALSKI (Poland)	OP 31-4
11:16	**Assessment of ambient noise effects on kiosk-based automated audiometry and its superior clinical utility for screening** Donghyeok LEE (Korea)	OP 31-5
11:25	**New evidence-based approach for hearing screening of preschool and school children** James W. HALL III (USA)	OP 31-6
11:34	**Hearing screening results of medical students at the University of Benghazi: A project report** Mai Hilal ABDULWAHHAB (Libya)	OP 31-7
11:43	**Validation of a Filipino word list used for adult speech recognition test** Avian Loren Co CARLOS (The Philippines)	OP 31-8

10:40-12:00 | May 27 | Rm. 209

OP 32 Auditory Implants V

Moderators: Onn Wah LEE (Malaysia), Yoon Chan RAH (Korea)

10:40	**Steady-state evoked potentials reveal altered multisensory processing in cochlear implant users** Olivier VALENTIN (Canada)	OP 32-1
10:49	**Long-term outcomes of cochlear implantation in children with cochlear nerve deficiency: Auditory speech performance and predictive factors over 5 years** Onn Wah LEE (Malaysia)	OP 32-2
10:58	**Cochlear implantation in children with acute onset single sided deafness** An BOUDEWYNS (Belgium)	OP 32-3
11:07	**Spectral ripples in normal and electric hearing models** Jeroen BRIAIRE (The Netherlands)	OP 32-4
11:16	**Application of the CROS system in cochlear implant users** Anna RATUSZNIAK (Poland)	OP 32-5

Posters

Auditory Screening and Diagnosis

PD 001

The co-occurrence of auditory neuropathy and Friedreich's ataxia and its implications in audiological and balance assessment in a pediatric patient: A case report

Milaine Dominici SANFINS, Fátima Cristina Alves BRANCO-BARREIRO, Mariana Ferreira Pires MARTINS, Maysa Ramos Pinto MOROZETTI, Piotr Henryk SKARZYNSKI, Adriana Neves De ANDRADE

Brazil, Poland

PD 002

Analysis of auditory electrophysiological responses in an adolescent with language and learning disorders

Milaine Dominici SANFINS, Adriana Neves De ANDRADE, Mariana Ferreira Pires MARTINS, Julia RIGHETI, Ana Júlia Tashiro De SOUZA, Claudia BERLIM, Piotr Henryk SKARZYNSKI, Aparecido José Couto SOARES

Brazil, Poland

PD 003

The use of self-administered smartphone-based hearing screening among older adults with mild cognitive impairment

Patcharaorn LIMKITISUPASIN, **Nattawan UTOOMPRURKPORN**

Thailand

PD 004

An audit of hearing diagnoses amongst babies with a cleft palate seen for diagnostic testing 2014-2023

Lisa CALLAHAN, Ru GAN, Renee LUMLEY, Mridula SHARMA

Australia

PD 005

Automated speech audiometry using open-source automatic speech recognition

Gloria ARAIZA-ILLAN, Luke MEYER, Khiet P. TRUONG, Deniz BAŞKENT

The Netherlands

PD 006

Exploring the transition between tone burst and narrow-band CE-Chirp stimuli within an infant diagnostic service

Lisa CALLAHAN, Katie HAMLYN

Australia

PD 007

Pattern analysis of eustachian tube function in healthy subjects using Tubotympanoaerodynamic Graphy (TTAG)

Hsin-Tien WU, **Yu-Hsi LIU**, Te-Fang WU, Po-Sheng LIN, Yi-Ming HOU

Taiwan

PD 008

Preschool hearing screening: Identifying undetected middle ear dysfunction and hearing loss

Michelle LOELIGER, Jutta HAU, Richard ANDERSON

Australia

PD 009

A fast-track hearing diagnosis system in northern Thailand: Overcoming barriers in a resource- constrained hospital

Krittipong PARANGRIT

Thailand

PD 010

Quality index of the neonatal hearing screening program of a public hospital in Brazil

Cammila Hiromi KUBO, **Daniela GIL**, Elaine Colombo MARUTA

Brazil

PD 011

Cross-cultural adaptation and validation of the Revised Hearing Handicap Inventory-Screening (RHHI-S) into Spanish

Oscar M. CAÑETE, Daniela ESTAY, María José BRICEÑO, Javiera CEA, Gabruiela JARA, Carlo GANDOLFO, Suzanne C. PURDY

Chile, New Zealand

PD 012

Comparison of Auditory Brainstem Evoked Response (ABR) test results in infants screened for neonatal hearing loss

So Hee KANG, Woo Seok KANG, Hong Ju PARK, Jong Woo CHUNG, **Joong Ho AHN**

Korea

PD 013

Characterizing distortion product otoacoustic emission components using variable stimulus-frequency ratios

Uzma Shaheen AKHTAR, Ana Paula BRUNER, Renata Mota Mamede CARVALLO, Sumitrajit DHAR, Alessandra Spada DURANTE

USA, Brazil

PD 014

A VR-based sound localization test incorporating personalized recordings for realistic spatial assessment

Seung-Ik JEON, Sun-Jeong KIM, Gyungsik JEON, **Hyo-Jeong LEE**

Korea

PD 015

Clinical evaluation of the Korean digits-in-noise test in comparison with the hearing in noise test

Sungmin JO, Ji-Hye HAN, Seungik JEON, Jungho HA, **Hyo-Jeong LEE**

Korea

PD 016

Normal hearing thresholds in Korean adults aged 20–70 years: Establishing reference values and comparison with ISO 7029:2017

Dongwoo LEE, **In-Ki JIN**

Korea

PD 017

Neural network-based surveillance for childhood listening difficulties: The KLiP checklist

Yu-Chen HUNG, Yi-Ping CHANG, Yi-Chih CHAN, Ming LO, Pin-Chun CHEN, Shu-Ting CHANG, Yongfu LIAO, Hsuan-Mei HONG

Taiwan

PD 018

The influence of sex and ear on auditory brainstem response: A large-scale analysis of latency and amplitude

Mariana Ferreira Pires MARTINS, Diego Lourenço Dos Santos SILVA, Leticia Vieira RODRIGUES, Julia RIGHETI, Piotr Henryk SKARZYNSKI, Elzbieta GOS, **Milaine Dominici SANFINS**

Brazil, Poland

PD 019

Universal methodology, local refinement: Multi-language validation of an adaptive speech-in-noise test

Jean-Charles CECCATO, Chloé PETIT, Genin ARNAUD, Frédéric VENAIL, Sawab SAADI, Deidda GIANNI, Maxime BALCON, Jean-Luc PUEL

France

PD 020

A systematic review of mobile phone-interfaced paediatric hearing screening tools/devices

Vishnu SARAVANA, **Vidya RAMKUMAR**

India

PD 021

Duplicated external auditory canal

Parisa RASOULI FARD, Aida SOLTANMORADI, Bardia MASROURI, Shamsollah NORIPOUR, Neda AMELI

Iran, Islamic Republic of

PD 022

Bridging the gap: Linking online hearing screening to care with audiology phone consults

Sylvia CIECHANOWSKI, **Marilyn REED**

Canada

PD 023

Development and validation of a dual-task paradigm for assessing listening effort in Kannada

Bhavana RHYTHM, **Hari Prakash PALANISWAMY**, Kanaka GANAPATHY

India

PD 024

Association between cleft palate and hearing loss in children

Aida SOLTANMORADI, **Parisa RASOULI FARD**, Bardia MASROURI

Iran, Islamic Republic of

PD 025

Comparative analysis of the reference values of P1, N1, P2, and N2 components of the LLAEP: Influence of acquisition and marking methods

Carolina Hikari USAMI, Lucas Pinto MIELLE, Carla Gentile MATAS

Brazil

PD 026

Association between unilateral renal agenesis and hearing loss: A comparative study

Bardia MASROURI, Parisa RASOULI FARD, Aida SOLTANMORADI

Iran, Islamic Republic of

PD 027

Balancing accuracy and safety: A review of sedation methods in pediatric auditory brainstem response assessment

Selvarani MOODLEY, Kalishia NAIDU

South Africa

PD 029

Neural correlates of spatial release from masking: Towards objective measures of binaural hearing

Juan-Daniel GALEANO-OTÁLVARO, Benjamin DIEUDONNÉ, Tom FRANCART, Jan WOUTERS

Belgium

PD 030

Audiological monitoring of children with diabetes: Insights from a scoping review and protocol development

Danielle GLISTA, Christine MESTON, Chris ALLAN, Grace MALHEIRO, Jana N BATAINEH, Paleesa KAPOOR, **Robin O'HAGAN**

Canada

PD 031

Exploring the acoustic and mechanical properties of middle ears with cholesteatoma using wideband tympanometry

Rithu RAJAN, **Nitish Ranjan PATEL**

India

PD 032

Reconstructing speech from EEG with large language models

Louis VILLEJOUBERT, Deborah Anne VICKERS

UK

PD 033

Optimising hearing assessment in difficult to test children: Objective testing during natural sleep without sedation

Nicola CAMPOREALE

Australia

PD 034

Review of audiological assessment methods used for children with cerebral palsy

Kalishia NAIDU, Selvarani MOODLEY, Joanne NEILLE

South Africa

PD 035

Vibrotactile responses among deaf students in a Nigerian school for persons with special needs

Olawale OGUNDIRAN

Ghana

PD 036

A mathematical approach to calculate the magnitude of air–bone gap using tuning fork time measures

Aksha DAYAL, **Debadatta MAHALLIK**, Preeti SAHU

India

PD 037

Prevalence of hearing loss among neonates delivered in Dhulikhel Hospital

Aakash PRADHAN, **Sameer KARMACHARYA**, Bikash Lal SHRESTHA

Nepal

PD 038

Development and validation of a Korean Adaption of AzBio Sentence Test (KoBio)

Hyeonwoo SON, Inkyum PARK, Liha SOH, Sumin CHO, Jonghwa Jeonglok PARK, Yoonseob LIM, Kanghyuk LEE, Jee Eun SUNG, **Jeongmi PARK**

Korea

PD 039

Development of the Korean Quick Speech-in-Noise Test (K-QuickSIN)

Yunpyo LEE, Hongsuk YANG, Jieun UM, **Hyunsook JANG**

Korea

PD 040

Features of forms of hearing impairment identified during universal screening of newborn hearing, Republican Specialized Scientific and Practical Medical Center of Pediatrics

Dilnoza Khakimjanovna NURIDDINOVA, Inoyatova Flora ILYASOVNA, Nadjmutdinova Nozima SHAMSUTDINOVNA

Uzbekistan

PD 041

Developing and validating monosyllabic speech materials with psychometric homogeneity for young adult Turkish-Azeri speakers in Iran and compiling the equivalent word lists

Amirreza KARAMI

Iran, Islamic Republic of

PD 042

System- and service-level determinants of providing equitable infant hearing screening in South African primary care

Mukovhe PHANGUPHANGU

South Africa

PD 043

Feasibility of integrating nurse-administered infant hearing screening into an immunisation programme at a primary healthcare clinic in South Africa: A hybrid type 2 trial

Mukovhe PHANGUPHANGU

South Africa

Hearing Disorders

PD 044

Auditory neuropathy spectrum disorder in Friedreich's Ataxia: A case study on behavioural and subjective validation of amplification

I. Zay MELVILLE, Alice H SMITH, Gavin B COAD, Peter R THORNE, Richard H ROXBURGH, Rachael L TAYLOR

New Zealand

PD 045

Transient disappearance of otoacoustic emissions after conventional hearing aid use in OTOF-related auditory neuropathy

Sabrina BOUZAID, Isabelle ROUILLON, Natalie LOUNDON

France

PD 046

Immunological basis of sensorineural hearing impairment in patients with chronic rhinosinusitis: A review of the literature

Aleksandar PERIĆ, Dejan GAĆEŠA, Dragoslava DJERIĆ

Serbia

PD 047

Cellular study of the protective effect on sensorineural hearing loss using cyclophilin D inhibitor

Sujin JUN, Ye-Ri KIM, Jeong-In BAEK, Kyu-Yup LEE, Un-Kyung KIM, Tae-Jun KWON

Korea

PD 048

Treatment outcomes of intratympanic steroid alone versus combined therapy in unilateral idiopathic sudden sensorineural hearing loss

Da Beom HEO, **Yong-Ho PARK**

Korea

PD 049

The role of blood labyrinth barrier in various hearing loss animal model

Yong-Ho PARK

Korea

PD 050

Beyond the audiogram: Interacting effects of cumulative noise exposure and ageing on hearing loss, speech-in-noise, and tinnitus in Palestinian workers

Adnan M. SHEHABI, Christopher J. PLACK, Amal ABU KTEISH, Walaa SROUR, Hannah GUEST

Palestine, UK

PD 051

The effect of varying signal-to-noise ratio on speech perception in noise of normal hearing young adults with noise exposure

Hyeon-Seung KWAK, Kimun LEE, **Jeong-Seo KIM**

Korea

PD 052

Sudden traumatic noise exposure induces an altered wave I in the auditory brainstem response in human

Elenor LUNDGREN, Eleonor KORO, Åsa KJELLGREN, Sten HELLSTRÖM, Fredrik ÖHBERG, Mimmi WERNER

Sweden

PD 053

Efficacy of salvage intratympanic steroid therapy following a two-week course of full-dose systemic corticosteroid treatment in refractory idiopathic sudden sensorineural hearing loss: A retrospective analysis

Chien-Wei HUANG, **Yu-Hsi LIU**

Taiwan

PD 054

Diagnostic accuracy of the audible contrast threshold test and the quick speech-in-noise test for the detection of a speech recognition in noise disorder

Donna Felker CODY, Andrew VERMIGLIO, **Sarah Crandall NUNNS**

USA

PD 055

The path to hearing restoration: Quantifying neural health for cell therapy trials

Eleni GENITSARIDI, Andrew SOULBY, Efstratia PAPOUTSELOU, Patrick BOYLE, Charlotte GARCIA, François GUÉRIT, Rachel HAINES, Faizah MUSHTAQ, Cherith CAMPBELL-BELL, Huib VERSNEL, Robert P. CARLYON, Douglas E. H. HARTLEY

UK, Germany, The Netherlands

PD 056

Exploring the attitudes of Malaysian youth toward noise exposure using the Malay youth attitude towards noise scale

Sarah RAHMAT, Siti Nor Shuhada MOHAMAD RADZI, Noraidah ISMAIL, Najihah AMIR

Malaysia

PD 057

Asymmetric hearing loss performance as a function of demographics and mapping techniques: What is most impactful to maximize outcomes in adult population?

Katie PLUM

USA

PD 058

The impact of single-sided deafness on visual attention and working memory: An electroencephalogram study

Min ZHU, Yufei QIAO, Yingying SHANG

China

PD 059

Wideband acoustic immittance in adults with unilateral sudden sensorineural hearing loss: A comparison with contralateral normal ears

Maisa DARAWSHI-NASSAR, Joseph ATTIAS

Israel

PD 060

ECoG & ABR results in 63 patients with acoustic neurinoma & monitoring of VIII nerve function during the surgery for hearing preservation

Leila AZADEH RANJBAR

Iran, Islamic Republic of

Auditory Neuroimaging and Neuroplasticity

PD 061

Late latency auditory evoked potentials and object-related negativity based on harmonicity in hearing-impaired children

Nasrin GOHAR

Iran, Islamic Republic of, Canada

PD 062

Top-down neural mechanisms supporting speech-in-noise perception in hearing aid users after auditory training

Hyo-Jeong LEE, Leeseul SHIM, Jahee KIM, Gobbeum KIM

Korea

PD 063

Ear-specific patterns of functional connectivity reorganization following single-sided deafness

Gyungsik JEON, Leeseul SHIM, **Hyo-Jeong LEE**

Korea

Genetics and Implications

PD 064

Mixed hearing loss in the pediatric population: Etiology, evolution, and management

Mirko ALDÈ, Diego ZANETTI, Umberto AMBROSETTI, Federica DI BERARDINO, Chiara RASOM

Italy

PD 065

Molecular etiology of bilateral inner ear malformations

Monika OLDAK, Natalia BALDYGA, Nina GAN, Dominika OZIEBLO, Marcin L. LEJA, Mariusz FURMANEK, Henryk SKARZYNSKI

Poland

PD 066

Auditory neuropathy associated with pathogenic variant of the TMTC2 gene: Report of the first pediatric case in Honduras

Sofia Cecilia DISCUA DUARTE, **Lucas Arturo ZELAYA ZALDAÑA**

Honduras

PD 067

Auditory function in ehlers-danlos syndrome: Behavioral and electrophysiological evaluation of a 26-year-old male case

Mariana Ferreira Pires MARTINS, Adriana Neves DE ANDRADE, Diego Lourenço Dos Santos SILVA, Leticia Vieira RODRIGUES, Julia RIGHETI, Piotr Henryk SKARZYNSKI, **Milaine Dominici SANFINS**

Poland, Brazil

PD 068

Audiologic characteristics in a large cohort of patients with biallelic DFNB1 mutations from a single clinical center

Dominika OZIEBLO, Natalia BALDYGA, Nina GAN, Marcin L. LEJA, Gabriela KEPCZYNSKA, Maria WALIGORSKA, Ewa TOMANEK, Henryk SKARZYNSKI, **Monika OLDAK**

Poland

PD 069

Transfection efficiency of vestibular organs according to various AAV serotypes

Myung Hoon YOO, Paul GRATIAS, Evan HALE, Richard OSGOOD, **Artur INDZHYKULIAN**

Korea, USA

Psychoacoustics and Transitional Research

PD 070

Effect of propofol- or isoflurane-based anesthesia on apical and basal cochlear function in domestic pigs: Preliminary results

Diego Da Silva ORMUNDO, Seisse Gabriela Gandolfi SANCHES, Alessandro Rodrigo BELON, Renata Mota Mamede CARVALLO

Brazil

PD 071

Large interaural level differences may improve binaural fusion by improving localization precision

Justin M. ARONOFF, Prajna BK, Itunu M. OYEBAMIJI, Akilah SAMAD, Karla RODRIGUEZ, Stephanie ROMERO, Z. Ellen PENG

USA

PD 072

Impressions of environmental sounds in individuals with and without hearing loss: Using semantic differential factor analysis

Atsuya TAKAYAMA, Chie OBUCHI, Kei SAKAMOTO, Han MATSUDA, Yuki SHIKO, Maiko OSAWA, Yohei KAWASAKI, Yayoi YAMAMOTO, Masae SHIROMA, Tetsuo IKEZONO

Japan

PD 073

Correlation between the pure tone audiometry results and the subjective hearing benefit of tympanoplasty

Chang Hyun CHO

Korea

Auditory Processing

PD 075

The effect of central auditory processing training in autistic children

Sahar Panahpoor ESLAMI

Iran, Islamic Republic of

PD 076

Electrophysiological markers of binaural processing at the brainstem level

So Eun PARK

USA

PD 077

Diagnostic accuracy of the click ordering lateralization test in children with APD

Elizabeth DELLA COLETTE, Carlos Alberto LEITE FILHO, Camila RABELO, Eliane SCHOCHAT

Brazil

PD 078

Navigating auditory assessment in autistic individuals: A narrative review

Doris-Eva BAMIOU, Silvia DI BONAVENTURA, David SKUSE

UK

PD 079

Long COVID and auditory brain function: Investigating central auditory processing alterations

May ELBAR, Navid SHAHNAZ, Eytan DAVID

Canada

PD 080

The impact of classroom soundfield systems on reading fluency in normal-hearing students

Lucy SHIELS, Peter CAREW, Dani TOMLIN, Gary RANCE

Australia

PD 081

Central auditory processing screening and diagnostic program in school-aged children

Maria Francisca COLELLA-SANTOS, Nadia Giulian De CARVALHO, Thalita UBIALI, Carla Gentile MATAS, Maria Isabel Ramos Do AMARAL

Brazil

PD 082

How musical training and perceptual history modulate alpha-band dynamics underlying audiovisual speech integration

Jihyun LEE, Hyo-Jeong LEE

Korea

PD 083

Frequency following response (FFR) in children with school difficulties and stroke: Analysis using descriptive statistics and artificial intelligence

Jheniffer Queiroz RAIMUNDO, Thalita UBIALI, Nadia Giulian De CARVALHO, Betânia Eugenia Rodrigues Da SILVA, Carla Gentile MATAS, Maria Isabel Ramos Do AMARAL, Edson BORIN, Maria Francisca COLELLA-SANTOS

Brazil

PD 084

Speech audibility in learning spaces: Real-time measurement of teacher signal-to-noise ratio in classrooms

William KEITH, Suzanne PURDY, Justine HUI

New Zealand

PD 085

Effects of noise on listening effort in older adults with normal hearing

Kumiko NISHIDA, Yayoi YAMAMOTO, Chie OBUCHI

Japan

PD 086

Changes in cortical auditory evoked potentials by ipsilateral, contralateral, and binaural speech stimulation in normal-hearing adults

Jee Yeon LEE, Hong Ju PARK

Korea

PD 087

Developmental effects and dichotic advantage in the digits-in-noise test for children aged 5–12 years

Ji-Hye HAN, Sungmin JO, Seungik JEON, Jihong AHN, Dohee GU, Hyo-Jeong LEE

Korea

PD 088

Testing auditory processing capacity using summary statistical tasks

Naoko HAMABE, Koki OKUSHIMA, Eskil CASTELEYN, Ryohei KOSHIDA, Emi HASUO, Gerard B. REMIJN

Japan, Belgium

PD 089

Influence of yoga practice on temporal processing and working memory in adolescents

Prajna BHAT J, **Rimcy J**, Augustina Noel Z

India

PD 090

The effect of increased right ear advantage in dichotic listening on speech perception in noise performance among older adults

Alejandro Gabriel IANISZEWSKI GÓMEZ, Adrian FUENTE, Jean-Pierre GAGNÉ

Chile, Canada

PD 091

The importance of breastfeeding on the auditory system, speech and language: A narrative review

Nasrin GOHARI

Iran, Islamic Republic of

PD 092

Assessing the different types of listening difficulty in noise in adults with normal or near-normal hearing

Jenny CHAN, Gabrielle SAUNDERS, Michael STONE, Harvey DILLON

UK

PD 093

Association between socioeconomic status and auditory processing skills among university students

Alejandro Gabriel IANISZEWSKI, **Anthony MARCOTTI**, Sandra ROJAS, Catherine SILVA

Chile

PD 094

Study of spatial processing in children with a history of otitis media

Julia Moraes QUEIROZ, Leticia Reis BORGES-IFANGER, **Maria Francisca COLELLA-SANTOS**

Brazil

PD 095

PLC-IP3 signaling regulates sensory hair cell formation in zebrafish neuromast

Chao YANG

China

Global Audiology and Public Health

PD 096

Geospatial mapping of otitis media and social determinants in remote Australian communities

Prasha SOOFUL, Tinashe DUNE, Christian AGUILAR, Mich THONRTON, Jack DELACY, Sami AZAM, Gypsy De JONGE, Hemi PATEL, Rebecca ALLNUTT, Al-Rahim HABIB, Eva IGNATIOUS, Suresh MAHENDRAN

Australia

PD 097

Audiology technician training in Cameroon

Madison SAUNDERS

Canada, USA

PD 098

What insights can health professionals provide into the resourcing of ear health evaluation programs for Aboriginal and Torres Strait Islander children?

Lisa CALLAHAN, Laura NOLAN, Patrick SHARPE, Emma BURNETT, Samantha HARKUS, Eng OOI, Jacqueline STEPHENS

Australia

PD 099

Development and validation of the Korean HEAR-COMMAND tool: An ICF-based approach to hearing and communication assessment

Razan ALFAKIR, Lily DUNAWAY, Jungmoon HYUN, Hae SAGONG, Tahereh AFGHAH, Soyean KANG

USA, Germany, Korea

PD 100

Bridging the healthcare gap: Advancing health equity for individuals with intellectual and developmental disabilities

Denise Luana CARDONA, **Brittany Greenwell ROUTH**, John HANLEY

USA

PD 101

Railway noise and community conversations: A decolonizing perspective of sound and hearing in Sri Lanka

Lakmali Dinukshi ILEPERUMA, Mershen PILLAY, Ananda Rajitha WICKREMASINGHE

Sri Lanka, New Zealand

PD 102

Factors influencing the professional quality of life in South African audiologists

Senamile NTULI, Ben SEBOTHOMA, Nabeelah NAGDEE

South Africa

PD 103

Promoting healthy hearing over the lifespan

James W. HALL III

USA

PD 104

Building bridges: Interprofessional collaboration between hearing care professionals and spoken language interpreters

Piers D. DAWES, Mehwish NISAR, Mansoureh NICKBAKHT, Marc ORLANDO, John NEWALL, Benjamin HARRIS-ROXAS, Louise HICKSON, Nerina SCARINCI

Australia

PD 105

Association between frequency of adding salt to foods and risk of hearing loss: A population-based cohort study using UK Biobank data

Da Jung JUNG, Kyu-Yup LEE, Youngji HAN, Incheol SEO

Korea

PD 106

Challenges in the professional status of audiologists in Mainland China: A thematic analysis of career experiences

Shangqiguo WANG, Keqi MOU, Jingwen WANG, Changgeng MO, Fei ZHAO, Wenqi ZUO

Hong Kong SAR, China, UK

PD 107

Prevalence of hearing loss and its associations in the Australian eye and ear hearing survey

John NEWALL, Oonagh MACKEN, Richard KHA, Bamini GOPINATH

Australia

PD 108

The Mahino Project: Bringing clarity to ear health in Tonga with 3D printed otoscopes

Zoë HECTOR, Sepi 'AHO, Jenni DE LUCA BAMBER, Sione Frisco FOLAU, Elizabeth HOLT, Joan LEUNG, Deborah MONROE, Michelle POKORNY

New Zealand, Australia, Tonga

PD 109

Recognizing factors impacting audiological evaluation help-seeking behaviors in adult Vietnamese populations in Oklahoma using the Health Belief Model

Maheisha RAVENDRA, **Christi BARBEE**, Marie PHAMILLE, Lakshmi KUMAR

USA, India

PD 110

Developing a sustainable online training framework to enhance audiologist expertise in hearing implant technology

Celina Ann TOBIAS-GRASSO

Austria

PD 111

Voices from the clinic: Professional perspectives on culturally responsive hearing care

Nerina SCARINCI, Cailyn FURZE, Mansoureh NICKBAKHT, John NEWALL, Louise HICKSON, Christopher ARMITAGE, Piers DAWES

Australia, UK

PD 112

Registration of the audiology profession in Australia: Implications for public health services

Jaime LEIGH, Lia TRAVES, Dayse TAVORA-VIEIRA

Australia

PD 113

Understanding the acceptability of hearing healthcare among people from diverse ethnic communities in Australia

Monique WAITE, Chandni ARORA, Mansoureh NICKBAKHT, Cailyn FURZE, Christopher J. ARMITAGE, Nerina SCARINCI, Piers DAWES

Australia, UK

PD 114

Comparative analysis of clinical and developmental milestones in children with hearing loss from diverse ethnic communities in Australia

Manikkuge Dumini DE SILVA, Piers DAWES, Viji EASWAR, Mansoureh NICKBAHKT, John NEWALL, Asaduzzaman KHAN

Australia, Sri Lanka

PD 115

No clear pathway: Hearing healthcare transitions as a missed opportunity for global adolescent health

Jermy PANG, Naomi CLARRY, David ALLEN, Nerina SCARINCI

Australia

PD 116

Hearing screening for adults within the Inn.health study on cardiovascular health

Philipp ZELGER, Josef SEEBACHER, Franz MUIGG, Lukas MEYER-SUESS, Michael KNOFLACH, Stefan KIECHL, Simone GRAF

Austria

PD 117

Using systems thinking to design an approach to delivering ear and hearing care through Indigenous Community controlled health services in Australia

Anita MORROW, Kiri MEALINGS, Luke HALVORSEN, Catherine MCMAHON

Australia

PD 118

Barriers, facilitators, and strategies for the labor inclusion of deaf people in Latin America: A scoping review

Tomas ROJAS-ERIZ, Joselyn LINCO-RIVAS

Chile

PD 119

Comprehensive assessment of in-helmet noise exposure and acute auditory threshold shift in motorcyclists

Jean-Charles CECCATO, Maxime ELKAIM, Virgile PUEL, Paul CAZALS, Jean-Luc PUEL

France

PD 120

Dietary patterns and pure-tone audiometric thresholds in Chilean older adults: An exploratory cross-sectional study

Adrián GONZÁLEZ, Sofía SUTHERLAND, Samuel DURÁN, Carolina PYE, Rosario CASTRO, Natalia SALVO, Anthony MARCOTTI, Alejandro Gabriel IANISZEWSKI GÓMEZ

Chile

PD 121

Socio-cultural factors on parental attitude towards newborn hearing screening

Rithu RAJAN, **Rashmi J BHAT**

India

PD 122

Use of WHODAS 2.0 to assess the functionality of people with hearing impairment: An integrative review

Altair Cadrobbi PUPO, Luisa Barzaghi FICKER, **Cecilia Bonini TRENCHE**

Brazil

PD 123

A systematic review and quality assessment of clinical practice guidelines for congenital hearing loss

Komal AGGARWAL, Lauren K DILLARD, Rohit RAVI, Pallavi MISHRA

USA, India, Switzerland

PD 124

Developing a dynamic early intervention program for early cochlear implants: A data-driven approach to training and tracking in Australia and Japan

Aleisha DAVIS, Akira TAKAGI, Jason HOLLOWELL, **Katie NEAL**, Lee CLARK

Australia

PD 125

Prevalence of asymmetric hearing loss in Korean adult population

Jaeman PARK, Jaesung PARK, June CHOI, Gi Jung IM, Jae-Jun SONG, **Sung-Won CHAE**

Korea

PD 126

Preventing noise exposure in farmworkers

Laura COCO

USA

PD 127

Development of preliminary items for the Korean version of the Hearing Beliefs Questionnaire

Seong Jin JANG, So Yoon LEE, **Hye Yoon SEOL**

Korea

PD 128

Introduction to the global audiology initiative of the International Society of Audiology

Nausheen DAWOOD, **Vinaya MANCHAIAH**, Thais MORATA, Gabriella GREEN, Madison Monlezun SAUNDERS, Sajana ARYAL

South Africa, USA

PD 129

Development of a Māori language ling sound test

Jen SMITH, Carla HENDRY, Jeanette KING, Greg A. O'BEIRNE

New Zealand

PD 130

A framework for advanced audiology practice and training in New Zealand

Katherine JEPSEN, Mike MASLIN, Michelle POKORNY

New Zealand

PD 131

How to write a Knowledge, Attitude, and Practice (KAP) study in audiology: A Practical Guideline

Azadeh BORNA, Seyedeh Zohre MOUSAVI, **Farnaz FATOLAHZADE**, Ahmadreza NAZERI, Behrooz Mahmoodi BAKHTYARI, Saeed MAHMOODIAN

Iran, Islamic Republic of

PD 132

Global audiology training and education survey manuscript

Christopher WATERWORTH, Brenton STUCKI, Nader ZALAQUETT, Joyce Rodvie SAGUN, Komal AGGARWAL, Mateo USECHE, Sarah CHUNG

Australia, USA, The Philippines

PD 133

Growing the audiology profession in Malawi: Progress and next steps for the EARS incorporated–led degree program and clinical network

Wesley ONG, Peter BARTLETT, **Rebecca BARTLETT**

Australia

PD 134

Health-related quality of life and social participation of older adults with hearing loss and their close ones

Anaïs LESSARD, **Adriana LACERDA**

Canada

PD 135

Beyond audiologic rehabilitation: Integrating balance and fall risk assessment into the management of hearing aid users

Razan ALFAKIR

USA

PD 136

Impact of symbol misinterpretation in audiometry: A survey study supporting standardization of symbols for insert earphone

Aksha DAYAL, **Animesh BARMAN**

India

PD 137

WHO initiative to make listening safe

Shelly CHADHA, **Masahito KAWAMORI**, Katya FREIRE, Lidia BEST, Chucri KARDOUS

Switzerland, Japan, Brazil, The Netherlands

PD 138

Myths and misperception regarding hearing loss and use of hearing aids in Nepalese population: A descriptive cross sectional study

Dilli Raj PAUDEL, Prabuddha BHATARAI, Bebek BHATTARAI

Nepal, USA, UK

Auditory Rehabilitation and Speech Perception

PD 139

A preliminary study on the development of an auditory training tool for enhancing discourse competence

Eun-Yeong SHIN, Mi-Kyung LEE, Hyoin LEE, **Soojin CHO**

Korea

PD 140

The benefits of adaptive gain in remote microphones

Min Cheol ROH

Switzerland

PD 141

The three-legged stool of skills needed to live well with hearing loss

Shari EBERTS

USA

PD 142

Person-centered care from the patient's perspective

Shari EBERTS

USA

PD 143

From accuracy to confusion: Phoneme similarity and perceptual distance in Korean monosyllabic word recognition

Sunmi MA, Yeoju KIM, Jieun JOO, Sangmin PARK, **Woojae HAN**

Korea

PD 144

Decoding speech errors in aging ears for tailored rehabilitation

Jieun JOO, Sunmi MA, Yeoju KIM, Sangmin PARK, **Woojae HAN**

Korea

PD 145

Environmental factors of the ICF–audio processor feedback using the APSQ

Ilona ANDERSON, Elena GRANDELIS, Dorothée HOPPE, Magdalena BREU

Austria

PD 146

Evaluation of the home acoustic environment of deaf children: A descriptive study

Cilmara Cristina ALVES DA COSTA LEVY, Graziela LIEBEL, Karla Jean ZIMMERMANN, Debora Frizzo PAGNOSSIN, Maria Eduarda Da Luz ULBRICHT, Elizana DA SILVA, Raquel Schillo KOEHLER, Laís FERREIRA

Brazil

PD 147

Development of the first Patient-Reported Experience Measure (PREM) for hearing loss in audiology

Sian SMITH, Georgina BURNS O'CONNELL, Rebecca KNIBB, Rosemary GREENWOOD, Saira HUSSAIN, Rachel SHAW, Jean STRAUS, Jonathan BANKS, Amanda HALL, Nisha DHANDA, Sian NOBLE, Helen PRYCE

UK

PD 148

Family-centred hearing care: Exploring the experiences of caregivers and communication partners

Georgina BURNS-O'CONNELL, Helen PRYCE, Sian K SMITH, Nicolas DAUMAN, James DERNIE

UK, France, Isle of Man

PD 149

Impact of formal auditory training on frequency following response and cognitive potential P300 responses in a patient under investigation for mild cognitive impairment

Milaine Dominici SANFINS, Cammila Hiromi KUBO, Karin Zazo ORTIZ, Leticia Moraes INOCENCIO, Vitor ROMARIO, Piotr Henryk SKARZYNSKI, Daniela GIL

Brazil, Poland

PD 150

Integrating PCC six elements and tools into counseling for listening-related fatigue: A clinical implementation model

Wen JIANG, Hongbin TIAN, Wen LIU, Mei Dingxiang FENG

China

PD 151

Longitudinal patterns of hearing device use in children with congenital unilateral hearing loss

Vicky ZHANG, Teresa CHING, Sanna HOU, Vijayalakshmi EASWAR

Australia

PD 152

Using eye-tracking to examine plural morphology in three-year-olds children with and without hearing loss

Vicky ZHANG, Nan XU-RATTANSONE, Benjamin DAVIES, Katherine DEMUTH, Teresa CHING

Australia

PD 153

Development of a mobile phone-based auditory training tool for mandarin-speaking adults with hearing loss

Ping TANG, Ruowei WU

China

PD 154

Early intervention decisions in children with congenital and late-onset hearing loss

Wei-Chen CHANG, Fu-Mei LIU, Chia-Ying CHU, **Yu-Chen HUNG**

Taiwan

PD 155

Results of cognitive and motor function rehabilitation in children with hearing impairments

Gaziz TUFATULIN, Alexey ANDRIANOV, Inna KOROLEVA, Vladimir DVORYANCHIKOV

Russia

PD 156

The benefits of utilizing ipsilateral and contralateral acoustic hearing in pediatric cochlear implant users

Kyung Ray MOON, Ji Min KIM, Young-Myoung CHUN, Son A CHANG, Heana KIM, Seung-Hwa JEONG, Sol YOON, Juha KIM

Korea

PD 157

Trust, hearing aid adoption, and predictors of trustworthiness

Chi Yhun LO, Sean GILMORE, Frank RUSSO, Stefan LAUNER, **Gurjit SINGH**

Canada, Switzerland

PD 158

Enhancing listening skills in preschool children with hearing loss: Development of a Korean auditory training program

Gyu Been HWANG, Jeong Min KIM, **Junghwa BAHNG**

Korea

PD 159

Korean Auditory, language, and cognitive Rehabilitation for Infants (KARI) program

Chae Kyung MUN, Chae Bong LIM, Kyu Sung KIM, **Jinsook KIM**

Korea

PD 160

School readiness of first-grade entrants with hearing impairments and additional learning needs receiving auditory-verbal therapy in Taiwan

Kueiju LIN, Rong LIN

Taiwan

PD 161

Korean sentence-based neurofeedback system

Jukyung LEE, Hyosung JOO, Do Anh Quan LUONG, Inyong CHOI, **Jihwan WOO**

Korea, USA

PD 162

Competitive neurofeedback system to improve speech-in-noise perception

Seokhyeon BAE, Hyunju HWANG, Hyosung JOO, Do Anh Quan LUONG, Inyong CHOI, **Jihwan WOO**

Korea, USA

PD 163

Adding a recall task to auditory training significantly improves working memory in older adults with hearing loss

Yuan CHEN

Hong Kong SAR

PD 164

Resonating support: Parents as key partners in hybrid aural rehabilitation therapy - A case study

Neethi JESUDASS, Ramamoorthy RAJALAKSHMI

India

PD 165

Preoperative cognitive predictors of speech-in-noise outcomes after cochlear implantation in adults with severe-to-profound hearing loss

Cordélia FAUVET, Auriane GROS, Peggy GATIGNOL, Valeria MANERA

France

PD 166

Auditory cortical development in young children with hearing loss using cortical auditory evoked potentials

Vicky ZHANG, Ronny IBRAHIM, Teresa CHING, Fabrice BARDY, Gary RANCE, Donella CHISARI, Mridula SHARMA, Harvey DILLON

Australia, UK

PD 167

Evaluating a co-designed hearing education program ('ACE Your Hearing'): A hybrid effectiveness-implementation trial

Nerina SCARINCI, Jasmine FOLEY, Carly MEYER, Catherine HASLAM, Barbra TIMMER, Katie EKBERG, Bec BENNETT, Louise HICKSON

Australia, Switzerland

PD 168

Understanding variability in listening and communication outcomes for children with hearing loss and additional needs

Katie NEAL, Jennifer WHITEWAY, Ingrid STEYNS, Aleisha DAVIS

Australia

PD 169

Effects of word familiarity on the intelligibility of mosaic speech as perceived by young and elderly listeners

Gerard B. REMIJN, Yuna UZUHASHI, Emi HASUO, Kazuo UEDA, Yoshitaka NAKAJIMA

Japan

PD 170

A review of model approaches and strategies in aural rehabilitation & its implementation for children across the globe

Deekshitha AKULA, **Vidya RAMKUMAR**

India

PD 171

Development of the University of Canterbury Four-Alternative Forced Choice (UC4AFC) monosyllabic word list

Greg A. O'BEIRNE, Jayne NEWBURY, Gemma ANDERSON, Eliza RILEY, Hanson CHONG, Sarah MURRAY, Toby MACRAE

New Zealand

PD 172

How do the Individuals with hearing impairment behave regarding to metaphor skills: A systematic review

Seyede Zohre MOUSAVI, Ahmadreza NAZERI1, Farnaz FATHOLLAHZADEH, Azadeh BORNA, **Behrooz MAHMOODI-BAKHTIARI**

Iran, Islamic Republic of

PD 173

Relationship between affiliate stigma, stress, and perceived quality of life among parents of children with hearing loss

Shin Ying CHU, Yifang ZENG, Jaehoon LEE, Alya Farhanah BINTI HANAPI, Onn Wah LEE

Malaysia, USA

PD 174

Speech handicap index in young adults with hearing impairment using cochlear implants

So-Jung YOUN, Miyoung LEE, Sang-Yong SHIM, Minseung KU, Hyanghee KIM, Ji Hye HEO, **In Seok MOON**

Korea

Hearing Aids

PD 175

The International Outcome Inventory for Hearing Aids (IOI-HA) and its correlation with WHOQOL-BREF in assessing the quality of Life of patients with hearing loss using hearing aids

Ahmad ALRASHEED, Khalid ARDI, Montasir JUNAID, Rakan ALRASHEED

Saudi Arabia

PD 176

Navigating speech-in-noise deficits: Linking cognitive health to evidence-based hearing technology selection

Megan QUILTER

USA

PD 177

Epidemiological profile and determinants of binaural hearing aid fitting in adults with hearing loss in China

Wenling JIANG, Yan REN, Haifeng LI, **Zhiwu HUANG**

China

PD 178

From trial to clinical practice: Real-world implementation of user-operated audiometry in hearing aid fitting

Carl Christian PEDERSEN, Ellen Raben PEDERSEN, Chris Bang SØRENSEN, Søren LAUGESEN, Raul SANCHEZ-LOPEZ, Jacob NIELSEN, Daniel Lindy PEDERSEN, Jesper Hvass SCHMIDT

Denmark

PD 179

Influence of financial toxicity on hearing aid feature and service delivery preferences

Preeti PANDEY, Anu SHARMA, Kerry WALKER, Kayla CORMIER, Carly SCHIMMEL, Sung-Joon MIN, De Wet SWANEPOEL, Elaine HOI NING NG, Vinaya MANCHAIAH

USA, Denmark

PD 180

Efficacy and effectiveness of hearing devices for adults with mild to severe hearing loss: A systematic review and meta-analysis of randomized controlled trials

Preeti PANDEY, Megan KNOETZE, Anu SHARMA, De Wet SWANEPOEL, Hansapani RODRIGO, Eldre BEUKES, Vinaya MANCHAIAH

USA, South Africa, UK

PD 181

Effects of DNN-based denoising hearing aids on categorical perception of Mandarin tones

Yuxia WANG, Xin TIAN, Xinran DU, Jingjing GUAN, Volker KUEHNEL, Stefan LAUNER, **Chang LIU**

China, Switzerland, USA

PD 182

Nuance eyeglasses with amplification: Evaluation of speech-in-noise performance, SII scores, and effect on listening effort in a group of adults with mild to moderate hearing loss

Paula FOLKEARD, Yu-Ying SUNG, Tami HAREL-ARBELI, Giulia CUCCATO, Susan SCOLLIE

Canada, Italy

PD 183

Comparative efficacy of PSAPs and hearing aids in unilateral hearing loss: A randomized crossover trial

Da Beom HEO, **Yong-Ho PARK**

Korea

PD 184

Comparison of remote and face-to-face hearing aid fitting in terms of satisfaction and outcomes

Yuseon BYUN, Hyeyun YIM, Junghee SAGONG, **Youngjoon SEO**

Korea

PD 185

Impact of hearing aid use duration on depressive symptoms, cognitive function, and quality of Life in older adults with hearing loss: Evidence from a middle-income country

Joseane De Oliveira SILVA, **Maria Cecilia MARTINELLI**

Brazil

PD 186

Restoring auditory discrimination in noise: Evidence for a deep neural network denoising system in hearing aids

Wanting HUANG, Jingjing GUAN, Hongwei DING, Volker KÜHNEL, Stefan LAUNER

China, Switzerland

PD 187

Assessing advanced hearing aid algorithms using a Chinese Concurrent CRM (CC-CRM) multi-talker speech test

Xin TIAN, Matthias LATZEL, Volker KUEHNEL, Cloe YANG, Jingjing GUAN

China, Switzerland

PD 188

AI-denoising in the Phonak Audéo I90-Sphere hearing aid: Speech-in-noise performance and listening effort in a group of adults with mild to moderately-severe hearing loss

Paula FOLKEARD, Vahid ASHKANICHENARLOGH, Vijay PARSA, Volker KÜHNEL, Bilal SHEIKH, Jinyu QIAN, Mohamed RAHME, Yu-Ying SUNG, Stefan LAUNER, Susan SCOLLIE

Canada, Switzerland

PD 189

Hearing loss compensation and noise reduction using deep neural networks: How to combine?

Lars BRAMSLØW, Szymon DRGAS

Denmark, Poland

PD 190

Band-importance function and transfer function variation by hearing loss severity in Korean adults: Implications for speech intelligibility index

Jimin JEONG, Jangwon LEE, **In-Ki JIN**

Korea

PD 191

The future of hybrid meetings: Improving accessibility in conference rooms using Auracast broadcast audio

Jill MECKLENBURGER, Sarah MORGAN, **Marie Joie MARASIGAN**

USA

PD 192

Adult hearing aid users' perspectives on outcome expectations and perceived value for money: A qualitative study using the health belief model

Nausheen DAWOOD, Ilze OOSTHUIZEN, Faheema MAHOMED, Vinaya MANCHAIAH, **De Wet SWANEPOEL**

South Africa, USA, India

PD 193

Hearing loss: Social stereotypes

Mariia MARKOVA

Russia

PD 194

Audiologists' knowledge of, experiences with, and attitudes toward counseling pre-teens and their families about the "Hearing Aid Effect"

Merrellann SAWYER, **Carole JOHNSON**

USA

PD 195

Factors associated with hearing aid discontinuation among older adults

Bruna SOARES BATISTA, Katia DE ALMEIDA, Káris ESTER DONG-CRESTE

Brazil

PD 196

Imprecision in the impression: Does the slit-leak vent behave like a traditional vent?

Aksha DAYAL, **Debadatta MAHALLIK**, Preeti SAHU

India

PD 197

Perceived health, hearing aid self-efficacy, and communication-related quality of life in older adults with hearing loss: A correlational study

Jin-Dong KIM, **Myungsun SHIN**

Korea

Aging and Cognition

PD 199

The invisible burden: Linking hearing loss, cognition, and mental health through the listen to this global initiative

Megan QUILTER

Denmark

PD 200

SRT2104-induced SIRT1 activation enhances mitophagy to mitigate senescence in auditory cells

Sung-Il CHO, Eu-Ri JO, Gi-Sung NAM

Korea

PD 201

Relationship between working memory and listening ability in older adults

Yayoi YAMAMOTO, Chie OBUCHI

Japan

PD 202

Hearing aid experience and its associations with hearing Loss, cognition, balance confidence & fall risks: Correlational analyses in Malaysian older adults

Vivekanandh MATHIYALAGAN, **Nor Haniza ABDUL WAHAT,** Cila UMAT, Mahadir AHMAD

Malaysia

PD 203

Muscle quality correlates with hearing thresholds: A cross-sectional analysis

Young-Jee JEON, Ji Ho LEE, Byung Chul KANG, Joong-Keun KWON

Korea

PD 204

Association between music perception and cognitive function: A pilot study using AMP and SCST

Hyungjun SIM, Sungyeol KIM, Eunhyang KIM, Joungseo CHOI, Minsik PARK, Juhee CHIN, **Hyunjung AN**

Korea

PD 205

Effects of auditory training on cognitive and auditory processing abilities in older adults with mild cognitive impairment: A randomised controlled trial

Kanaka GANAPATHY, Leelavathi THAMIZHMANI, **Hari Prakash PALANISWAMY**, Arivudai Nambi PITCHAIMUTHU

India

PD 206

Using the Integrated Digit-in-Noise Test (iDIN) for hearing and cognitive function screening in the community

Shangqiguo WANG, Lena L. N. WONG, June H. C. TUNG

Hong Kong SAR

PD 208

The impact of auditory and cognitive factors on speech-in-noise performance in Chinese older adults

Wen JIANG, Chanfeng SHENG, Yan WANG, Xiaofeng LAI, Wen LIU, Shangqiguo WANG

China

PD 209

Translation and validation of the "the practitioner assessment network typology" questionnaire in the Kannada Language

Rajashree Ganesh BHAT, **Kanaka GANAPATHY**, Hari Prakash PALANISWAMY, Shwetha T S

India

PD 210

Integrating hearing screening into geriatric health services: A pilot study in a selected elder's home in Sri Lanka

Lakmini BALASURIYA, Buddhinie NONIS, **Dinukshi ILEPERUMA**

Sri Lanka

PD 211

Differences in phonetic neural processing between normal and mild age-related hearing loss adults

Minjae JEON, Jeewon LEE, Hyosung JOO, Yoonseob LIM, **Jihwan WOO**

Korea

PD 212

Age-related hearing loss and cognitive decline: A systematic review of clinical challenges and emerging virtual reality applications

Seyede Zohre MOUSAVI, Azadeh BORNA, Farnaz FATHOLLAHZADEH

Iran, Islamic Republic of

PD 213

Foresight into cognitive screening for the aging generation with hearing loss: Toward multisensory and AI driven prediction models

Farnaz FATHOLLAHZADEH, Ahmadreza NAZERI, Seyede Zohre MOUSAVI, Azadeh BORNA, **Saeid MAHMOUDIAN**, Behrooz MAHMOODI-BAKHTIARI

Iran, Islamic Republic of

PD 214

Impact of working memory and contextual cues on speech perception in noise among the elderly

Sangyong SHIM, **Hyunsook JANG**

Korea

PD 215

Environmental noise and air pollution as risk factors for hearing loss and dementia: The Tramontana Cohort Study in Taranto, Italy

Rodolfo SARDONE, Feliciana CATINO, Nicola Quaranta

Italy, UK

PD 216

A machine learning approach to sensory-based cognitive risk prediction in the older population of southern Italy

Rodolfo SARDONE, Feliciana CATINO, Nicola Quaranta

Italy, UK

PD 217

Cognitive assessment in NHS hearing aid clinics for older adults

R. OMAR, E. DAVIES, N. SCOTT-FIELDER, **E. ZEREN**, K. GREEN, L. MILLS, R. KATIRI, T. MOUNTAINS, J. CRAWLEY, O.s ALI, B. MASUNDA, G. SMITH, S. COSTAFREDA, A.g SCHILDER

UK

Vertigo and Balance Disorders

PD 218

Diagnostic utility of caloric and video head impulse tests in vertigo

Po-Sheng LIN, Chi-Yuan YIN

Taiwan

PD 219

Relationship between visual vertigo and postural control in adults and older adults with vestibular dysfunction

Bárbara Souza BATISTA, Fátima Cristina Alves BRANCO-BARREIRO, Rodrigo Lima MARQUES, Guilherme Batista DA SILVA, Gabrielle Da Silva MATOS, Fernando Freitas GANANÇA, Karen De Carvalho LOPES

Brazil

PD 220

Sustained functional gains after vestibular rehabilitation in older adults with vestibulopathy: A longitudinal trajectory across short-, mid-, and long-term follow-up

Fátima Cristina Alves BRANCO-BARREIRO, **Maysa Ramos Pinto MOROZETTI**, Caroline Meneses LOPES, Karen De Carvalho LOPES, Fernando Freitas GANANÇA

Brazil

PD 221

Assessing dynamic instability in bilateral vestibulopathy patients during daily living tasks using inertial measurement units

Gautier GROUVEL, Thomas ZIMMERMANN, Raymond VAN DE BERG, Nils GUINAND, Stéphane ARMAND, Angelica PEREZ FORNOS, Julie CORR

Switzerland, The Netherlands

PD 222

The Geneva Balance Test as a useful tool to monitor pediatric patients with bilateral vestibulopathy after vestibular rehabilitation

Emile MONIN, Anissa BOUTABLA, Jean-Francois CUGNOT, Nils GUINAND, Hélène CAO VAN, Angelica PEREZ FORNOS

Switzerland

PD 223

Optimizing vestibular implant stimulation and electrode arrays in a non-human primate

Woo Seok KANG, Katherine MUELLER, Evan VESPER, Ruolan SUN, Celia FERNANDEZ BRILLET, Brian MORRIS, Charles DELLA SANTINA

Korea, USA

PD 224

Novel approach to vestibular caloric testing

Christopher SPANKOVICH

USA

PD 225

Pilot study on the relationship between balance, functional mobility, self-reported dizziness, and falls in middle-aged and older adults

Fátima Cristina Alves BRANCO-BARREIRO, Caroline Meneses LOPES, Amanda Miranda LOPES, Karen De Carvalho LOPES, Fernando Freitas GANANÇA

Brazil

PD 226

Characteristics of uncompensated acute unilateral vestibulopathy patients: Comparison of spontaneous nystagmus and direction changing nystagmus

Yu Jung PARK, Eun Jeong JO, Hye Yoon LEE, Jae Yun JUNG, Ji Eun CHOI, **Min Young LEE**

Korea

PD 227

Analysis of clinical characteristics in Meniere's disease patients with tumarkin crises

Yafeng LYU, Daogong ZHANG, Huirong JIAN, Yawei LI, Xiaofei LI

China

PD 228

Long-term efficacy analysis of endolymphatic duct blockage for intractable Meniere's disease

Yafeng LYU, Daogong ZHANG, Yawei LI, Xiaofei LI, Jing WANG, Zhaomin FAN, Haibo WANG

China

PD 229

Clinical characteristics of 315 cases with bilateral Meniere's disease

Yafeng LYU, Huirong JIAN, Yawei LI, Xiaofei LI, Jing WANG, Daodong ZHANG

China

PD 230

Standardization of Vestibular Evoked Myogenic Potentials (VEMP) protocols and normative values in Asian adult population: A systematic review

Muhammad Ilyas SAPUTERA, Wijana WIJANA

Indonesia

PD 231

Living with chronic vestibular symptoms: A mixed-method study on the religious practice and emotional experiences of Muslims

Nurul Syarida MOHD SAKERI, Saiful Adli JAMALUDDIN, Mohd Normani ZAKARIA

Malaysia

PD 232

Otolith-specific vestibular deficits as differential biomarkers for amnestic and non-amnestic mild cognitive impairment subtypes

Nahid SHAMSI, **Mansoureh ADEL GHAHRAMAN**, Reza HOSEINABADI, Shohreh JALAIE, Vajiheh AGHAMOLLAII, Sara YARGHOLI

Iran, Islamic Republic of, UK

PD 233

Data-driven analysis from audiometric profiles of 1200 patients consulting for dizziness and vertigo

Cécile NICOLAS-PUEL, Jérôme BOURIEN, Régis NOUVIAN, Jean-Charles CECCATO, Jean-Luc PUEL

France

PD 234

Balance training in older adults with idiopathic dizziness

Patricia CASTRO, Edoardo SCHIFINO, John ALLUM, Adolfo BRONSTEIN, **Diego KASKI**

United Kingdom, Chile, Italy, Switzerland, UK

PD 235

Impact of mild hearing loss on postural control in elderly patients with chronic dizziness

Jaeha LEE, Se A LEE, **Jongdae LEE**

Korea

PD 236

Positional nystagmus in sudden sensorineural hearing loss with vertigo

Chang-Hee KIM, Dong-Han LEE, Jiah KIM, Chanhui HONG

Korea

PD 237

Single-cell transcriptomic atlas of zebrafish otic vesicle development reveals key regulators of otolith formation

Ruijun SHI, Junxiang XU, Xin WANG, **Dong LIU**

China

Future E-Health, Innovative Technology and Therapies

PD 238

Transforming hearing rehabilitation: Harnessing self-directed auditory training in the era of e-health

Sangmin PARK, Sunmi MA, Jieun JOO, **Woojae HAN**

Korea

PD 239

Deep learning based automated diagnosis of otitis media from tympanic membrane images

Min Chae JEON, **Kyoung Ho PARK**

Korea

PD 240

Clinical evaluation of a digital auditory-cognitive rehabilitation program for age related hearing loss

Chan Mi LEE, **Kyoung Ho PARK**

Korea

PD 241

Student perceptions of simulation-based aural rehabilitation training in audiology education

Michelle LOELIGER, Jutta HAU, Richard ANDERSON

Australia

PD 242

A robust auto-calibration algorithm using headset and microphone for reliable dB output in hearing screening for Normal Pressure Hydrocephalus (NPH)

Daegwan KIM, Yumin PARK, Nahyeon BAE

Korea

PD 243

Real-world evaluation of the AudioKey 3 App: Performance, user satisfaction, and cochlear implant usage insights

Adna OMERAGIC BEJDIC, Dorothée HOPPE, Magdalena BREU, Michael MAIR, **Ilona ANDERSON**

Austria

PD 244

Challenges of post-operative cochlear implant intervention in Bhutan: Exploring possible way forward

Pelden WANGCHUK

Bhutan

PD 245

Verification, analytical validation, and clinical validation study protocol of an affordable otoacoustic emission device from India

Vishnu SARAVANA, **Vidya RAMKUMAR**

India

PD 246

Development and validation of kiosk-based audiometry as pioneer in digital health in audiology

Donghyeok LEE, Chanbeom KWAK, **Young Joon SEO**

Korea

PD 247

From maps to metrics: validating MSI for noise–hearing links

Chul Young YOON, Jinsu KIM, Yeonho SEO, Dam YOON, **Young Joon SEO**

Korea

PD 248

Piloting a student-facilitated tele-audiology infant diagnostic program

Jocelyn PHILLIPS, Dani TOMLIN, Kelley GRAYDON, Julia SARANT

Australia

PD 249

Proof of concept: AI-generated video enhancement of the HHIE-S questionnaire for improved accessibility – A Multi-stakeholder expert evaluation

Changgeng MO, Shangqiguo WANG

China, Hong Kong SAR

PD 250

Active learning-based automated audiometry vs standard Hughson-Westlake for notch detection

Ines BEN AÏSSA, Meriem JAÏDANE, Rim AMARA

Tunisia

PD 251

Immersive assessment of auditory perception according to Listening habits: A pilot study in musicians and non-musicians

Cordélia FAUVET, Auriane GROS, Peggy GATIGNOL, Valeria MANERA

France

PD 252

The language-independent ACT and AMSPECT tests fail to capture speech recognition ability at the phoneme, word, and sentence levels

Erik WITTE, Sofia JANSON, Agneta PALMKVIST, David SIMIC

Sweden

PD 253

Evaluation of outer hair cell function based on contralateral suppression of distortion-product otoacoustic emissions: Numerical analysis using a human cochlear model

Sinyoung LEE, Ken KIYONO

Japan

PD 254

Expanding clinical exposure through simulation: A theoretical framework for audiology training in African contexts

Selvarani MOODLEY, Dhanashree PILLAY

South Africa

PD 255

Validation of an m-health based hearing screener for children below 6 years of age in India and evaluation of its usability among grassroots workers

Deepashree JOSHI B, **Vidya RAMKUMAR**, Anil PRABHAKAR, Ramya VAIDYANATH

India

PD 256

Exploring stakeholders' perspectives on artificial intelligence (AI) integration in hearing healthcare

Joanie FERLAND, Matthieu J. GUITTON, **Andreanne SHARP**, Loonan CHAUVETTE

Canada

PD 258

LLM-assisted Wikipedia editing in undergraduate audiology training

Hector Gabriel Corrale De MATOS, Thais Catalani MORATA, Kátia De Freitas ALVARENGA, Lilian Cássia Bórnia JACOB

Brazil

PD 259

Wikidata datathon on audiology evidence: Building data and computational literacy for open science

Hector Gabriel Corrale De MATOS, Fernanda ZUCKI, Thais Catalani MORATA, Kátia De Freitas ALVARENGA, Lilian Cássia Bórnia JACOB

Brazil

PD 260

Advancing hearing health through digital innovation in Sub-Saharan Africa: A systematic review (2014–2024) and the case of KnewEar AI

James David KOMANYA, Ali JAFFAR, Halima Nassoro SHEMSI

Tanzania, United Republic of

PD 261

Need and Implementation of Automated Method for Testing Auditory Sensitivity (AMTAS) in industrial audiology in Malaysia: A study protocol

Nor Hidayah MOHAMMED HATTA

Malaysia

PD 262

Exploring telehealth solutions for auditory processing assessments: A pilot study

Grace NIXON, **Lucy SHIELS**, Dani TOMLIN

Australia

PD 263

Insights from the use of the COSI 2.0 in audiological clinical practice: Evidence from a large-scale pilot study

Taegan YOUNG, Bettina TURNBULL, Padraig KITTERICK, Lindsay PRUSICK, Giao NGUYEN, Daniela DIXON

Australia

Tinnitus and Hyperacusis

PD 264

Tinnitus and hyperacusis in high-functioning autism children: Clinical insights and usefulness of desensitization therapy

Rakesh GODAVARTHI, **Vijaya Kumar NARNE**, Sri Lakshmi GODAVARTHI

India, Saudi Arabia

PD 265

Educational counseling for tinnitus management: A scoping review of intervention structure, content, and outcomes

Jung Suk YANG, **In-Ki JIN**

Korea

PD 266

Predictors of the effectiveness of cochlear implantation in the rehabilitation of patients with tinnitus due to sensorineural hearing loss

Elena LEVINA, Vladimir DVORYANCHIKOV, Vladislav KUZOVKOV, Sergeii LEVIN, Kseniya SAMSONOVA

Russia

PD 267

Objective neurophysiological correlates of behavioral interventions for tinnitus: A scoping review of EEG and ERP evidence

Keerthana RAJANBABU, **Hari Prakash PALANISWAMY**

India

PD 268

Diagnostic accuracy of simple screening questions for hyperacusis in patients with tinnitus: Comparing loudness discomfort levels and the hyperacusis questionnaire

Fátima Cristina Alves BRANCO-BARREIRO, Talita Fecchio PAULINO, Anna Carolina Marques Perrella BARROS, Flávia Alencar BARROS, Ektor Tsuneo ONISHI

Brazil

PD 269

Electroencephalographic biomarkers in tinnitus: A traditional review of current approaches and clinical perspectives

Hyeonsu OH, **In-Ki JIN**

Korea

PD 270

The association between smoking and tinnitus based on population data in Korea

Junhui JEONG

Korea

PD 271

App-based digital therapy for chronic tinnitus: Clinical outcomes from a multicenter prospective study

Jae-Hyun SEO, Jee Won MOON, Sumin LEE, In Seok MOON, Il Joon MOON, Jae-Jin SONG, Jae-Jun SONG

Korea

PD 272

Evaluating the effectiveness of custom hearing aids with occlusive earmolds for sound tolerance in individuals with hyperacusis

Pierre H. BOUREZ, Guillaume T. VALLET, François BERGERON, Mathieu HOTTON, Philippe FOURNIER

Canada

PD 273

Assessing hearing health risks and prevention attitudes among musicians: A pilot study

Michelle YEUNG, Pauline Patie PELICAUT, Audrey PAGÉ, Milena Kovalski OLIVEIRA, Sylvie HÉBERT, Victoria DUDA, Tony LEROUX, Myriam BOUCHER, Dominic THIBAULT, Miguel CHAGNON, Caroline TRAUBE, **Adriana LACERDA**

Canada

PD 274

Applying the tinnitus thermometer tool in person-centered tinnitus rehabilitation: Clinical correlations with the THI

Wen JIANG, Jie QIU, Wen LIU, Mei Dingxiang FENG

China

PD 275

Audiological and otologic characteristics of patients with musical hallucinations

Chanil SONG

Korea

PD 276

Clinical case report: Evolution of the emotional impact of tinnitus over 12 weeks of Cognitive-Behavioral Therapy (CBT), evaluated using the THI

Giovani DE OLIVEIRA E SILVA, Livia Noleto De Rezende OLIVEIRA, Ana Margareth MANIQUE DE MELO, Stephanie ROSEMANN, **Edna Aragao Farias CANDIDO**, Antônio Gabriel MEDEIROS

Brazil, Germany

PD 277

Features of tinnitus in patients with acoustic trauma

Ksenia SAMSONOVA, Vladimir DVORYANCHIKOV, Elena LEVINA, Galina KOSHKINA, Elena VYAZEMSKAYA

Russia

PD 278

Can tinnitus cause speech in noise deficit?

Srividya GRAMA BHAGAVAN, **Ishan BHATT**

USA

PD 279

Anxiety in patients with hyperacusis and tinnitus

Elzbieta GOS, Danuta RAJ-KOZIAK, Piotr H. SKARZYNSKI, Henryk SKARZYNSKI

Poland

PD 280

Correlation between quantitative EEG and tinnitus handicap inventory: Identifying qEEG parameters as potential indicators of subjective tinnitus severity

Sungsu LEE, Jiwon KIM, Gwangsup JEONG, Eunjin OH, Hong-Chan KIM, **Hyong-Ho CHO**

Korea

PD 281

Effectiveness of hearing aid sound support in reducing tinnitus severity and improving hearing in individuals with hearing loss and tinnitus

Dani RAMDANI

Indonesia

PD 282

Short-term fluctuations to complete resolution in pulsatile tinnitus following the modified sigmoid sinus wall reconstruction surgical technique using bone cement

Yue-Lin HSIEH, Jae-Jin SONG, **Wuqing WANG**

China, Korea

PD 283

Effective sound therapy using a hearing aid and educational counseling: Real-world outcomes from 1,240 patients with chronic tinnitus

Ayaka SASAKI, Daisuke SUZUKI, Ko HENTONA, Naoki OISHI, Kenichi TAKANO, Seiichi SHINDEN

Japan

PD 284

Tinnitus: Mechanisms, diagnosis, and treatment – A review

Maryam DORRAZEHI

Iran, Islamic Republic of

PD 285

The effect of tinnitus on listening effort: A systematic review

Seyed Alireza ALAVI DEHKORDI, Saeid MAHMOUDIAN, Negin DASMEH

Iran, Islamic Republic of

Auditory Implants

PD 286

Barriers beyond the audiogram: Rethinking adult cochlear implant candidacy in the real world

Muhammed AYAS

UAE

PD 287

Interest of the electrically evoked stapedius reflex threshold (eSRT) measurements on cochlear implant programming

Sabrina BOUZAID, Nara VAEZ-LEPPIN, Isabelle ROUILLON, Natalie LOUNDON

France

PD 288

Cochlear implantation outcomes in RRM2B-related deafness: A case report and literature review

Sabrina BOUZAID, Natalie LOUNDON, Isabelle ROUILLON

France

PD 289

Use of cortical auditory evoked potentials in cochlear-implanted children

Sabrina BOUZAID, Isabelle ROUILLON, Natalie LOUNDON

France

PD 290

Categorical perception of speech under simulated cochlear implant processing

Sungmin LEE, Soo Jung LEE, Won SO

Korea, USA

PD 291

Evaluation of the auditory performance in noise of bone-anchored hearing system in patients with single side sensorineural deafness

Sébastien SCHMERBER, Philippine TOULEMONDE, Christophe VINCENT, Thibaud DUMON, Ashley BAGUANT, Raphaele QUATRE

France

PD 292

Pitch pattern reproduction in children with cochlear implants

Sayaka OGANE, Chie OBUCHI, Masae SHIROMA, Yuki SATO, Tetsuya TONO

Japan

PD 293

The impact of altered cochlear biomechanics on hearing preservation after cochlear implantation

Adam WALKOWIAK, Artur LORENS, Marek POLAK, Piotr Henryk SKARZYNSKI, Henryk SKARZYNSKI

Poland, Austria

PD 294

Effect of cochlear implant on language acquisition in children with hearing impairment in Bangladesh

S M TOUFIQ, Adiba AFNAN, Md Bulbul AHMED, Md Ariful ISLAM, Jesmin ARA

Bangladesh

PD 295

Prevalence of medical/surgical management issues for children implanted younger than 9 months compared with children implanted between 9 and 24 months

Shani DETTMAN, Jaime LEIGH, Danielle BAKER, Maria ROGERS-CIMPOESU, Nicole MAKILING, Therese MOFFITT

Australia

PD 296

The impact of paediatric cochlear implantation on family life and adult cochlear implantation on partner relationships

Robert EIKELBOOM, Ché LAMBINON, Chané DE BEER, Rebecca J BENNETT, Talita LE ROUX

Australia, South Africa

PD 297

Expanding cochlear implant candidacy: New evidence and SRT-in-noise criteria for adult cochlear implantation

Jaime LEIGH, Richard DOWELL, Rodney HOLLOW, Robert BRIGGS

Australia

PD 298

The feasibility of the interphase gap (IPG) effect of electrically evoked compound action potential to characterize the functional status of the auditory nerve in cochlear implant users

Jeong-Seo KIM, Sung Hwa HONG, Il Joon MOON

Korea

PD 299

Improving quality of life in the elderly through cochlear implants

Noriko KAWAKAMI, Shin KARIYA

Japan

PD 300

Surgical and auditory outcomes of cochlear implantation in children with CHARGE syndrome

Yeonjoo CHOI, Yun Ji LEE, Woo Seok KANG, Joong Ho AHN, Hong Ju PARK, Jong Woo CHUNG

Korea

PD 301

Device use time better predicts cortical and speech outcomes than time since activation in adult cochlear implant users

Dayse TAVORA-VIEIRA, Caris BOGDANOV, Patrick CONNOLLY, Aanand ACHARYA

Australia, Austria

PD 302

Using cortical auditory evoked potentials in middle ear and bone conduction implant users: An objective method to optimise the fitting

Dayse TAVORA-VIEIRA, Marcus VOOLA, Lorenzo VIGNALI, Hamidrez MOJALLAL

Australia, Austria

PD 303

Cortical measurements as a trouble shooting tool or to help with fine tuning

Dayse TAVORA-VIEIRA, Caris BOGDANOV, Aanand ACHARYA

Australia

PD 304

Cochlear implant anatomy based fitting: A single centre report on early experience and subsequent protocol development for interventional outcome comparison

Andrew Jonathan SOULBY, Irumee PAI

UK

PD 305

Evaluation of cochlear implant rehabilitation services in Wales and England: A pilot study

Liping ZHANG, Pinal PARMAR

China, UK

PD 306

Residual hearing preservation in cochlear implants

Philipp GLOCKNITZER, Astrid MAGELE, Georg Mathias SPRINZL

Austria

PD 307

The use of bone-conduction implants in patients with rare genetic syndromes associated with ear malformations

Piotr Henryk SKARZYNSKI, Katarzyna Beata CYWKA, Emilia CZAPLICKA, Henryk SKARZYNSKI

Poland

PD 308

Bone conduction versus middle ear implant treatment concept in patients with asymmetrical mixed hearing loss

Piotr Henryk SKARZYNSKI, Katarzyna Beata CYWKA, Hamidreza MOJALLAL, Kamila KONDRACIUK, Anna RATUSZNIAK

Poland, Austria

PD 309

Outcomes of active bone conduction implants (Bonebridge, Sentio, and Osia): A clinical study in pediatric and adult populations

Piotr Henryk SKARZYNSKI, Katarzyna Beata CYWKA, Emilia CZAPLICKA, Henryk SKARZYNSKI

Poland

PD 310

Evaluating the oticon ponto in patients after radical modified mastoidectomy

Piotr Henryk SKARZYNSKI, Anna RATUSZNIAK, Artur LORENS, Anita OBRYCKA, Henryk SKARZYNSKI

Poland

PD 311

Study of processing skills and developmental auditory responses in deaf children with cochlear implants and prelingual onset (SparCI)

Carolina Ferreira LEAL, Debi VICKERS, Elizabeth BUCHANAN-WORSTER, Nicholas HAYWOOD

UK

PD 312

Benefit of target–masker speech rate differences on speech perception in children with cochlear implants under competing speech conditions

Yuki SATO, Chie OBUCHI, Masae SHIROMA, Sayaka OOGANE, Tetsuya TONO

Japan

PD 313

Perception of harmonic musical intervals by cochlear implant users

Anna RATUSZNIAK, Artur LORENS, Agata MIKUSEK, Anita OBRYCKA, Ewa CZEPICZEK, Henryk SKARZYNSKI

Poland

PD 314

Tracking use and hearing gains: Single sided deafness cochlear implant datalogging

Roberta MARINO, Caris BOGDANOV, Aanand ACHARYA, Dayse TÁVORA-VIEIRA

Australia

PD 315

The impact of auditory deprivation and cortical reorganization on speech perception after cochlear implantation in adults with prelingually unilateral and bilateral deafness

Thomas MAYR, **Claudia HÜBL**, Georg M. SPRINZL

Austria

PD 316

Impact of auditory deprivation and cortical reorganization on speech perception after cochlear implantation in adults with postlingually unilateral and bilateral deafness and possible patient outcome predictions

Claudia HÜBL, **Thomas MAYR**, Georg M. SPRINZL

Austria

PD 317

Piezoelectric bone conduction device performance evaluation using Laser Doppler Vibrometry (LDV)

Krittayot PATCHANEE, **In Seok MOON**

Korea, Thailand

Others

PD 318

Auracast™ in action: Demonstrations mark a watershed moment in hearing access

Megan QUILTER

USA

PD 319

Sex difference in age-related hearing loss before and after menopause in Korean: A cross-sectional study

Sunghee KIM, Eun Jung LIM, Tae Hoon KIM, Jun Ho PARK

Korea

PD 320

Investigating the family and child's experience of microtia and hearing loss

Saira HUSSAIN, Helen PRYCE, Amanda HALL

UK

PD 321

Prevalence and etiology of hearing impairment in a historically isolated region of Northern Sweden

Åsa KJELLGREN, Eleonor KORO, Fredrik NYLEN, Irina GOLOVLEVA, Mimmi WERNER

Sweden

PD 322

An English–Vietnamese clinical guide for audiologic care of Vietnamese patients

Marie M. PHAMILLE, Andrew B. JOHN, Tram Thi Phuong BUI

USA

PD 323

A case of congenital severe hearing loss diagnosed with autism spectrum disorder and attention-deficit/hyperactivity disorder in adulthood

Rika MURATA, Masako NOTOYA, Nobuhiro TAKAHASHI, Minoru TOYAMA

Japan

PD 324

Small vessel disease and risk of hearing loss: A nationwide NHIS cohort study

Chul Young YOON, Jinsu KIM, Yeonho SEO, Dam YOON, Young Joon SEO

Korea

PD 325

Microbial presence and hearing outcome in surgically treated middle ear cholesteatoma

Charlotte WESTRIN, Eleonor KORO, Mimmi WERNER

Sweden

PD 326

Self-understanding of disability among students with hearing loss: Associations with educational background and explanatory experiences

Ayumu SAITA, Chie OBUCHI

Japan

PD 327

Parenting behaviors of caregiver with normal hearing raising children with hearing loss

Mie OSHIMA, Chie OBUCHI

Japan

PD 328

Stuck in the middle with you: Young people's perspective on deafness and peer mentoring

Katie NEAL, Max HARPHAM, Aleisha DAVIS, Hamish FAIRLIE

Australia

PD 329

Patterns of co-speech gesture and conversation repair in adults with acquired hearing impairment

Victoria SHAKES, Karen SPARROW, Sarah WALLIS

Australia

PD 330

Cognitive interference effects of colour-word and counting stroop task on the Auditory Brainstem Response (ABR) in children and adults

Nur Hafizah SULAIMAN, Muhamad Kamarul Asyraf BAKRI, Muhammad Imran YUSRI, Rina Kartini ALHAWARI, Ahmad Aidil Arafat DZULKARNAIN

Malaysia

PD 331

Cognitive and psychological impact of speech–text time lags on individuals who are hard of hearing

Kanon EBASHI, Chie OBUCHI

Japan

PD 332

Navigating primary care with hearing loss: A mixed methods study of lived and professional experiences in the United Kingdom

Eithne HEFFERNAN, Kieran AYLING, Colleen EWART, Sandra SMITH, Sian CALVERT, Devina MARU, Jean STRAUS, Tom DENING, Nova MATHEW, Helen HENSHAW

UK

PD 333

The advantages of a clinical nurse specialist as part of the audiology and hearing implant team

Hilary HARKIN

UK

PD 334

Persian version of the Swedish metaphor questionnaire: Translation and psychometrics evaluation

Ahmadreza NAZERI, Fatemeh MOLLA ALI AKBARI

Iran, Islamic Republic of

PD 335

A longitudinal comparison of language production in Broca's aphasia with and without hearing loss

Hana KIM, Diana PEREZ, Jisook PARK

USA

PD 336

Analysis of cochlear duct length based on computed tomography images of temporal bones in patients of the Institute of Physiology and Pathology of Hearing

Piotr Henryk SKARZYNSKI, Emilia CZAPLICKA, Anita OBRYCKA, Artur LORENS, Henryk SKARZYNSKI

Poland

PD 337

Chemical sympathectomy with 6-OHDA attenuates noise-induced hearing loss and cochlear inflammation

Chao-Hui YANG

Taiwan

PD 338

The effect of cognitive cues on acoustic parameters of speech prosody in children with and without hearing impairment

Seyede Zohre MOUSAVI, Azadeh BORNA, Farnaz FATHOLLAHZADEH, Ahmadreza NAZERI, Saeid MAHMOUDIAN, Behrooz MAHMOODI-BAKHTIARI

Iran, Islamic Republic of

PD 339

Improved efficiency in hearing care delivery via community-based care

Hazel Kai Hui YEO, Hong Choon OH, Justina Yu Han TAN, Jia Hui LIM, Apel Wan Leng YAP, Khuzaimah BINTE MOHAMAD YUNI, Milawaty NURJONO, Steven Lock Hey LEE

Singapore

PD 340

ECAP results in patients with long term deprivation without any auditory stimulation & rehabilitation & hearing aid using

Leila AZADEH RANJBAR

Iran, Islamic Republic of

PD 341

ReSound Clear Focus outperforms Front Focus in challenging listening situations

Lena DIEU

Denmark

PD 342

Large-scale school-based hearing screening using a web-based platform: Prevalence and implementation outcomes in West Java students

Sally MAHDIANI

Indonesia

PD 343

Reliability of Bone-Conducted cervical Vestibular- Evoked Myogenic Potentials in newborns: A prospective study

Niki KARPETA, Luca VERRECCHIA, Maoli DUAN

Sweden

Aram Glorig Award

Hearing and Healthy Aging: The Imperative for Communication Accessibility

AG 01

Hearing and Healthy Aging: The Imperative for Communication Accessibility

M. Kathleen PICHORA-FULLER

Psychology, University of Toronto, Canada

The presentation will emphasize the importance of the connections among research, practice and policy that have been shaping global initiatives to position hearing health in person-centered, integrated, community-based primary care for older adults. From beginning to end, the focus of the lecture will be on the importance of hearing for healthy aging in older adults. It will be argued that there is an imperative for communication accessibility in the community as the ultimate outcome of hearing healthcare. Beyond age-related changes in the audibility of sound, research on auditory and cognitive processing in sub-types of auditory aging will be reviewed and related to possible explanations for and an exploration of the clinical implications of age-related changes that may result in mismatches between self-reported hearing problems in everyday life and hearing loss defined based on pure-tone thresholds. This exploration of the gaps between clinical practice and the everyday functioning of people living with hearing loss will be used to guide reflections on the benefits and limitations of clinic-based audiologic rehabilitation practice. Beyond hearing, a spotlight will be put on the population health research and the links between hearing and age-related changes in other key capacities (vision, cognition, mobility, mental health, nutrition) as identified in the WHO Integrated Care for Older Adults (ICOPE) that combine to affect the everyday functioning of older adults. Beyond hearing aids, practice options for situating hearing care within emerging opportunities for integrated person-centered primary care for older adults will cover new approaches to screening, assessment, in-clinic or online rehabilitation, and ultimately to community-based accessibility. The talk aims to create new conversations amongst audiologists as they embark on and adapt to new approaches for hearing care in the context healthcare to promote healthy aging.

Plenary Session 01

Future Perspectives in Audiology and AI, New Technologies

PL 01

Future Perspectives in Audiology and AI, New Technologies

Nicky CHONG-WHITE[1], Brent EDWARDS[2], Stefan LAUNER[3], Maren STROPAHL[3], Jeppe Høy CHRISTENSEN[4], Jan-Willem WASMANN[5]

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Artificial intelligence is playing a growing role in audiology - from advanced signal processing in hearing aids to digital tools that support clinical workflows, personalization, and patient engagement. Alongside this rapid innovation come important questions about evidence, trust, adoption, and the evolving role of the hearing care professional.

This plenary roundtable brings together leading researchers and industry experts to explore both the promise and the complexity of AI in hearing health. Short presentations will reflect on technological shifts, examine how AI is shaping hearing-aid performance and design, and consider its role in personalization and the broader hearing care journey.

The session will then open into an interactive discussion exploring where AI is genuinely delivering value and where important questions remain, surfacing diverse perspectives and stimulating new thinking about how emerging technologies are influencing the future of hearing care.

Plenary Session 02

When Audiology Meets Auditory Neuroscience: Bridging Clinical Practice and Brain Science

PL 02-1

Cortical plasticity following congenital single-sided deafness

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Objective: Congenital single-sided deafness (SSD) is characterized by an extremely asymmetric auditory input, with only one functioning ear. It leads to an aural preference change in the repre-sentation within the primary auditory cortex (Kral et al., 2013, Brain). In this study, we investigat-ed the reorganization of cortical activity in a higher order auditory field (PAF) and compared it to the representations in the primary auditory cortex in SSD cats, bilaterally hearing cats (HCs) and bilaterally congenitally deaf cats (CDCs).
Methods: Fifteen adult cats, four SSD, six HCs, and five CDCs were bilaterally implanted with 8 channel feline electrodes (MED-EL, Innsbruck). Three biphasic charge-balanced electric pulses (200 µs/phase, wide bipolar stimulation) was used for stimulation. All hearing ears were acutely deafened (neomycin) prior implantation to avoid electrophonic responses. Neuronal ac-tivity was recorded simultaneously from the primary auditory cortex (A1) and the posterior audi-tory field (PAF) using Neuronexus 16-channel multielectrode arrays. The recordings were local-ized to the recorded areas using bipolar derivation. The intergroup analyses compared amplitude and latency of cortical responses of the hearing and deaf ear in SSDs (CI stimulation) with con-tralateral and ipsilateral stimulation in HCs and CDCs. For quantification of phase-locked (evoked) responses, rectified LFPs were averaged across animals. For non-phase-locked components (induced activity), time-frequency representations (TFRs) were derived using wavelet analysis for each trial and were averaged in time-frequency domain across trials, posi-tions and animals. TFR data were analyzed in dB power relative to the prestimulus period and statistically compared using cluster-based permutations.
Results: Response latencies were significantly shorter in A1 compared to PAF in all ani-mal groups as it was typically found for primary and secondary cortical fields. In most compari-sons, LFP amplitudes and discharge rates were significantly higher in AI compared to PAF in all animal groups. In SSD animals, responses to the deaf ear were nearly absent in PAF, while stimulation of the hearing ear evoked PAF responses comparable of those found in hearing con-trols. This was the case for both the evoked and the induced components. There was a further substantial drop of responsiveness to the deaf ear in the secondary field PAF when compared to A1 in the same animals. This indicates that the preference for the hearing ear in SSDs, as de-scribed for AI in previous studies, is further increased in the secondary cortex.
Conclusions: Deprivation leads to deficits which were more extensive in PAF compared to AI as shown by reduced LFPs, TFRs and multi-unit activity (Yusuf et al., 2017, Brain). In SSD, activity evoked by stimulation of the deaf ear is significantly below the one in the bilateral deaf group (CDC), more pronounced in the secondary field PAF than in A1. This demonstrates per-ceptual weakening of the representation of the previously deaf ear along the cortical hierarchy.

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Plenary Session 02

When Audiology Meets Auditory Neuroscience: Bridging Clinical Practice and Brain Science

PL 02-2

Motor Contributions to Speech Perception: Context-Dependent Neural Mechanisms and Behavioural Benefits

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Understanding how distributed brain networks transform sound into meaning requires integrating evidence across neuroimaging, electrophysiology, and behavioural paradigms. We synthesized three complementary lines of work to characterize when and how speech motor systems contribute to speech perception and to test whether production-based engagement can improve perception in noise. First, a coordinate-based meta-analysis using activation likelihood estimation compared neural activations for speech production with those in three challenging perception conditions (speech-in-noise, spectrally degraded speech, and linguistically complex speech). Overlap emerged in left frontal, insular, and temporal cortices, with consistent nodes in the left frontal operculum, posterior lateral inferior frontal gyrus, planum temporale, and pre-supplementary motor area. Patterned responses indicated context-independent hubs (planum temporale, frontal operculum) and context-dependent nodes (pre-SMA sensitive to signal quality; posterior lateral IFG sensitive to linguistic content), suggesting roles in sensorimotor integration and executive control during difficult listening.

Second, magnetoencephalography in 32 young adults performing phonological discrimination under three noise levels was used to test whether the motor cortex supports phonological processing and noise compensation. Correct discrimination evoked simultaneous activation in the left ventral primary motor cortex and the bilateral posterior superior temporal gyrus, with stronger responses for phonologically different versus identical syllable pairs. Phonological differences were resolved earlier in ventral M1 than in the posterior temporal cortex. Crucially, motor cortex engagement did not scale with noise level, indicating that ventral M1 contributes to phonological processing, likely via predictive or articulatory representations, rather than serving as a noise-specific compensatory mechanism.

Third, in four behavioural experiments, we tested whether priming the speech motor system by overt syllable repetition enhances subsequent syllable discrimination in noise. Across experiments, repetition priming consistently produced reliable gains in discrimination accuracy compared with a non-motor priming task. These gains generalized to unprimed syllables, persisted for one hour after priming, transferred across auditory and visual priming modalities, and remained effective in older adults. These results demonstrate that motor engagement can produce durable, clinically relevant improvements in speech-in-noise perception.

Together, these studies support an interactive model in which the auditory and motor systems jointly shape speech perception. Distinct motor-related nodes play complementary roles: some provide stable sensorimotor scaffolding for mapping acoustics to phonology, while others are recruited flexibly in response to linguistic demands and signal quality. Behaviourally, production-based priming offers a straightforward approach to enhance phonological sensitivity and speech-in-noise performance, with potential applications for rehabilitation in populations with hearing or age-related perceptual deficits.

Plenary Session 02

When Audiology Meets Auditory Neuroscience: Bridging Clinical Practice and Brain Science

PL 02-3

Developmental neuroplasticity in children with cochlear implants: How important is bilateral input?

Karen A. GORDON

Archie's Cochlear Implant Laboratory, The Hospital For Sick Children, University Of Toronto, Canada

Children with early onset hearing loss are at risk for missing sensitive periods in auditory development. This is why we strive to identify newborns with congenital hearing loss and those at risk for progressive deterioration in hearing so that intervention is provided as quickly as possible. In this talk, we will address development in children that occurs after interventions such as cochlear implants (CIs) begin. Early studies revealed that electrical stimulation from a unilateral CI promoted brainstem and cortical plasticity but, at the same time, allowed for an "aural preference" to develop in which pathways from the stimulated ear were strengthened relative to the deprived ear. These neural asymmetries corresponded to one better hearing (ie "preferred") ear. The time to bilateral CIs has subsequently decreased and now simultaneous bilateral implantation occurs routinely in children younger than 12 months. Advantages for bilateral auditory development and functional hearing are clear but functional gaps remain. Children with bilateral CIs still show some impairments in academics and cognitive abilities which are linked to their challenges accessing both what incoming sounds mean and where these sounds come from. We have been exploring responses from both the "what" and "where" brain pathways to assess how restrictions in both of these important aspects of hearing are contributing to developmental challenges. Results in completed and ongoing studies will be presented.

Plenary Session 02

When Audiology Meets Auditory Neuroscience: Bridging Clinical Practice and Brain Science

PL 02-4

Neuroimaging Markers of Auditory Processing Disorder: Bridging Brain and Behavior in Children with Listening Difficulties

Suzanne C. PURDY

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The terms auditory processing disorder (APD) and listening difficulties (LiD) have been used to describe children who have greater difficulty than their age peers with a range of complex auditory tasks such as frequency, intensity and temporal discrimination, dichotic listening or spatial sound processing, or children who have reported listening difficulties based on caregiver or teacher questionnaire responses.

With increasing accessibility of neuroimaging tools, a number of research groups have endeavored to show associations between brain and behavior in order to better understand underlying neural mechanisms. Early studies in this area emerged about 15 years ago. One study by Schmithorst et al. (2011) used MRI diffusion tensor imaging (DTI) in 9-11 children (n=17) with healthy hearing who were assessed using a range of clinical tests of auditory processing. This study prompted interest in brain connectivity as white matter tract measures in different brain regions of interest correlated with performance on certain auditory tests. At the same time Pluta (2011) was using a different approach, this time with two groups of children aged 7-16 years, half diagnosed with CAPD (n=13) and half with healthy hearing (n=13). They used an event related MRI paradigm with children responding when pairs of tones differing in frequency, duration or intensity were presented. Brain activity was measured relative to control no-stimulus blocks. Brain activation was smaller and less extensive in the CAPD group compared to controls. These early studies focused on connectivity and amount and extent of brain activation in regions of interest.

Our more recent research lead by Dr Ashkan Alvand used graph theory to analyze diffusion MRI and resting state functional MRI. This showed that brain networks in children diagnosed clinically with APD are similarly integrated and segregated compared to healthy controls (HCs), and children with APD (n=29) have similar modular organization compared to HC (n=29), but their network "architecture" differs significantly in certain regions. These included regions associated with default mode and executive control brain networks, suggesting multimodal differences in brain activity of children with APD. Importantly, measures of brain hub organization were correlated with performance on the LiSN-S auditory processing behavioral assessment measure. Significant differences were in areas primarily associated with listening and speech processing.

Stewart et al. (2022) similarly undertook an fMRI study with typically developing children (n=43) and age matched (6-13 years old) children with LiD (n=43). Children were not diagnosed clinically with APD, instead they were categorized based on caregiver responses to the ECLiPS questionnaire. The ECLiPS includes questions on Speech and Auditory Processing, Environmental & Auditory Sensitivity, Language/Literacy/ Laterality, Memory & Attention (M&A), and Pragmatic & Social Skills (PSS) and hence children could have a range of auditory, language and/or cognitive differences underpinning their listening difficulties. This study found differences between cortical areas associated with language production, memory encoding and retrieval, and word recognition, with no associations with LiSN-S scores, which contrasts with Alvand et al. Overall, these studies show that there are robust links between brain and behavior in children with APD or LiD, but differences in participant selection and neuroimaging approach and outcome measures influence study findings.

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Plenary Session 03

Audiology in Low Resource Regions: Diagnostics and Rehabilitation

PL 03

Audiology in Low Resource Regions: Diagnostics and Rehabilitation

Vidya RAMKUMAR[1], S M TOUFIQ[2], Lakmali Dinukshi ILEPERUMA[3], Shangqiguo WANG[4], Samantha GOVENDER[5], Dilli Raj PAUDEL[6]

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This panel discussion aims to deepen understanding and strengthen global engagement with audiology diagnostics and rehabilitation in low- and middle-income countries (U/LMICs). Bringing together perspectives from Bangladesh, China, Nepal, Sri Lanka, and South Africa, the session will examine how audiology services are currently organized and delivered across public, private, and academic settings in these diverse contexts.

The conversation will explore the key personnel driving service delivery—ranging from audiologists and audiometrists to community health workers and ENT specialists—and review national government priorities for ear and hearing care, both in clinical practice and research, along with the progress achieved so far.

A central focus will be the innovative adaptations and practical solutions that have emerged as strengths in resource-constrained environments. These include community-based hearing care models, task-shifting strategies, mobile and e-health technologies, integration of indigenous knowledge and practices, and creative modifications to testing protocols and clinical environments to better suit local needs and realities.

By highlighting the contextualised successes in building sustainable audiology services, the panel will conclude with forward-looking, actionable insights and priority steps that participants see as essential for advancing hearing healthcare across these regions over the next two years.

Plenary Session 03

Audiology in Low Resource Regions: Diagnostics and Rehabilitation

PL 03-1

Audiology in Low Resource Regions: Diagnostics and Rehabilitation in Bangladesh

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Background: Hearing impairment remains a major public health challenge in low-resource regions, particularly in Bangladesh, where limitations in infrastructure, workforce, and equitable access affect early diagnosis and long-term rehabilitation. Audiology services have expanded over the last decade; however, service distribution and quality remain uneven across the country.

Objective: This abstract reviews the current diagnostic and rehabilitation landscape of audiology services in Bangladesh, highlighting institutional capacity, cochlear implant (CI) services, workforce gaps, and service delivery challenges in a low-resource context.

Methods: A narrative, evidence-informed review was conducted using national reports, institutional data, and service delivery records from government and private sector audiology and ENT centers in Bangladesh. Descriptive statistics were used to summarize the burden of hearing impairment, availability of diagnostic facilities, rehabilitation services, and cochlear implant coverage.

Current Scenario: In the government sector, comprehensive diagnostic and rehabilitative audiology services are primarily concentrated in tertiary centers such as **Bangladesh Medical University** (ENT & Cochlear Implant Department), **National ENT Institute**, **National ENT Foundation**, **Combined Military Hospital Dhaka** and **Combined Military Hospital Chittagong** (ENT & Cochlear Implant Departments), **Proyash Institute of Special Education & Research**, **Mymensingh Medical College & Hospital**, **Sylhet Osmani Medical College & Hospital**, and **Faridpur Medical College & Hospital**.

The private sector plays a crucial complementary role, with institutions such as **Hearing & Speech Solutions.**, **Advanced Institute of Rehabilitation Sciences**, **Cochlear Implant & Priority Hearing Assistances (CIPHA)**, **Senso Hearing Care Center**, **SHAHIC**, **Abid Hearing Center**, **Central Hearing & Speech Solutions**, **Shono Bangladesh Hearing & Speech Point**, **Shunte Chai Hearing & Speech Center**, **MARS Hearing & Health**, **Unique Hearing system**, among many others. Collectively, these clinics provide hearing screening, audiological diagnostics, hearing aid fitting, speech-language therapy, and auditory rehabilitation services.

Burden and Service Gaps: Bangladesh has an estimated about 34.6% of the Bangladeshi population that's approximately 49.2 million people with disabling hearing loss, including a substantial pediatric population. To date, more than 3,500 children have received cochlear implants with post-implant rehabilitation through combined government and private initiatives. Despite the presence of approximately 350 hearing centers nationwide, a large proportion lack comprehensive diagnostic facilities (e.g, ABR, ASSR, immittance, pediatric audiology setups), structured rehabilitation programs, and adequately qualified audiologists and speech-language pathologists. Rural and peripheral regions remain particularly underserved.

Conclusion: Audiology services in Bangladesh demonstrate significant progress in diagnostics and rehabilitation, including cochlear implantation, despite operating within a low-resource setting. However, major disparities persist in service quality, professional availability, and geographic access. Strategic policy support, expansion of academic audiology programs, workforce development, standardization of services, and strengthened public–private partnerships are essential to achieve equitable, sustainable hearing healthcare and align Bangladesh with global hearing health goals.

Keywords: Low-resource settings, Audiology, Hearing impairment, Cochlear implant, Rehabilitation, Bangladesh

Workshop 01

WS 01

Acquisition and Analysis of Vestibular Evoked Myogenic Potentials(VEMP)

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The objective of this workshop is to provide a comprehensive overview of the application of vestibular evoked myogenic potential (VEMP) recordings. The workshop will cover basic physiology and short evolution of otolith testing. I will demonstrate how to setup your VEMP system with any AEP device and address most important parameters. Additionally, the utility of bone conducted stimuli and modifications for pediatric testing will be addressed as well as clinical utility in specific populations (e.g. patients with CI, superior canal dehiscence syndrome, ..). We will demonstrate (or even better: you will perform, hands-on) a VEMP recording, and finally discuss practical tips and technical pitfalls.

After this workshop, participants will know:
- The difference between cervical- and ocular-VEMPs
- Which parameters are important to successfully perform VEMPs
- Clinical pitfalls during VEMP testing and are able to solve them
- Examples of clinical VEMP applications in specific patient groups

Workshop 02

WS 02

Objective Assessment of Infant Hearing

James W. HALL III

Audiology, Salus At Drexel University, United States of America

This workshop provides audiologists with practical "take home" information on objective auditory assessment of infants. Attendees will be introduced to a protocol for the diagnosis of infant hearing loss with a test battery consisting of aural immittance measures (tympanometry and acoustic reflexes), otoacoustic emissions (OAEs) and auditory brainstem response (ABR). Polling question slides will be embedded in the PPT presentation. This workshop will include hands-on demonstrations using clinical devices.

After this workshop, participants will be able to:
- Identify four objective auditory measures for assessment of infant hearing
- Define the special contributions of the acoustic reflex and otoacoustic emissions in infant hearing assessment
- Describe three ABR techniques contributing to efficient estimation of auditory thresholds in naturally sleeping infants
- Identify two examples of the link between a specific diagnosis for auditory dysfunction and management decisions

Workshop 03

WS 03

The Force Awakens: Robots, Avatars and ASR in Clinical Audiology

Jan-Willem WASMANN[1], Gloria ARAIZA-ILLAN[1]

[1]*Audiology, Computational Audiology Network, Netherlands*

This workshop explores how emerging technologies such as robots, AI-avatars, VR glasses, and automated speech recognition (ASR), are already transforming hearing healthcare. Through live demonstrations and hands-on activities, we will examine how these innovations can support clinical practice, enhance accessibility, and improve patient outcomes and interactions.

With the workshop participants, we will reflect critically on the challenges:
- What do clinicians need to adopt these tools effectively into their practice?
- What ethical, practical, or workflow barriers must be considered and addressed?

With a nod to science fiction's vision of human-machine interaction, this session provides both inspiration and robust discussion on the real-world potential these tech tools have. Join us to engage with technology not just as a trend, but as a clinical force for good.



Figure Jan-Willem WASMANN, Gloria ARAIZA-ILLAN

Workshop 04

WS 04

Navigating a Noisy World: Speech in Noise Tests

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The biggest difficulty that people with hearing loss have, is speech understanding and communication in noisy environments, limiting participation in social events, reducing work opportunities and impacting quality of life. Hearing difficulties affect one in six adults (WHO 2018).

Presence of noise swamps the speech and most of the peaks, soft sounds and gaps are masked by the background noise. In a food court, for instance, listener's ears receive collective signals that include people chatting, moving furniture, music and sounds of cutlery and echo/reverberation from all the sounds in the room.

Current speech tests include determining the accuracy of speech tests or reception thresholds using syllables or words or sentences. The task may be recognition of words heard, or sentences understood. There is variability in the task, methods and focus. Yet, speech tests make a significant part in Audiology Clinical services.

The workshop will aim to discuss some of the limitations and challenges of the current speech tests and identify what could be done or must be done to provide clinical scenarios.

Requirements: Participants to bring their computers and have Praat downloaded (https://praat.en.softonic.com/) on their computers prior to the workshop.

Workshop 05

WS 05

NAL-NL3: A New Era in Hearing Aid Fitting and Clinical Best Practice

Pádraig KITTERICK[1], Bettina TURNBULL[2]

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The NAL-NL3 fitting system represents a revolution in best-practice adult hearing aid fitting. Not only does the system include the NAL-NL3 Prescription that replaces NAL-NL2 but its Modules address unmet needs related to hearing aid fitting. For audiologists, understanding the research underpinning the NAL-NL3 fitting system and the design & intended use of each module is critical to its effective use in clinical practice.

This workshop provides a comprehensive introduction to NAL-NL3's development, including the evidence base, design principles, key differences from NAL-NL2, case-based applications, and real-ear verification guidance tailored for clinical application.

Whether you're a clinician preparing to adopt NAL-NL3 into your clinical practice or a researcher exploring its translational impact, join us to ensure you're equipped for the next generation in evidence-based hearing aid fitting.

Workshop 06

WS 06

Approaches and Practical Applications for Psychoacoustic Experiments

Yonghee OH

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This workshop is designed to provide an in-depth overview of experimental techniques and methodologies used in psychoacoustic research, with an emphasis on clinical research applications. Aimed at both early-career researchers and experienced professionals, the workshop will explore key topics, including auditory threshold estimation, speech assessment, spatial hearing assessment, and the design of other perceptual tests.

Participants will be introduced to best practices in experimental design, stimulus creation, and data analysis using customized software and tools (MATLAB). The workshop will feature interactive components, including live demonstrations and interactive discussions, to foster active engagement and knowledge sharing. By bridging theoretical concepts with applied techniques, this session offers valuable insights into how psychoacoustic experiments can be effectively integrated into broader research and development contexts, including hearing technologies, audio engineering, and cognitive science.

Workshop 07

WS 07

Management Options and Strategies in Tinnitus Patients

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Despite advances in research, tinnitus management remains a challenge due to its multifactorial nature, complexity of mechanisms, and variability among patients.

This workshop aims to bring together clinicians, researchers, audiologists, and allied health professionals to explore and compare the full spectrum of management strategies for tinnitus. From evidence-based medical and behavioral approaches to cutting-edge innovations, participants will gain a comprehensive overview of current best practices, therapeutic options under development, and future directions.

Key topics being considered to be handled in this session:

- Assessment and diagnostic refinement: tools for phenotyping and grading tinnitus severity, comorbidities, and risk factors
- Auditory interventions: hearing aids, sound therapy, masking,
- Tinnitus retraining therapy (TRT)
- Novel and emerging technologies: neuromodulation (e.g. transcranial magnetic, electrical stimulation), wearable devices, app-based interventions
- Surgical treatment: Cochlear implantation/bone-conduction implant, etc

By the end of the workshop, attendees will be equipped to develop integrated, patient-centered tinnitus management plans, apply evidence-based interventions more confidently, and identify areas where further research is needed.

Workshop 08

WS 08

Diagnosis and Treatment of Central Auditory Processing Disorders

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[3]Audiology, Family Hearing Centre, New Zealand

This workshop will present principles and criteria for diagnosis of central auditory processing disorders including in the presence of comorbidities and in children younger than seven; illustrate the use of templates for reports and management plans; and discuss considerations in the selection of treatments. Evidence supporting selected treatments from the three key treatment categories of auditory training, amplification, and language and supporting therapies, will be presented. Illustrative case studies will be presented and attendees will be challenged to match treatments to individual cases.

Attendees will be informed of factors affecting diagnosis, terminologies for different circumstances, advantages and drawbacks of available treatments, assistive and therapeutic benefits of RM hearing technology, and treatment benefits in children with autism spectrum disorder.

Workshop 09

WS 09

Functional and Otolith-driven Assessment of Vestibular Function: fHIT and vOCR

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This hands-on workshop introduces clinicians to two novel tools for assessing vestibular function beyond traditional gain-based metrics:
- Video Ocular Counter-Roll (vOCR)
- Functional Head Impulse Test (fHIT)

vOCR quantifies static otolith-ocular function using simple head tilt maneuvers and real-time video-oculography. fHIT evaluates vestibulo-ocular reflex integrity by measuring a patient's ability to read during rapid passive head impulses.
Attendees will engage in live demonstrations, explore clinical cases, and interpret real-world data, gaining practical experience in integrating these tools into bedside and outpatient assessments. Discussion will focus on complementary roles of fHIT and vOCR in diagnosis and rehabilitation planning.

Workshop 10

WS 10

Is It Time to Move Beyond 226 Hz Tympanometry? Why Wideband Acoustic Immittance (WAI) Should Be the New Standard of Care for Middle Ear Assessment Across the Lifespan

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Despite many years of evidence showing the shortcomings of traditional 226-Hz tympanometry, it remains the primary method worldwide for assessing the middle ear, with few audiologists using multifrequency or WAI methods. The 226-Hz tympanometry was never intended as a universal solution; it was a technological compromise, not a physiological ideal. The only change in the past 80 years, since the inception of tympanometry, is the use of a 1-kHz probe tone for testing infants. This hands-on workshop examines why that gap between evidence and practice persists and why it is now time to make a clinically meaningful shift.

This workshop uses WAI to show data from newborns, children, and adults that proves it is better at diagnosing ear issues compared to conventional 226-Hz tympanometry. Participants will look at group data and real clinical cases to show how WAI helps to better find and understand common and complicated middle ear issues, like fluid in the middle ear, problems with the ossicular chain, tympanic membrane issues, and the effects of middle ear pressure. Its potential implications for assessing Superior Canal Dehiscence Syndrome (SCDS) and Meniere's disease will also be discussed. The effect of age, ethnicity, gender, and instrumentation will also be covered.
By discussing cases together and having guided conversations, attendees will learn how to use WAI in their everyday clinical work, shifting from single-frequency tympanometry to a more informed, frequency-specific approach to assessing middle ear function.

Learning Outcomes:
1. By the end of this workshop, participants will be able to achieve the following outcomes:
2. Explain the limitations of conventional 226-Hz tympanometry across the lifespan
3. Interpret key wideband acoustic immittance patterns in common and complex middle ear conditions
4. Compare the diagnostic performance of WAI and traditional immittance measures using clinical cases
5. Apply WAI as part of a minimal, evidence-based test battery in routine clinical practice

Planned Session 01

New Perspectives of Auditory Objective Measures
PS 01-1

Towards a Groundbreaking Brain Measure: Direct Recording of Auditory Cortical Potentials Through Cochlear Implants

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Traditional scalp recorded cortical auditory evoked potentials (CAEPs) have long served as an important noninvasive method for evaluating auditory cortical processing. However, their clinical usefulness is limited by low signal to noise ratio, sensitivity to muscle and skin artifacts, variability in scalp electrode placement, and the need for stable attention and cooperation. These constraints significantly restrict their applicability in infants, toddlers, individuals with developmental challenges, and many cochlear implant (CI) users whose behavioral performance may vary across clinical sessions. To address these limitations, we introduce a groundbreaking method that records electrically evoked cortical auditory potentials (eCAEPs) directly through intracochlear CI electrodes, providing an artifact free, high fidelity, and rapid measure of auditory cortical function.
This novel approach leverages the near field position of intracochlear electrodes. Alternating "stimulus" and "no stimulus" sweeps are delivered, and subtraction of these traces eliminates all device generated electrical fields, revealing a clean biological cortical response. This avoids the stimulation artifact typically observed in scalp EEG and produces well defined P1 and N1 components with amplitudes and clarity that far exceed those of surface recordings. The single figure included with this abstract illustrates this key advantage:

The figure shows the average intracochlear eCAEP response of implanted children to stimulation at MCL levels, contrasted with the complete absence of cortical components at 0 CU. This striking difference demonstrates both the biological authenticity of intracochlear eCAEPs and their suitability as a physiologically grounded neural measure. The clean morphology of the P1 and N1 peaks at MCL, combined with the flat, response absent trace at zero intensity, highlights the excellent signal to noise ratio, the absence of device artifact, and the clear dependence of the response on true auditory stimulation.
A major advantage of this intracochlear method is its speed and independence from behavioral cooperation. A full cortical recording can be obtained in less than four minutes, without requiring the user to attend, stay still, or participate in any task. This makes the method exceptionally suitable for preverbal infants, young children, and patients who cannot perform behavioral assessments or tolerate extensive scalp EEG setup. Because the electrodes are stably implanted, the recording conditions remain highly consistent across sessions, enabling reliable and repeatable measurements. Numerous recordings have demonstrated high within session and between session repeatability, reinforcing the biological nature of the response and supporting its use in clinical practice.
Intracochlear eCAEPs have revealed a strong and consistent association between age at implantation and cortical latency. Children implanted early often before one year of age show short P1 latencies and synchronized cortical responses, consistent with optimal auditory cortical development during the critical period of neuroplasticity. These robust cortical responses can be reliably detected even in infants implanted at seven months, offering one of the earliest objective biomarkers of auditory cortical maturation-well before speech based assessments can be administered. In contrast, children implanted later in life often exhibit prolonged P1 and N1 latencies, indicating delayed or less efficient cortical encoding and reduced access to age appropriate auditory input during early development.
The method has also provided valuable insight into bilateral CI strategies. Simultaneous bilateral implantation leads to symmetrical cortical latencies between the two ears, reflecting balanced cortical maturation. Sequential implantation, however, introduces increasing interaural asymmetry, with larger latency differences observed as the gap between surgeries increases. Because such asymmetries reduce binaural fusion and negatively impact speech in noise performance, the intracochlear eCAEP measure is becoming a powerful biomarker for determining optimal timing of second side implantation and for counseling families.
In adults, intracochlear eCAEPs reveal meaningful evidence for experience driven cortical plasticity. Although adult CI recipients typically demonstrate slower and less synchronized cortical responses than early implanted children, longitudinal monitoring shows that P1 latencies tend to shorten with continued implant use. This improvement reflects cortical adaptation and provides clinicians and patients with objective evidence of physiological progress during auditory rehabilitation. Such data can enhance patient counseling, guide realistic expectations, and support individualized rehabilitation planning.
Clinically, intracochlear eCAEPs function as a biologically grounded biomarker that bridges neural physiology and real world auditory outcomes. Because the cortical response reflects the efficiency of central auditory encoding, intracochlear eCAEPs correlate strongly with speech in noise and speech in quiet performance. They can identify suboptimal stimulation parameters, help verify electrode functionality, and evaluate the cortical status of each ear independently. In preverbal infants and young children, the measure provides early insight into cortical auditory health long before behavioral speech tests become feasible. In adults, it offers a physiological measure of auditory adaptation and supports personalized CI programming strategies.
Looking to the future, the intracochlear eCAEP method opens the door to next generation closed loop cochlear implants. By directly recording cortical responses through the implant itself, future neuro

adaptive CI systems could adjust stimulation parameters in real time based on neural feedback. Such devices could dynamically optimize intensity, channel interaction, spectral shaping, and noise reduction algorithms according to cortical encoding efficiency, reducing cognitive load and improving speech understanding in challenging listening environments. This direction brings the field closer to precision auditory medicine, in which cochlear implants adapt continuously to the brain's own responses.

In summary, direct intracochlear recording of auditory cortical potentials represents a transformative advance in auditory neuroscience and CI clinical practice. It provides rapid, artifact free, and biologically validated access to cortical auditory processing; reveals critical developmental and bilateral patterns; supports individualized rehabilitation strategies; and establishes a robust link between cortical physiology and perceptual outcomes. The innovative method illustrated in the accompanying figure- showing clear cortical responses at MCL and their absence at 0 CU, demonstrates the power, reliability, and clinical significance of intracochlear eCAEP recordings. This novel brain measure is not simply an incremental improvement but a fundamental leap toward understanding and optimizing the implanted auditory system.

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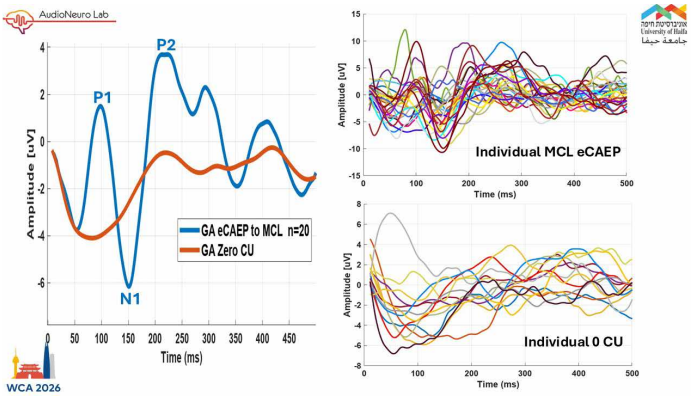


Figure Intracochlear eCAEPs recorded from implanted children: the grand-average response and individual superimposed traces elicited at MCL stimulation, contrasted with the absence of cortical components at 0 CU.

Planned Session 01

New Perspectives of Auditory Objective Measures
PS 01-2

Using fNIRS technology to assist management of auditory neuropathy and candidate selection and post-implant programming of infants with cochlear implants.

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Early intervention is critical for language development in infants with hearing loss. Despite the benefits of newborn screening, there are subgroups of infants who do not optimally gain benefit from early detection. The group most affected are those diagnosed with auditory neuropathy. Current EEG techniques do not reliably allow assessment of hearing levels in this group, nor do they inform parents or clinicians whether a hearing aid would be beneficial or not. These infants are often over 2 years of age and language delayed before appropriate intervention can be determined. All infants who need a cochlear implant are also in danger of intervention occurring later than ideal, either because a) implantation is delayed until behavioural assessment is reliable, b) no reliable objective programming method is available leading to inaccurate and suboptimal hearing or c) implantation is delayed until evidence of language delay using a hearing aid is determined. Our research group has used functional near-infrared spectroscopy (fNIRS) to develop a clinically feasible assessment of speech sound detection and discrimination that addresses all of these needs. fNIRS is a baby-friendly too that can measure cortical responses to sounds or changes in sounds while an infant is asleep.

Our innovative fNIRS hearing assessment tests and data analysis algorithms have shown clinically-feasible accuracy of > 90% for assisting clinicians in the management of infants with hearing assessment. The fNIRS tests can be completed while the infant is asleep or awake and can test whether an infant can hear and discriminate between different speech sounds. Translation of this innovation into clinics will lead to fast-tracking of intervention in groups of infants who currently have delayed optimal intervention, thus improving their language development and subsequent quality of life.

Planned Session 01

New Perspectives of Auditory Objective Measures
PS 01-3

Electrocochleographic patterns predicting increased impedances and hearing loss after cochlear implantation

Stephen O'LEARY

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Stephen O'Leary, Aaron Collins, Tayla Razmovski, Christo Bester

Background: Intracochlear electrocochleography (ECochG) may be recorded directly from cochlear implants. This has proven useful during cochlear implant surgery to guide the preservation of residual acoustic hearing. Here, we describe the "state-of-the-art" interpretation of ECochG signals to facilitate hearing preservation.

Methods: ECochG is recorded directly from the most apical electrode of straight cochlear implant arrays during electrode insertion, while a high-intensity acoustic tone pip (500 Hz @ 108 dB, presented with alternating polarity) is delivered to the external ear canal. The cochlear microphonic (CM) and auditory nerve neurophonic (ANN) are derived. The outcome is preservation of low-frequency hearing at 3 months after implantation. The data discussed are derived from our clinic and broader collaborations with other investigators.

Results: An instantaneous drop in CM signal of >30% predicts poorer preservation of acoustic hearing, as does a drop of the CM amplitude over the duration of the insertion of > ~60%. However, CM amplitude lacks specificity. Specificity is improved considerably by the introduction of the ANN. The ANN is considered a more global response, while the CM reflects the hair cells' response near the recording electrode. A simultaneous drop in both the CM and the ANN is a better predictor of loss of residual hearing, whereas a drop in CM alone is not. Consideration of the CM-response phase-shift also improves hearing-loss prediction.

Conclusions: To best predict residual hearing following cochlear implantation, real-time monitoring of ECochG should include real-time analysis of the CM, the ANN, and, preferably, the CM-response phase.

Planned Session 01

New Perspectives of Auditory Objective Measures

PS 01-4

Proposal of new hearing preservation criteria based on preoperative hearing evaluations and intraoperative monitoring of auditory brainstem response and dorsal cochlear nucleus action potential in vestibular schwannoma surgery

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Objective: Auditory brainstem response (ABR) and dorsal cochlear nucleus action potential (DNAP) are used for intraoperative hearing monitoring during vestibular schwannoma surgery. Wave V latency prolongation of ABR <1 msec and the DNAP amplitude ratio ≥40% have been used as indicators of hearing preservation. However, hearing loss may occur despite meeting these criteria. This study evaluated hearing preservation using intraoperative monitoring and proposed new predictive criteria that combine preoperative hearing results with intraoperative monitoring.

Methods: We retrospectively analyzed 54 patients with vestibular schwannoma who underwent retrolabyrinthine surgery between January 2018 and December 2023. Patient records, preoperative hearing test results, intraoperative monitoring results, and postoperative hearing outcomes were reviewed. Hearing preservation was defined as a <20 dB decrease in pure tone audiometry (PTA) and a <20% decrease in the word recognition score (WRS). We examined the correlations between postoperative hearing outcomes and ABR wave V latency and DNAP amplitude after tumor removal, alongside intraoperative changes. We also evaluated whether combining preoperative ABR or DNAP before tumor removal with intraoperative changes improved hearing outcome prediction.

Results: Hearing was preserved in 53% of the patients. Neither the wave V latency of the ABR after tumor removal nor the intraoperative ABR changes correlated with postoperative PTA or WRS. DNAP amplitude after tumor removal and intraoperative DNAP changes were moderately correlated with postoperative PTA and WRS. Hearing preservation was achieved in 73% of cases with wave V latency prolongation ≤1 msec and in 66% with a DNAP amplitude ratio ≥40%, indicating limited usefulness of the conventional criteria. Combining preoperative ABR and DNAP before tumor removal with intraoperative monitoring improved outcome prediction. In cases with preoperative ABR latency within the institutional normal limit (≤6.5 msec), limiting additional prolongation to ≤1 msec was associated with a hearing preservation rate of 82%. In patients with prolonged latency, even a 0–1 msec prolongation reduced the preservation rate (47%), whereas shortening the latency improved the rate (75%). In cases with small DNAP amplitudes before tumor removal (<2 μV), preservation rate was 38% with a DNAP amplitude ratio of 40–60%, and increased to 73% when maintained at ≥60%.

Conclusions: Combining preoperative ABR and DNAP before tumor removal with intraoperative monitoring improves the prediction of hearing outcomes and may improve hearing preservation.

Planned Session 01

New Perspectives of Auditory Objective Measures

PS 01-6

DIAGNOSTIC VALUE OF WIDEBAND ACOUSTIC IMMITTANCE IN MIDDLE EAR PATHOLOGY: CLINICAL CASE EVIDENCE

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Background: Conventional 226 Hz tympanometry can be non-diagnostic in patients with clinically relevant conductive components, particularly when the tympanogram appears near-normal. This may delay or complicate middle-ear differential assessment in routine clinics.

Case Series / Methods: We present a series of representative clinical cases with conductive or mixed patterns evaluated using a stepwise decision workflow (Figure 1). The pathway begins with audiometry to identify an air–bone gap, followed by 226 Hz tympanometry to screen for clear conductive blockage. When tympanometry is near-normal, acoustic reflexes and otoacoustic emissions (TEOAE/DPOAE) are used as a functional screening step. Wideband acoustic immittance (WAI) is then applied as the key advanced test, focusing on absorbance patterns and resonance frequency to describe the main mechanical behavior of the middle ear. Each case is shown with cross-matched results from the full test battery to illustrate how the pathway guides interpretation and reporting.

Findings: Across cases, WAI provided clinically useful, frequency-dependent information on energy transfer that explained discrepancies between near-normal 226 Hz tympanograms and conductive components on audiometry. The workflow supported a simple, mechanism-oriented interpretation that is practical for daily use (e.g, stiffness-dominant, mass-dominant, or over-mobile/partly uncoupled behavior). Acoustic reflexes and OAEs added functional evidence that helped separate mechanisms that may look similar on conventional tympanometry and improved confidence in the overall interpretation.

Learning Point / Conclusion: In clinical case evidence, WAI is a high-yield adjunct to the standard test battery. When used within a structured decision pathway (Figure 1) and cross-matched with reflexes and OAEs, WAI improves clinical confidence beyond 226 Hz tympanometry by providing rapid, broadband insight into middle-ear transmission and supporting stratified reporting rather than a binary "normal/abnormal" label.

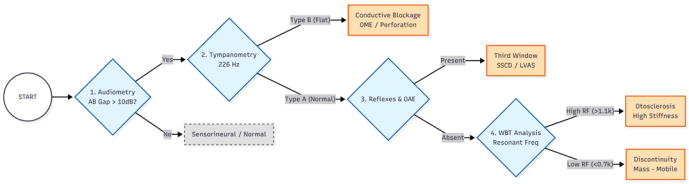


Figure Stepwise decision workflow for middle-ear assessment integrating audiometry, 226 Hz tympanometry, acoustic reflexes, otoacoustic emissions, and wideband acoustic immittance

Planned Session 02

Innovative Auditory Training Approaches for Cognitive Enhancement

PS 02-1

Practising Difficult Conversations in Hearing Rehabilitation Using Virtual Patients

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Effective hearing rehabilitation depends on strong clinician–patient communication, yet opportunities to practise challenging conversations are often limited. This presentation describes a virtual patient training tool developed to support communication skills training in audiology, with examples from university-led implementations. The focus is on how the tool is used to practise difficult clinical interactions, including explaining results, recommending treatment options, and managing patient resistance, and how this approach can support confidence-building and patient-centred care in hearing rehabilitation

Planned Session 02

Innovative Auditory Training Approaches for Cognitive Enhancement

PS 02-2

Music rehabilitation to enhance speech-in-noise perception and psychosocial wellbeing in paediatric and geriatric contexts

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While speech-in-noise (SIN) perception remains a central clinical outcome associated with hearing loss, communication difficulties often cascade into reduced social participation, diminished confidence, and increased risk of loneliness across the lifespan. This program of research examines music-based rehabilitation as a dual-pathway intervention targeting both auditory processing and psychosocial wellbeing in paediatric and geriatric populations.

In children with sensorineural hearing loss, group-based music training has demonstrated improvements in SIN perception, spectral resolution, and prosodic discrimination. Critically, these perceptual gains are also accompanied by measurable psychosocial benefits, including reductions in internalizing difficulties, improved peer relationships, and enhanced emotional regulation. These findings suggest that music training may support not only auditory skill acquisition but also psychosocial wellbeing and belonging during key developmental windows.

In older adults with hearing loss, music engagement similarly extends beyond auditory outcomes. Randomized controlled trials of choir-based interventions indicate improvements in SIN perception and neural encoding; however, participants also report enhanced mood, increased social connectedness, and greater engagement in meaningful activity. Emerging work further links rhythm processing and working memory to communication outcomes, highlighting shared cognitive–auditory mechanisms that may underpin both functional listening and social participation.

Finally, the SingWell Project builds on this lifespan approach through an international, multisite randomized controlled trial investigating whether group singing improves SIN perception, psychosocial wellbeing, and physiological regulation in older adults with unaddressed hearing loss. By integrating behavioural, neural, and psychosocial measures, this research positions music-based rehabilitation as a scalable, community-embedded model that addresses hearing loss not only as a sensory difference, but as a condition deeply intertwined with quality of life, identity, and human flourishing.

Planned Session 02

Innovative Auditory Training Approaches for Cognitive Enhancement

PS 02-3

ALICE: Improved speech in noise understanding with self-guided hearing care

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Persons with hearing aids or cochlear implants often have difficulty understanding speech well, especially in noisy environments. Auditory perceptual training can help improve an individual's ability to discriminate and identify sound. The current study aimed to determine the efficacy of the ALICE program, a self-guided home-based hearing care program including monitoring, training and counseling. A multicentric study was carried out, including hearing aid centers and a cochlear implant center in Flanders (Belgium). Adult participants were randomly assigned to an intervention (n = 65) or control (n = 65) group. Participants in the intervention group received a tailored flow of exercises that could be streamed to the device or presented in a sound field. All participants were tested before and after 8 weeks using sentences in noise and different self-report questionnaires. Participants in the intervention group were compliant during the 8-week training period. Significant on-task improvements were observed, along with improved speech-in-noise understanding for the intervention group only. The self-report data did not reveal changes following the intervention. Our clinical trial demonstrates that the self-guided ALICE training program is effective at improving the auditory system's ability to parse untrained speech in noise. This enhancement in speech-in-noise performance is specific to the training group, as the control group did not show any improvement. The results of the clinical trial imply that ALICE can be used as a scalable, accessible, and safe hearing care intervention.

Planned Session 02

Innovative Auditory Training Approaches for Cognitive Enhancement

PS 02-4

Implementing Auditory Training in Adult Cochlear Implant Rehabilitation

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Adult cochlear implant (CI) users frequently experience persistent difficulty with spectrally complex listening tasks such as music perception and speech understanding in noise. These challenges extend beyond audibility and reflect increased cognitive listening demands, including sustained attention, spectral discrimination, and listening effort. Although auditory training (AT) has demonstrated potential to support perceptual learning, translation into routine clinical care remains inconsistent due to limited appointment time, variable patient adherence, and uncertainty regarding objective neural markers of rehabilitation-related change. This presentation integrates experimental evidence with patient-reported outcomes and proposes a practical, clinic-ready framework for innovative auditory training in adult CI rehabilitation.

Two AT paradigms were examined. A month-long home-based music training program (12 sessions; n = 8) targeting pitch and timbre discrimination produced significant improvements in behavioral pitch discrimination following both acute laboratory exposure and extended at-home practice, with the greatest gains observed for mid-difficulty contrasts. In contrast, speech-in-noise performance (QuickSIN) and cortical onset responses (N1–P2) did not demonstrate significant change. The Acoustic Change Complex (ACC) showed a positive trend but did not reach statistical significance. A second short-duration laboratory paradigm (40 minutes; n = 17) focused on spectral ripple modulation depth discrimination yielded small but statistically significant improvements in behavioral spectral discrimination thresholds. However, ACC responses remained stable across sessions and did not reliably correlate with perceptual gains.

Collectively, these findings support preserved perceptual learning capacity in adult CI users while highlighting the current limitations of cortical biomarkers in detecting training-related change under limited duration and clinical dosing conditions. Importantly, preliminary cross-sectional survey data reveal a "music paradox": despite reporting substantial listening effort and fatigue during complex musical listening, adult CI users describe music as emotionally meaningful and highly motivating. This coexistence of cognitive effort and enjoyment underscores the need for rehabilitation approaches that address both perceptual skill development and sustainable engagement.

Building on these findings, a practical implementation model for busy audiology clinics is proposed, incorporating: (1) structured counseling focused on listening effort, fatigue management, and realistic expectation setting; (2) guided selection of accessible web- and app-based training resources tailored to individual goals; (3) CI support group–based and person- and family-centered coaching to facilitate initiation, troubleshooting, and long-term adherence; and (4) interdisciplinary collaboration with music therapists to promote functional music engagement and sustained participation. This integrated approach supports cognitive listening engagement and long-term rehabilitation, even when objective neural measures do not immediately parallel behavioral improvement.

Planned Session 02

Innovative Auditory Training Approaches for Cognitive Enhancement

PS 02-5

Beyond speech understanding: The benefit dimensions of hearing care

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Good hearing is a cornerstone of healthy aging. Although hearing health is often associated primarily with understanding speech and communication, its impact extends far beyond. Hearing is frequently described as our "social sense", a role that often becomes fully apparent only when hearing loss and its consequences emerge. Hearing loss can substantially disrupt communication and weaken connections with others, affecting many areas of daily life.

Emerging evidence shows that untreated hearing loss is associated with cognitive decline, increased listening effort, and reduced mental well-being, while appropriate hearing care can foster cognitive health and wellbeing. Hearing also plays a crucial role in social well-being, enabling participation, maintaining relationships, and reducing the rsk of loneliness and social withdrawal. In addition, better hearing is linked to greater hearing-related quality of life and healthy aging.

Hearing devices support people with hearing loss in regaining access to sound. While research and development have long focused on technological improvements, a more holistic perspective on hearing care has increasingly gained importance, leading more experts to advocate for comprehensive, person-centered approaches in hearing care. This presentation will provide insights into the latest evidence on how good hearing contributes to healthy aging, highlighting the broader benefit dimensions of hearing care and their implications for clinical practice.

Planned Session 03

Candidacy for Auditory Implants: Who Can Benefit?
PS 03-2

Can an individual with low frequency hearing in the candidate ear benefit from a cochlear implant even if they have normal hearing in the other ear?

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In cochlear implant (CI) users, the benefits of binaural over monaural hearing have been extensively examined, particularly regarding improvements in sound localization and speech perception compared to monaural listening conditions. To date, binaural benefits have predominantly been examined across three CI configurations: bilateral, bimodal, and in single-sided deafness (SSD). In the bilateral configuration, two implants are placed to provide individuals with severe-to-profound hearing loss access to binaural auditory input. In the bimodal configuration, when residual hearing in the contralateral ear permits, a hearing aid is fitted to the non-implanted ear to complement the CI. In SSD cases, the binaural advantage arises from the integration of acoustic hearing in the normal-hearing ear and electric stimulation provided by the CI in the deaf ear.

Across these three configurations, cochlear implantation represents an effective intervention for the restoration of binaural hearing, providing benefits in terms of binaural redundancy, head shadow, and squelch effects (Schafer, et al. 2011; Lorens, et al. 2019). However, certain limitations are observed in the bimodal arrangement, where the extent of binaural benefit largely depends on the degree of residual hearing in the ear fitted with the hearing aid.

Successful hearing preservation in a patient with partial deafness (PD), characterized by normal or only mildly elevated thresholds in the low-frequency region (Skarzynski, et al. 2003), and the demonstration that combining acoustic and electric hearing within the same ear is beneficial (Lorens, et al. 2008), have raised an important question: Can an individual with preserved low-frequency hearing in the ear considered for implantation benefit from a cochlear implant, even when the contralateral ear has normal hearing?
The study group comprised 12 adult patients with normal hearing or mild hearing loss in one ear and partial deafness (PD) in the ear to be implanted (mean age 43.4 years; SD 13.6). Hearing preservation was evaluated at 1 and 14 months postoperatively using the Skarzynski Hearing Preservation Classification System. The benefit from cochlear implantation was assessed using the Abbreviated Profile of Hearing Aid Benefit (APHAB) questionnaire and monosyllabic words recognition test. Word recognition test was performed in an anechoic chamber under various loudspeaker configurations to independently evaluate the three effects of binaural hearing.

The mean hearing preservation was 82% one month after cochlear implantation and 75% at approximately 14 months postoperatively. The hearing benefit from cochlear implantation was calculated as the difference between the 'Without CI' and 'With CI' conditions for each APHAB subscale and for the global score. The mean benefit amounted to 26.7 percentage points (p.p.) for Ease of Communication, 39.1 p.p. for Background Noise, and 33.4 p.p. for Reverberation. A decline of 14.9 p.p. was observed for the Aversiveness subscale. The mean benefit in terms of Global Score was 33.1 p.p. Binaural effect benefits were calculated as the difference between the 'CI on' and 'CI off' conditions for each loudspeaker configuration. The results demonstrated mean benefits of 13 percentage points (p.p.) for binaural redundancy, 15 p.p. for the head shadow effect, and 11 p.p. for the squelch effect.

For a patient with single-sided deafness, low-frequency hearing in the ear to be implanted should not be considered a contraindication for receiving a CI.

Planned Session 03

Candidacy for Auditory Implants: Who Can Benefit?
PS 03-3

Impact of unilateral vs. bilateral evaluation on CI candidacy and CI outcome

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Audiological indication criteria for cochlear implantation (CI) differ considerably across regions. They are not only based on results of audiometric measurements but also on economic boundaries. For example, most of the countries define limits based on bilateral measurements. The aim of this study was to analyse a large clinical audiological data set with regard to audiological criteria for cochlear implantation. In particular, the effects of different preoperative assessments (uni- versus bilateral measurements, different cut-off values for aided speech perception, effects of air and bone-conduction thresholds) on the number of CI candidacy cases were simulated.

Methods: We analysed a very large clinical audiological database comprising pure-tone thresholds and speech-audiometric data of 27,564 adults with complete data sets who underwent audiometric assessment in our clinic between 2002 and 2023. Data were analysed with reference to the audiometric CI criteria for word recognition and pure-tone hearing loss for different countries according to the most recent guidelines.

Results: Nearly half of the subjects (50.8%) exhibit hearing asymmetry of more than 10 dB for averaged hearing thresholds, 32.6% exhibit differences of more than 20 dB, and 21.1% of more than 30 dB. The bilateral evaluation of CI candidacy has the strongest influence on the number of potential CI candidates. Profound hearing loss in both ears was found in 837 cases. Profound hearing loss in the worse ear was found in 8003 cases.

Overall, the simulation suggests that considering CI candidacy for patients ear by ear has an extremely large influenceon case numbers – greater than the effect of merely shifting cut-off criteria within reasonable ranges. Though the study sample is not necessarily representative, these data may be used for estimating the influence of modified audiometric criteria for cochlear implantation and potential costs for the society.

Planned Session 03

Candidacy for Auditory Implants: Who Can Benefit?
PS 03-4

Cochlear Implantation in Vestibular Schwannoma: Outcomes and Realistic Candidate Selection

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Over the last 15 years, cochlear implantation (CI) has progressively evolved as a hearing rehabilitation option for selected patients with vestibular schwannoma (VS), extending beyond its initial indication in neurofibromatosis type 2 to include sporadic tumors and a variety of clinical scenarios. This presentation summarizes the experience of a tertiary referral implant center in the management of VS patients considered for CI and analyzes auditory outcomes and candidate selection in real-world practice.

Our experience includes patients undergoing simultaneous tumor resection and CI, as well as cases implanted after prior surgery, during observation, or following radiotherapy. Audiological outcomes have shown substantial variability and are, overall, inferior to those observed in conventional CI candidates. Meaningful auditory benefit, ranging from sound detection to speech perception, can nevertheless be achieved in selected cases. Factors influencing outcomes include tumor size, preoperative hearing status, prior irradiation, extent of resection, and the presence of neurofibromatosis type 2, although no single variable reliably predicts success.

A central component of our strategy has been the intraoperative assessment of cochlear nerve functionality. The use of electrically evoked auditory brainstem responses, particularly through tools such as the Auditory Nerve Test System, has proven valuable in guiding intraoperative decision-making and in identifying patients most likely to benefit from implantation, especially in anatomically preserved but functionally uncertain nerves.

Based on this long-term experience, we propose a pragmatic approach to defining the best realistic candidates for CI among VS patients. While routine implantation is not justified in patients with normal contralateral hearing, selected individuals across surgical, observational, and irradiated scenarios may achieve meaningful auditory outcomes when careful functional assessment and appropriate expectations are applied.

Planned Session 03

Candidacy for Auditory Implants: Who Can Benefit?

PS 03-5

Clinical Performance of the Osia® 3 System: Preliminary Results in Patients with Mixed Hearing Loss

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The Osia® 3 System is a new active transcutaneous bone conduction hearing implant designed to provide improved high-frequency gain, reduced feedback, and enhanced wearing comfort. In Korea, the system was approved in August 2025, and clinical implantation began thereafter. Although early clinical experience has suggested promising audiological outcomes, clinical data in patients with mixed hearing loss remain limited. This study aimed to present preliminary clinical and audiological outcomes of the Osia® 3 System in patients with mixed hearing loss at a tertiary referral center in South Korea. We retrospectively reviewed the early clinical experience of patients with mixed hearing loss who underwent implantation with the Osia® 3 System. Audiological outcomes were evaluated using aided and unaided sound-field thresholds and speech recognition testing, and functional gain was calculated by comparing aided and unaided sound-field thresholds. Device use, surgical feasibility, and early postoperative complications were also assessed. Preliminary findings demonstrated that the Osia® 3 System provided meaningful hearing benefit in patients with mixed hearing loss. Aided sound-field thresholds improved across tested frequencies compared with unaided conditions, with notable benefit in the speech frequency range, and speech recognition performance also improved after device fitting. In addition, the system showed favorable early clinical performance with stable device use and no major device-related complications during the initial follow-up period. These preliminary results suggest that the Osia® 3 System is a safe and effective hearing rehabilitation option for patients with mixed hearing loss, providing improved audibility and speech performance in the early postoperative period. Further studies with larger sample sizes and longer follow-up are needed to confirm long-term outcomes.

Planned Session 04

Understanding the Impact of OTC Hearing Aids and PSAPs on Audiological Practice

PS 04-1

Sound advice for delivering hearing health care for adults with mild-to-moderate hearing loss

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Hearing aid service delivery models are undergoing a profound transformation driven by policy changes, technological innovation, and evolving consumer expectations. In the U.S. market, a range of direct-to-consumer (DTC) hearing devices—including over-the-counter (OTC) hearing aids, personal sound amplification products (PSAPs), and hearables—are now available. Although these regulatory categories are not uniformly defined globally, similar consumer-accessible hearing technologies exist worldwide. These devices vary widely in features, functionality, and price, and have expanded access and affordability, particularly for adults with perceived mild-to-moderate hearing difficulties. Beyond introducing new sales channels, they have also enabled alternative hearing aid service delivery models. Drawing on research in alternative service delivery, digital hearing health, and person-centered care, this presentation examines the opportunities and challenges these developments pose for audiological practice.

Evidence indicates that self-directed and hybrid models—combining consumer-controlled technologies with targeted professional support—can provide meaningful benefits for selected users, particularly when supported by education and remote monitoring. However, differences in user readiness, health literacy, and comorbidities underscore the continuing role of audiologists in assessment, counseling, and clinical oversight. This talk synthesizes current evidence and proposes a framework for integrating OTC and DTC solutions into comprehensive hearing-care ecosystems, reframing the audiologist's role toward hearing health facilitation across the continuum of care.

Planned Session 04

Understanding the Impact of OTC Hearing Aids and PSAPs on Audiological Practice

PS 04-2

What's in a name? Would a hearing aid by any other name sound as sweet?

David MAIDMENT

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The global proliferation of over-the-counter (OTC) hearing aids, personal sound amplification products (PSAPs), and hearables is reshaping hearing-care markets and service delivery models across diverse health systems. This rapid evolution has prompted debate regarding device effectiveness, regulatory categorisation, and the implications for audiological practice worldwide. This presentation draws on findings from a recent systematic review and meta-analysis comparing the effectiveness of hearing aids and non-medical amplification devices in adults with mild-to-moderate hearing loss.

The systematic review synthesised evidence from 14 studies evaluating PSAPs (k = 10) and smartphone amplification applications (k = 4). Devices were categorised as basic or premium based on technical sophistication. Basic devices typically offered fewer (<16) compression channels and limited opportunities for individualised fine-tuning. In contrast, premium devices incorporated a greater number of channels (≥16) and enhanced opportunity for personalisation to individual hearing profiles.

Meta-analyses indicated that premium PSAPs significantly improved speech intelligibility in noise compared with unaided listening, whereas basic PSAPs and smartphone amplification applications did not. Premium PSAPs performed better than basic hearing aids, while premium hearing aids demonstrated superior performance than premium and basic PSAPs, smartphone applications, and basic hearing aids. Although data could not be pooled across studies due to heterogeneity in study designs and outcomes, similar findings were also found for quality of life, listening ability, cognition, feasibility, and adverse effects. Nevertheless, evidence regarding longer-term effectiveness of PSAPs, particularly in the absence of audiological input, remains limited.

Taken together, these findings support a reframing of contemporary debates away from categorical distinctions between "hearing aids" and "OTC devices" towards a more nuanced, function-led understanding of amplification technologies. This perspective has potential implications for clinical guidance, service design, and international policy as hearing healthcare continues to evolve.

Planned Session 04

Understanding the Impact of OTC Hearing Aids and PSAPs on Audiological Practice

PS 04-3

OTC hearing aids: An opportunity to enhance rehabilitative services in audiology practice

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While over-the-counter (OTC) hearing aids became available to consumers in October 2022, audiologists had been aware of this development for many years. Although some initially expressed concern that OTC devices might negatively impact audiology practices, most have come to view this shift as a new professional opportunity. Many individuals with hearing loss who pursue OTC devices are uncertain about which products are appropriate for their hearing needs and frequently encounter challenges related to device selection, adjustment to amplification, and the need for audiologic rehabilitation, including counseling.
The purpose of this session is to define and explore the evolving role of the audiologist in the delivery of services for adults with self-perceived mild to moderate hearing loss who are considering OTC devices or who have recently obtained amplification without professional consultation. Clinical scenarios will be presented to illustrate therapeutic decision-making processes and common issues that may arise, highlighting the importance of audiologic counseling skills. Participants will be encouraged to share experiences and case examples related to encounters involving OTC hearing devices.

Outline:
Brief history of OTC in the US
Current trends
Guidelines for Practice Aural Rehabilitation
Obstacles to and benefits of integrating OTC hearing aids in practice
Dispensing OTC?
Recommending OTC?
Managing OTC?
Scenarios to consider when addressing OTC hearing aids in Practice

Planned Session 04

Understanding the Impact of OTC Hearing Aids and PSAPs on Audiological Practice

PS 04-4

The benefits of personal sound amplification products on speech perception in noise

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Background: Difficulty understanding speech in noise and increased listening effort are common complaints among older adults, even in cases of normal hearing or mild hearing loss. Although hearing aids remain the clinical standard of care, cost and accessibility barriers have increased interest in Personal Sound Amplification Products (PSAPs) as an over-the-counter option. In this study, we evaluated the short-term clinical effects of PSAP use on speech perception in noise and listening effort in older adults, with particular emphasis on interindividual variability and participant characteristics associated with benefit.

Design: A randomized, counterbalanced crossover clinical trial was conducted in which participants completed speech-in-noise testing under unaided and bilaterally aided (PSAP) conditions across two sessions separated by one week.

Participants: Twenty-eight adults aged 60–87 years with normal hearing to mild hearing loss participated; 25 completed electroencephalography (EEG) recordings.

Intervention: Participants were fit bilaterally with PSAPs and completed standardized speech-in-noise tasks in aided and unaided conditions.

Main Outcome Measures: Clinical outcome measures included the Quick Speech-in-Noise (QuickSIN) test, word or syllable discrimination in noise, and self-reported listening effort. Neural indices of listening effort were assessed using EEG alpha-band (8–12 Hz) activity.

Results: PSAP use significantly improved speech perception in noise and reduced self-reported listening effort. A clinically meaningful benefit was observed in approximately 60–70% of participants, with considerable interindividual variability. Age, degree of hearing loss, and cognitive status were significant predictors of benefit. EEG findings showed that PSAP use helped preserve alpha-band event-related desynchronization in challenging signal-to-noise conditions, a neural marker of sustained listening engagement. Reduced neural engagement was associated with greater perceived listening effort.

Conclusion: PSAPs can provide measurable short-term benefit for speech understanding in noise and reduce listening effort in many older adults with normal hearing or mild hearing loss; however, this benefit is not universal. When counselling older adults about over-the-counter amplification options, the prescription of PSAPs should consider patient age, hearing thresholds, and cognitive status. While PSAPs do not replace prescription hearing aids, they may serve as a clinically relevant and accessible option for selected patients who experience listening difficulties in noisy environments.

Planned Session 04

Understanding the Impact of OTC Hearing Aids and PSAPs on Audiological Practice

PS 04-5

Clinical Efficacy of Over-the-Counter Hearing Aids: Indications, Performance, and Practical Considerations

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Background and Objective

The World Health Organization estimates that over 400 million people worldwide require hearing rehabilitation, yet hearing aid adoption remains below 20%. Key barriers include limited access to hearing care professionals, high cost, and social stigma. The introduction of the over-the-counter (OTC) hearing aid category by the U.S. Food and Drug Administration (FDA) in 2022 was a landmark regulatory shift designed to address these accessibility and affordability challenges. OTC hearing aids, including self-fitting models that allow users to adjust frequency-specific gain through smartphone applications, have the potential to expand hearing care delivery beyond the traditional audiologist-dependent model. This presentation reviews the clinical efficacy of OTC hearing aids, discusses appropriate indications for their use, and highlights important considerations for clinicians.

Clinical Evidence for Self-Fitting OTC Hearing Aids

Several randomized controlled trials have demonstrated that self-fitting OTC hearing aids can yield clinical outcomes comparable to audiologist-fitted prescription devices in adults with mild to moderate sensorineural hearing loss. Sabin et al. (2020) compared 75 adults randomized to either audiologist-based prescription (ABP) fitting or self-fitting and found that user-selected gain in the self-fitting group was on average only 1.8 dB lower than clinician-fitted levels, with frequency-specific differences within 5.6 dB. Standardized outcome measures including speech-in-noise tests and self-report questionnaires showed no statistically significant differences between groups. Notably, blinded sound quality comparisons revealed a slight preference for self-fitted settings. A subsequent randomized clinical trial by Swanepoel et al. (2023) involving 64 adults confirmed that self-reported and speech-in-noise benefits were equivalent between self-fitting OTC and audiologist-fitted conditions after a 6-week field trial. Furthermore, Humes et al. (2017) demonstrated in a three-arm double-blind placebo-controlled trial that a consumer-directed self-fit model produced only slightly poorer outcomes compared to gold-standard audiologist fitting.

Electroacoustic Performance: Real-Ear Measurement Findings

Our comparative study evaluated five commercially available OTC hearing aids against a conventional prescription hearing aid in 30 adults with mild to moderate hearing loss (mean age 62.2 years; mean pure-tone average 41.2 dB HL). Real-ear measurement (REM) results demonstrated that the conventional hearing aid achieved appropriate fit-to-prescription targets at all seven test frequencies (250–6000 Hz). Among the OTC devices, performance varied considerably. One OTC product matched prescription targets at all seven frequencies, while others achieved appropriate fit at five to six of seven frequencies. The most common deviations were observed at 4000 and 6000 Hz, where several OTC devices provided 10–24 dB less gain than prescribed, suggesting limitations in high-frequency amplification.

Auditory Performance Outcomes

Aided sound-field pure-tone audiometry revealed comparable thresholds across most devices, with mean aided thresholds ranging from 32.8 to 37.2 dB HL. However, speech recognition scores in quiet showed some variation: the conventional hearing aid achieved a mean score of 78.4%, while OTC devices ranged from 68.4% to 77.1%. Speech perception in noise (SPIN) testing demonstrated that certain OTC devices performed comparably to the conventional hearing aid for both word and sentence scores, while others showed reduced performance. These results indicate that while some OTC hearing aids can approximate prescription-level auditory performance, others may provide suboptimal benefit, particularly in challenging listening environments.

User Satisfaction and Preferences

Satisfaction surveys (n=13) revealed nuanced findings. The conventional hearing aid received a mean overall satisfaction score of 6.5 out of 10, while OTC devices scored between 5.8 and 6.8. Notably, OTC devices received significantly higher satisfaction ratings for cosmetic appearance (7.1–7.2 vs. 6.3) and value for money (6.6–7.5 vs. 4.2). Purchase intent was markedly higher for the best-performing OTC device (69%) compared to the conventional hearing aid (23%). These findings align with broader literature suggesting that user experience, affordability, and cosmetic appeal are important drivers of hearing aid adoption beyond acoustic performance alone.

Indications and Candidacy

Based on current evidence and regulatory guidelines, OTC hearing aids are appropriate for adults (aged 18 and older) with perceived mild to moderate sensorineural hearing loss. Ideal candidates include individuals with symmetric hearing loss, no active otologic pathology, adequate cognitive function and manual dexterity to manage self-fitting applications, and realistic expectations about device capabilities. Self-fitting OTC hearing aids with in-situ audiometry and app-based frequency adjustment are preferable to preset-only models, as they allow individualized gain optimization.

Precautions and Limitations

Several important considerations should be noted. First, OTC hearing aids are not interchangeable with self-fitting hearing aids; the FDA distinguishes between preset OTC devices and those with validated

self-fitting algorithms. Second, REM verification is generally not performed in the OTC pathway, which may result in suboptimal gain, particularly at high frequencies. Third, consumers may lack the ability to recognize red-flag symptoms requiring medical evaluation, such as asymmetric hearing loss, sudden onset, or associated otologic symptoms. Fourth, the inconsistent quality across OTC products underscores the need for clinician guidance and evidence-based product recommendations. Finally, ongoing professional support for troubleshooting, counseling, and long-term management remains valuable even in the OTC framework.

Conclusions

OTC hearing aids represent a meaningful advancement in expanding access to hearing care for the underserved population with mild to moderate hearing loss. Clinical evidence supports their efficacy as a viable alternative to audiologist-fitted devices for appropriately selected candidates. However, variability in electroacoustic performance across products, limitations in high-frequency gain, and the absence of professional oversight necessitate continued research, improved quality standards, and the development of hybrid care models that integrate OTC accessibility with professional guidance. Clinicians should be prepared to counsel patients on appropriate OTC device selection, recognize candidacy limitations, and facilitate seamless transitions to prescription hearing aids when indicated.

Planned Session 05

Diagnosis of (C)APD with Diverse Phenotype
PS 05-1

Issues and trends in the diagnosis of central auditory processing disorder

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Not all commonly used central auditory processing disorder (CAPD) tests and test batteries exhibit good sensitivity and specificity and even the best designed and validated do not achieve 100% predictive efficiency. Arbitrary cut-off criteria based on standard deviations can be problematic in part because population data may not conform to normal distributions. Evidence also indicates that widely used tests often under-diagnose CAPD under American Speech Language Hearing Association and American Academy of Audiology criteria. Some criticise the absence of a gold standard for CAPD test interpretation, though this is not uncommon in the diagnosis of developmental disorders in children, with case history, expert opinion and exclusion-based diagnosis prevailing. These issues do not preclude high quality decision-making. Rather than relying solely on test performance, diagnosis should be holistic, integrating case history, questionnaires, exclusion of alternative causes, test results, and application of professional judgement.

There are promising features in some well-validated newer test packages such as Sound Scouts and Audia Dichotic, but also concerns in the case of tests which, in seeking to separate out cognitive from auditory effects, may inadvertently lead to under-diagnosis of central auditory deficits. Language and cognitive weaknesses comorbid with auditory deficits may be a consequence of the auditory weakness rather than the cause of poor performance on auditory tests. There is much evidence contradicting the argument by some that CAPD is primarily cognitive and should be described as a listening, rather than auditory, complaint. This controversy is nonetheless damaging, directing people with genuine auditory difficulties away from appropriate diagnosis and treatment.

Clinical services for CAPD are encouraged to adopt a Statement of Principles and Criteria for Diagnosis of Central Auditory Processing Disorders to guide and describe their diagnostic principles.

Planned Session 05

Diagnosis of (C)APD with Diverse Phenotype
PS 05-2

Auditory processing disorder: Hearing healthcare professionals' knowledge, practices and guidelines

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Auditory processing disorder (APD) is a clinical entity that has attracted increasing research and clinical interest from different healthcare professional societies and professional groups worldwide in recent decades. There has been an increasing number of national and international guidelines on consensus basis in the last three decades in particular. But while there is broad consensus that APD should be diagnosed on the basis of clinical symptoms, test results and careful consideration of other potential higher order factors that may influence test results, worldwide classification manuals for diseases that encode this diagnosis do not provide diagnostic criteria. The ICD-11 of the World Health Organisation includes APD under AB5Y-Other specified (ear) disorders with hearing impairment and provides the alternate terms auditory processing disorder, central auditory processing disorder and auditory fatigue deafness. In the ICD-11 supplementary section for functioning assessment, "auditory perception" comes under VV0Y - Other specified mental functions, acknowledging the fact that we hear with our brains. Awareness of APD amongst healthcare professionals has improved over time. In the UK, 29% of surveyed professionals considered themselves not very well informed in 2024 (Bernard et al, 2024) vs 58% r in 2006 (Hind, 2006), but still only 4% considered themselves very informed in 2024, consistent with the <5% reported in 2006. Improved awareness did not translate to the same degree in availability of clinical services: in the UK survey a minority of respondents reported diagnosing (14%) APD vs 11% in 2006. In contrast, over 90% of USA audiologists who self reported expertise in APD tested affected individuals in a 2011 survey (Emanuel et al, 2011. Awareness as well as provision of clinical services varies world wide with majority of respondents reporting being poorly informed in Malaysia (Nor, Bernard et al 2025), and not diagnosing APD in Kerala (65% Swetha et al 2024). This disparity may be due to availability or not of educational programs and clinical training in APD in different parts of the world. Tellingly, increased awareness and education of professionals was identified as a priority need by the majority of surveyed patients/families with APD (Agrawal et al, 2021). We propose that professional organisations need to develop and agree on minimum knowledge and training requirements for professionals who diagnose and manage APD in a variety of settings, and support provision of such education within their learning events.

Planned Session 05

Diagnosis of (C)APD with Diverse Phenotype
PS 05-3

Cortical auditory function in children with APD

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Audiology and hearing research has a long history of using cortical auditory evoked potentials (CAEPs) to non-invasively investigate cortical auditory function in adults and children with healthy hearing and with a range of hearing differences, including APD. Compared to age-peers with healthy hearing, children with APD show differences in cortical auditory function across a range of cortical measures. It is generally difficult to directly link behavioural measures of auditory processing with CAEP measures in infants and very young children, however, this has been investigated using discriminative cortical responses which index auditory discrimination. This presentation will address three areas of research: discriminative CAEP measures of auditory processing, links between early auditory function and later language and literacy, and clinical assessment of APD in school-age children using CAEPs.

The Acoustic Change Complex (ACC) provides an objective indicator that the auditory brain has noticed a change in the acoustic stimulus. The Mismatch Response (MMR) requires establishment of a cortical 'memory trace' of the frequent acoustic stimulus in order to generate a mismatch evoked response when the stimulus changes to the deviant, indicating a higher level of auditory processing than that needed for the ACC. MMR detection is indicative of auditory discrimination – absent MMR even when the stimulus and recording protocols are optimised may indicate a need for auditory discrimination training (however, false positives need to be considered).

The co-morbidity of APD with language and literacy difficulties is well established in cross-sectional studies of school-aged children. A number of longitudinal studies have also shown that CAEP latencies and amplitudes early in infancy are associated with later measures of language and literacy at pre-school and school age, providing robust evidence for an auditory basis for these difficulties, and suggesting that cortical function measures at a young age could highlight children needing more support to develop these skills.

Children most commonly present for assessment for suspected APD at school age when listening and learning difficulties become apparent, despite the presence of good peripheral hearing. Clinical assessment of CAEPs is problematic, however, at this age due to the developmental changes that occur across childhood and the wide range of stimuli, recording protocols and response measures reported in the literature. Despite these challenges there is some consensus that speech-evoked N1/P2/N2 CAEP measures, rather than P1, are sensitive to the effects of APD on cortical auditory function and show promise as a diagnostic tool and as a measure of treatment outcomes.

Planned Session 05

Diagnosis of (C)APD with Diverse Phenotype
PS 05-4

Cortical auditory evoked potentials as a measure of auditory processing

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This presentation highlights the application of objective measures, auditory evoked potentials (AEPs) to investigate auditory processing skills in clinical populations. Auditory processing is a multilayered complex set of skills that includes auditory discrimination, auditory attention and listening in noise. This presentation aims to highlight the applications of auditory evoked objective techniques to assess these skills, in three parts. The first part will share a study that used AEPs to measure discrimination abilities in a normal hearing population. The second part of the talk will share the results of neural encoding to continuous speech in noise in older adults. The third part will share results from a study evaluating auditory attention in young adults using syllables in noise as the stimulus.

Planned Session 05

Diagnosis of (C)APD with Diverse Phenotype

PS 05-5

Identification and Treatment of Dichotic Deficits in Children

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This presentation is a review of data from clinical and school-based assessment of dichotic listening performance with the Randomized Dichotic Digits Test and the Dichotic Words Test and treatment of children with significant deficits with Auditory Rehabilitation of Interaural Asymmetry (ARIA). Over 800 children were assessed with each dichotic test from which age-appropriate cut-off values were developed using non-parametric statistical methods. Cut-off values were applied to data from more than 1,500 children assessed with both tests to identify deficits from each test. Performance characteristics from each test were used to characterize amblyaudia, dichotic dysaudia, or amblyaudia plus, the three common dichotic deficit patterns. Children were identified with dichotic deficits when score patterns matched across the two tests. Percentile ranks for deficit scores across the two tests were used to rank the severity of dichotic deficits in each child. Prevalence rates of moderate and severe dichotic deficits from school testing typically developing schoolchildren and children referred for clinical auditory processing assessment will be discussed.

Children identified with significant dichotic deficits participated in one four-week session of ARIA conducted in an audiometric sound booth with stimuli presented from sound field speakers. Pre- and post-ARIA scores from dichotic tests and other behavioral measures, including the Frequency Pattern Test, Words in Noise Test, LiSN-S, Forward and Backward Digits from the TAPS-4, and C-TOPP were analyzed for significant differences before and after therapy. Effects of deficit type and severity, site location, and age on behavioral outcomes were analyzed.

Children demonstrated significant improvements in dichotic performance with many achieving age-appropriate scores after one four-week intervention with ARIA. Greater severity was linked to larger improvements, highlighting the adaptive nature of the treatment. Children also demonstrated significant improvements in other untrained measures, including listening in noise, working memory, and phonological processing.

Hearing healthcare can benefit from utilizing the principles behind precision medicine that direct clinicians to avoid a one-size-fits-all approach and to modify services to specifically identify and treat individual deficits in hearing and auditory processing. Our assessment with improved dichotic listening tests maps asymmetry and integration performance between the listener's two ears, creating a neural listening profile that captures the binaural integration pattern for each child. We then stratify children according to their specific dichotic deficit subtype derived from quantitative performance and match them with the most effective ARIA training protocol. The ARIA protocol is a targeted, deficit-specific auditory therapy that uses adaptive, contralateral suppression and constraint-induced tasks to strengthen binaural mechanisms in the brainstem neurophysiologic pathway of the auditory system. Intensity adjustments throughout training and task progression are personalized according to each child's performance characteristics. Our aggregate anonymized performance data across this large, multi-site cohort helps us identify developmental trajectories of binaural integration performance following participation in ARIA and monitor generalization of benefits across other untrained skills related to speech perception, working memory, attention, and phonological processing. Our laboratory is currently assessing and treating children across all grade levels in several schools where we will include pre- and post-ARIA standardized measurements of academic achievement and gather data from the state health department related to lead exposure. Our long-term goal is to demonstrate the benefits of precision identification and treatment of dichotic deficits and advocate for its universal implementation across the school-age pediatric population. This same approach may provide similar benefits among adults with complaints of difficulty understanding despite normal hearing, children with hearing aids and cochlear implants who are unable to move into mainstream education, and older adults with bilaterally symmetrical hearing losses who are dissatisfied with binaural amplification.

Planned Session 06

e-Health
PS 06-1

Digital healthcare & health equity: Better world with technology

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CEO, Kakaohealthcare, Korea

The dawn of the twenty-first century has brought about a seismic shift in the way we perceive and deliver healthcare. We are currently witnessing a digital revolution that is not merely changing the tools we use, but fundamentally redefining the architecture of human well-being. From the integration of Artificial Intelligence in diagnostics to the rise of remote monitoring and telemedicine, technology is moving at an unprecedented pace. However, as we stand at this technological crossroads, we must confront a pivotal question: Is this innovation serving to narrow the gap between the privileged and the underserved, or is it inadvertently creating new walls?

Historically, healthcare systems have been built around centralized models—large hospitals and specialized clinics located in urban hubs. This structure naturally favored those with the means to travel and the resources to pay, leaving those in rural or marginalized communities in "medical deserts." Digital healthcare offers a radical departure from this legacy. By decoupling medical expertise from physical location, digital platforms allow us to democratize access to health. Telemedicine, for instance, is no longer just a convenience for the busy professional; it is a lifeline for the elderly in remote villages and a vital resource for low-income families who cannot afford the time or cost of long-distance travel. When a patient can consult a specialist through a smartphone, the barriers of distance and transportation begin to dissolve, marking the first step toward true health equity.

A quintessential example of this transition in action is Kakao Healthcare's "PASTA" (Personalized AI-driven Sugar Tracking Assistant) service. Chronic diseases like diabetes are often called "social levelers" because they affect millions, yet the quality of management remains highly unequal due to the high cost of continuous monitoring and the complexity of medical data. PASTA addresses this gap by integrating Continuous Glucose Monitoring (CGM) sensors with a highly accessible, intuitive smartphone interface. By visualizing complex blood sugar data in real-time and providing AI-driven insights on how diet and exercise affect one's body, PASTA lowers the threshold for specialized metabolic care. It transforms a smartphone into a 24/7 personal health assistant, reducing the need for frequent, expensive hospital visits and making expert-level self-management available to anyone with a mobile device. This is "Accessibility" in its purest form—moving healthcare from the clinic into the palm of the patient's hand.

Furthermore, the surge in mHealth and services like PASTA has shifted the paradigm from reactive to proactive care. In a traditional setting, healthcare often begins only when a patient is already ill. Digital tools allow for continuous monitoring that can detect subtle changes in health before they escalate into crises. This shift is particularly crucial for health equity, as chronic diseases disproportionately affect underserved populations who may lack the "health literacy" to interpret complex clinical reports. PASTA's user-friendly design simplifies this data, using "gamification" and easy-to-understand visual cues to empower individuals who might have been overwhelmed by traditional medical jargon. By making health data intuitive and actionable, we level the playing field, ensuring that "knowledge" is no longer a barrier to a healthy life.

However, the path to equity is not without its pitfalls. We must acknowledge the "Digital Divide"—the reality that innovation can exacerbate existing inequalities if not implemented with intention. If a digital health intervention requires high-speed internet, the latest expensive hardware, or a high level of technical literacy, it risks leaving the most vulnerable populations even further behind. Furthermore, we must address the ethical challenges of algorithmic bias. As we integrate Artificial Intelligence into healthcare, we must ensure that the data used to train these models is as diverse as the population it serves. A "better world" cannot be built on biased data that misdiagnoses or overlooks minority groups. Therefore, health equity in the digital age requires a commitment to "Inclusive Design." We must design technology not for the average user, but for the margins. If a tool works for a person in a remote, low-resource setting with limited connectivity, it will work for everyone.

To truly harness technology for the common good, our approach must move beyond being "tech-centric" and become "equity-centric." This requires a multi-disciplinary collaboration between engineers, healthcare providers, and policymakers. We must view digital access as a social determinant of health, as essential as clean water or electricity. Kakao Healthcare's PASTA shows that when a major tech platform leverages its UX expertise for public health, it can bridge the gap between "medical data" and "human behavior." But technology alone is not a silver bullet. Governments and private sectors must work together to build the necessary infrastructure—broadband access, digital literacy programs, and open-source platforms—that allows digital healthcare to flourish in every corner of the globe. The sophistication of our gadgets is meaningless if they are only accessible to the few; their true value is measured by their reach and their impact on the collective health of humanity.

In conclusion, the intersection of digital healthcare and health equity represents one of the greatest opportunities of our time. We are no longer limited by the physical constraints of the past. Through thoughtful innovation, ethical implementation, and a steadfast commitment to inclusivity, we can build a healthcare system that is truly borderless. This 15-minute presentation will challenge the audience to look beyond the novelty of technology and see its profound potential as a tool for social justice. The "better world" we envision is within our reach, but it requires us to ensure that the digital revolution is a shared revolution. As we move forward, let us remember that the ultimate goal of technology is not just to extend life, but to ensure that every individual has the opportunity to live a healthy, dignified, and connected life. The future of healthcare is digital, but its success will be measured by how much more equitable it makes our world.

Planned Session 06

e-Health
PS 06-2

Development and Clinical Evaluation of HearRO: A Mobile Digital Therapeutic for Auditory Rehabilitation in Older Adults with Age-Related Hearing Loss

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Purpose:
Digital therapeutics (DTx) are emerging as evidence-based, software-driven interventions for sensory impairments including hearing loss. Age-related hearing loss (presbycusis) affects approximately 13 million people in Korea and is associated with a 2- to 5-fold increased risk of dementia, yet mobile-based rehabilitation applications specifically designed for elderly patients remain unavailable. This study aimed to develop HearRO (DP-DTx-002), a DTx, and evaluate its clinical efficacy and safety in older adults with mild-to-moderate presbycusis.

Methods:
HearRO was developed based on multiple validated patents and peer-reviewed research, incorporating: (1) a Korean-validated hearing self-assessment tool (Self-assessment for Hearing Screening of the Elderly, SHSE-K); and (2) a 4-week progressive training program with 9 modules covering syllable discrimination, sentence recognition in noise, discourse comprehension, and working memory. Clinical evaluation consisted of two phases: an exploratory trial at Seoul St. Mary's Hospital (training group n=13, control group n=13), and a multicenter, randomized, single-blind, standard-treatment parallel-controlled confirmatory trial across three hospital sites (n=86), in adults aged 60 or older with mild-to-moderate sensorineural hearing loss.

Results:
In the exploratory trial, the training group demonstrated consistent improvement trends across the Korean Hearing Handicap Inventory for the Elderly (KHHIE), Korean Mini-Mental State Examination (K-MMSE), and Digit Span Test. In the confirmatory trial, ANCOVA adjusted for baseline values at Week 4 revealed significant between-group differences in right-side speech reception threshold (SRT; adjusted mean difference 1.32 ± 0.55, p = 0.018) and left-side speech discrimination score (SDS; adjusted mean difference 2.67 ± 1.17, p = 0.025). No adverse events were reported.

Conclusion:
HearRO demonstrated clinically meaningful improvements in speech perception outcomes, supporting the feasibility and efficacy of mobile DTx for hearing rehabilitation in older adults with presbycusis

Planned Session 06

e-Health
PS 06-3

Advancing real-world audiology: Integrating smartphone-based hearing outcomes with passive wearable sensing

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Traditional assessments of hearing and hearing-aid benefit rely on in-clinic tests or retrospective questionnaires. While the former lack ecological validity, the latter tend to smooth over important moment-to-moment variations in listening experiences. To understand how well hearing aids support users in everyday life - and in which environments improvements are needed - new ambulatory assessment approaches are essential.
A promising method combines smartphone-based ecological momentary assessments (EMAs) of in-situ hearing outcomes with passive sensing of real-world listening environments. Complementary physiological measures from wearable devices (e.g, smartwatches) can further provide objective indicators of listening stress and effort.

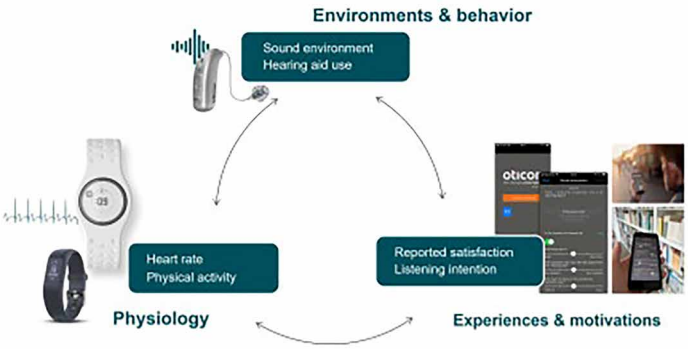


Figure Real-world assessment of hearing and hearing-aid benefit.

In this presentation, I will show data demonstrating the sensitivity of this multimodal approach in capturing real-world hearing-aid benefit, user preferences across environments, and fluctuations in listening stress. Ultimately, such integrated assessments can empower clinicians to more precisely evaluate whether treatment goals are being met and to tailor interventions, such as adjusting hearing-aid features based on real-life evidence.

Planned Session 06

e-Health
PS 06-4

An AR game for in-home training of spatial auditory attention

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Introduction: Augmented Reality (AR) has fundamentally expanded human perceptual boundaries by seamlessly intertwining virtual and physical environments. In the auditory domain, assisted listening devices—such as advanced hearing aids—already leverage AR-like characteristics to augment speech communication in everyday scenarios. However, fully realizing this seamless integration within modern, spatially complex auditory AR systems demands a high degree of human perceptual adaptation. Facilitating this adaptation quickly and efficiently remains a critical challenge. Drawing on established principles of perceptual learning, gamified training paradigms have emerged as a highly effective strategy for accelerating this process. Building upon prior research aimed at restoring auditory sensitivity to fine acoustic and spatial cues—often diminished by age or cognitive decline—this paper introduces a novel game-based training paradigm specifically optimized for Selective Auditory Attention (SAA). We discuss how this interactive approach not only enhances spatial hearing capabilities but also significantly accelerates user adaptation to next-generation auditory AR environments.

Technology: The foundation of auditory augmentation relies on the precise manipulation of Head-Related Transfer Functions (HRTFs). For over three decades, HRTF filtering has been the standard for rendering 3-dimensional (3D) spatial audio over headphones, allowing users to perceive virtual sounds as radiating from specific directions. Despite its ubiquity, traditional HRTF-based rendering faces significant hurdles in real-world AR applications. These include the high computational overhead required to smoothly interpolate non-measured HRTF data during dynamic head movements, as well as the necessity of individualizing profiles to match a listener's unique anthropometric features. More critically, generic HRTF rendering often ignores the acoustic reality of the physical space; room acoustics heavily modulate spatial cues, leading to a perceptual disconnect when virtual sounds fail to match the reverberant signature of the user's actual environment. To bridge this gap, our approach integrates a novel real-time rendering method proposed by Sato et al. [1], which utilizes LiDAR sensing to seamlessly embed virtual sound objects within the physical soundscape. By dynamically fusing in-situ room acoustic data with HRTF rendering, this system accurately positions virtual objects anywhere in the listener's environment. Compared to other generic methods in virtual reality (VR) engines, this method dynamically accounts for the interior conditions of a room in real-time, delivering a true auditory AR experience to listeners.

Experiment: To evaluate whether this Spatial Audio rendering approach could support meaningful perceptual learning in unconstrained everyday settings, the spatial audio framework was deployed on consumer-grade hardware (iPhone 14 Pro, AirPods Pro 2) as a gamified at-home auditory training application. Eleven middle-aged adults with self-reported normal-to-mild hearing difficulties undertook a 4-week training protocol in their own living environments, where the system dynamically adapted its acoustic rendering to each participant's unique room geometry. Changes in selective auditory attention and functional hearing were tracked using the Korean Matrix Sentence Test (KMST) administered at three time points: baseline, post-training, and an 8-week follow-up across progressively challenging signal-to-noise ratios (0 dB, -6 dB, -9 dB).

Results: The intervention demonstrated strong technical feasibility and adherence, achieving a 100% protocol completion rate (11/11). Exploratory efficacy analyses indicated statistically significant improvements in speech-in-noise (SiN) perception post-training across all tested acoustic conditions. Crucially, these perceptual gains were sustained at the 8-week follow-up. Furthermore, enhancements in in-game spatial localization correlated significantly with real-world speech perception gains in the more challenging noise conditions, validating the transferability of the game-based training.

Conclusion:
This pilot study demonstrated the feasibility of an AR-based audio-motor training program for at-home delivery, revealing encouraging preliminary efficacy signals. Aligned with previous research [2], the proposed closed-loop spatial attention training successfully induced cognitive improvements in speech understanding within noisy environments, highlighting its potential for the general enhancement of listening skills.
Despite these promising outcomes, formative findings indicate that the training requires further refinement in engagement and ease of use. Considering the varied digital literacy of target user groups, enhanced accessibility is a foremost condition for maximizing the efficacy of such gamified AR paradigms. Ongoing development therefore prioritizes reducing setup complexity while retaining the core game mechanics that drove sustained engagement and skill acquisition. These findings collectively inform the design of a subsequent randomized controlled trial aimed at establishing efficacy across more diverse clinical and demographic populations.

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Planned Session 07

Hearing Screening
PS 07-1

Global disparities in newborn hearing screening and how to achieve UNHS

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Background:
Undetected or inadequately managed permanent childhood hearing loss (PCHL) profoundly affects developmental outcomes across linguistic, cognitive, socio-emotional, and educational domains. Universal newborn hearing screening (NHS) has proven to be a cost-effective public health intervention, reducing the age at diagnosis and initiation of intervention and thereby mitigating the long-term consequences of PCHL.
In its World Report on Hearing (2021), the World Health Organization (WHO) identified effective NHS coverage as one of three tracer indicators for monitoring global progress in ear and hearing care, setting a target of a 20% increase in NHS coverage by 2030 (WHO 2021). The report cited a global survey on NHS implementation (Neumann et al, 2020) showing that, between 2013 and 2019, 38% of the world's population had no or only minimal access to hearing screening, while 33% were covered by universal programs. Among screened infants with PCHL, the mean ages at diagnosis and intervention onset were 4.6 and 6.7 months, respectively, compared with 34.9 and 36.7 months in unscreened infants.
Although many countries have since strengthened their NHS programs, emerging challenges—including resource constraints, the impact of armed conflicts, and disruptions to healthcare systems—threaten their sustainability.

Method:
A global follow-up survey is currently being conducted to update data on the status of NHS implementation. An expanded and refined questionnaire has been distributed to members of the International Newborn and Infant Hearing Screening (INISH) Group, a multidisciplinary professional network encompassing experts from more than 160 countries. The findings will be reported to WHO and are intended to inform the forthcoming Status Report on Global Ear and Hearing Care.

Results:
To date, more than 40 countries across nearly all continents have provided updated data on newborn hearing screening (NHS) or indicated their intent to do so. Many report higher coverage rates than in the previous global survey. Nevertheless, NHS programs remain absent in numerous low- and middle-income countries (LMICs), and even some high-income countries continue to show suboptimal or unstable coverage.

Discussion and Conclusion:
The follow-up survey highlights persistent structural and systemic barriers to the implementation of national infant hearing screening (NIHS) programs, particularly in LMICs. Major obstacles include the absence of audiological infrastructure, limited political commitment to improving hearing health, and the dominance of economic interests that restrict access to high-quality hearing technology.
Effective follow-up diagnostics in infants require not only appropriate equipment but also professional expertise—specifically, proficiency in applying a combination of objective and subjective diagnostic methods in accordance with established quality standards. Since these competencies depend largely on professional education and training, stronger international cooperation is essential. Experts and institutions in industrialized countries could assume greater responsibility by establishing long-term capacity-building partnerships with LMICs.
Achieving effective treatment also depends on political will. Governments must recognize early detection and intervention for childhood hearing loss as an investment in societal and economic development and allocate the necessary resources accordingly. For NIHS programs to evolve sustainably in LMICs, the fundamental prerequisites—comprehensive diagnostic capacity and accessible intervention services—must first be established, or at least developed simultaneously. Only when these essential conditions are met is mass screening ethically and practically justified, and only then can NHS programs be expected to develop effectively in underserved regions of the world.

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Planned Session 07

Hearing Screening
PS 07-2

Estimated Coverage of Universal Newborn Hearing Screening in Brazil (2008–2024): Expansion, Regional Diversity and Sustainability within a Universal Public Health System

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Background
Universal Newborn Hearing Screening (UNHS) has been mandated in Brazil since Federal Law 12.303/2010. Brazil operates one of the largest universal public health systems in the world, the Unified Health System (Sistema Único de Saúde – SUS), which provides coverage for the entire Brazilian population (approximately 203 million people). Approximately 75–80% of Brazilians rely exclusively on SUS for health care, and most births occur in public maternity hospitals. Therefore, coverage estimates within SUS reflect national population-level performance.
Since implementation, Brazil has progressively structured its neonatal hearing screening policy through federal legislation, national guidelines, dedicated financing mechanisms, and expansion of rehabilitation services. National Guidelines for Neonatal Hearing Screening were first published in 2012 and updated in 2025. The revised guideline reinforced quality indicators, standardized protocols, and integration across the screening–diagnosis–intervention continuum. It also refined risk indicators for hearing loss, distinguishing more clearly between cochlear and retrocochlear conditions.
As of August 2025, Brazil has 342 Specialized Rehabilitation Centers (CER), including 169 with an auditory rehabilitation modality, demonstrating established institutional capacity for early hearing detection and intervention.
Objective
To estimate and describe national coverage trends of Universal Newborn Hearing Screening within the Brazilian public health system between 2008 and 2024, incorporating screening procedures recorded in both outpatient and hospital administrative systems.
Methods
A population-based ecological time-series study was conducted using official national administrative databases. The numerator consisted of neonatal hearing screening procedures registered in the Outpatient Information System (SIA/SUS) and the Hospital Information System (SIH/SUS). The denominator was derived from the Live Birth Information System (SINASC), representing live births within SUS, excluding births covered by the supplementary private sector when applicable.
In Brazil, screening procedures are registered by public maternity hospitals and health services for the purpose of reimbursement and federal funding allocation. The procedure code used for recording is specific to neonatal hearing screening, ensuring that the analysis refers exclusively to screening performed in newborns. According to the 2025 national guideline, screening procedures may be registered in either SIA/SUS or SIH/SUS, depending on local administrative and billing workflows.
Annual estimated coverage was calculated as the ratio between screening procedures performed and eligible live births from 2008 through 2024. Longitudinal analysis allowed evaluation of national trends and regional variation.
As with any analysis based on administrative health databases, potential limitations include underreporting, variability in manual data entry practices across institutions, and time lags in data consolidation. Because data entry is linked to financial reimbursement, completeness may vary according to local administrative organization. Nevertheless, the use of official national databases ensures standardized methodology and comparability over time.
Results
Estimated national UNHS coverage increased substantially over the 16-year study period. Coverage rose from 7.8% in 2008 to 25.9% in 2011, reflecting early expansion following federal legislation. Continued growth was observed throughout the mid-2010s, reaching approximately 39–45% between 2015 and 2018. In 2024, estimated national coverage reached 47.4%.
This trajectory represents a nearly sixfold increase in coverage over the study period and demonstrates sustained expansion within a universal public health system serving a large and socioeconomically diverse population.
Regional disparities remain evident. The South achieved the highest estimated coverage levels, reaching 69.2% in 2019, the Midwest reached 42.4% in 2018, the North (31% in 2016), Southeast (30.9% in 2016), and Northeast (26.8% in 2019). These differences reflect heterogeneous regional development, variations in infrastructure, workforce distribution, and health system organization.
Although national coverage remains below the international benchmark of 95% recommended for universal newborn hearing screening programs, the consistent upward trend observed between 2008 and 2024 reflects meaningful public health progress.
Discussion
The Brazilian experience illustrates the complexity of implementing universal screening within a large, decentralized health system. Over the past decade and a half, Brazil has built a robust legislative and institutional framework, expanded rehabilitation networks, and strengthened reporting mechanisms.
The incorporation of screening records in both SIA/SUS and SIH/SUS, as recognized in the 2025 guideline, has improved monitoring capacity and contributed to more comprehensive coverage estimates. Institutional reports from the Ministry of Health indicate national coverage levels approaching 46%, consistent with combined administrative data analyses. Differences between earlier analyses based solely on outpatient data and more recent combined estimates highlight the evolution of data integration strategies rather

than inconsistencies in performance.
When considered in the context of Brazil's continental dimensions and marked regional diversity, the observed expansion represents a substantial achievement. Continued progress will depend on sustained governance, improved data integration, workforce stability, and equitable allocation of resources across regions.
The 2025 operational refinements, including clarification of risk indicators and adjustments in screening flow for newborns without risk factors, may further support service organization and sustainability. Ongoing monitoring will be essential to evaluate their impact on referral patterns and long-term coverage.
This analysis focuses specifically on the screening phase of neonatal hearing health programs. Evaluation of diagnostic and intervention indicators remains an essential next step for comprehensive assessment of early hearing detection and intervention performance in Brazil.
Balancing continued expansion with long-term sustainability remains the central challenge for UNHS in Brazil.
Conclusion
Between 2008 and 2024, Brazil achieved substantial expansion in estimated Universal Newborn Hearing Screening coverage within its public health system. While universal coverage has not yet been achieved, national progress has been consistent and institutionally supported.
Achieving universal newborn hearing screening in Brazil will require not only continued expansion, but the consolidation of sustainable and resilient systems capable of ensuring universal, equitable, and integrated care nationwide, in alignment with the foundational principles of the Brazilian Unified Health System.

Hearing Screening
PS 07-3

The Screening-to-Outcome Gap in EHDI: Structural and commercial determinants

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Hearing screening has become a central pillar of global strategies to address childhood hearing loss, with widespread efforts to implement newborn and early childhood screening programs across diverse health systems. The underlying goal of Early Hearing Detection and Intervention (EHDI) has been clear: to ensure that children with hearing loss access timely rehabilitation, enabling them to develop language, participate in education, and achieve broader social and economic outcomes.
However, an important question remains—are we achieving this goal, or are we placing disproportionate emphasis on the means rather than the end?
Emerging evidence, particularly from low- and middle-income countries (LMICs), points to a persistent "screening-to-outcome gap". A systematic review of EHDI programs in LMICs highlights a strong focus on screening, with progressively less attention to subsequent stages of the care pathway, including diagnosis, amplification, rehabilitation, and long-term integration. Reviews of national programs in India similarly demonstrate that while early identification efforts have expanded, access to rehabilitation and meaningful outcomes remain limited.
These reflect broader structural and commercial determinants that shape how programs are designed and funded. Investments often prioritize device-related and screening technologies, while comparatively less attention is directed toward sustained rehabilitation, language development, and educational support. This tends to create an imbalance where identification is strengthened, but pathways to outcomes remain fragmented and contextually uneven.
In addition, the transfer of evidence-based models across settings without adequate contextualisation supported by feasible, locally grounded rehabilitation pathways is problematic.
This presentation calls for a reframing of EHDI- should early intervention planning precede early detection strategies? Or, more fundamentally, from EHDI toward 'EI-by-ED (Early Intervention enabled by Early Detection)' paradigm that centres outcomes rather than processes?

Planned Session 07

Hearing Screening
PS 07-4

The potential value of hearing screening after the newborn period

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With the introduction of newborn hearing screening, the added value of childhood hearing screening (CHS) after the newborn period has to be reconsidered. As permanent hearing losses are mostly identified directly after birth, the potential yield of CHS is smaller. It is therefore relevant to know how different countries have implemented CHS and what factors have played a role in their choices for implementation.

Within the European EUscreen project we performed an inventory of CHS within forty-two European countries or regions, plus Russia, Malawi, Rwanda, India, and China. From each participating country or region, experts provided information through an extensive questionnaire: implementation year, age at screening, test method, pass criteria, screening location, screener profession, and quality indicators: coverage, referral, follow-up and detection rates, supplemented by literature sources.
CHS was performed universally with pure-tone audiometry screening (PTS) in 17 countries or regions, whereas non-universal CHS was performed in eight with PTS or whisper tests. All participating countries with universal PTS had newborn hearing screening. Coverage rate was provided from three countries, detection rate from one, and referral and follow-up rate from two. In four countries, universal PTS was performed at two ages. Earliest universal PTS was performed in a (pre)school setting by nurses (n = 9, median age: 5 years, range: 3-7), in a healthcare setting by doctors and nurses (n = 7, median age: 4.5 years, range: 4-7), or in both (n = 1).

In conclusion, pure-tone audiometry screening at 4-6 years of age is the most preferred form of CHS. A second hearing screening at later ages is only performed in a minority of countries. There is only limited use of automated procedures and new techniques. Unfortunately, insufficient collection of data and monitoring with quality indicators impedes evaluation of screening. Within the presentation the pros and cons of CHS will be discussed, as well as the most relevant factors for successful implementation.

Planned Session 07

Hearing Screening
PS 07-5

CGHH Hearing Pathways Working Group: Preschool Hearing Screening and Intervention Practices Around the World

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Introduction: The World Health Organization (WHO) recommends hearing screening across the lifespan, from infancy to older adulthood. While many high-income countries have implemented universal newborn hearing screening (UNHS), such programs cannot detect progressive, late-onset, or acquired childhood hearing loss (e.g, cytomegalovirus, genetic disorders, or otitis media). Early childhood hearing screening (ECHS), targeting children between one year of age and school entry, is therefore critical to ensure timely identification and intervention. Given the importance of hearing for cognitive, speech, language, and psychosocial development, the absence of ECHS may contribute to long-term developmental and educational disparities.

The purpose of this study was to examine the current global status of ECHS.

Method: A group of experts from 10 countries in six continents formed the Coalition for Global Hearing Health (CGHH) Hearing Pathways Working Group II, which generated a survey to examine the offerings of ECHS in different countries. The survey questions were entered into RedCap with main questions on the practices and the barriers regarding: 1) infant hearing screening, 2) early childhood hearing screening, 3) screening test protocols, 4) types of hearing loss referred and treated, and 5) early intervention, hearing device and hearing assistive technology offerings. Each of the main questions was also accompanied by branching questions to provide more details. The survey was sent to professionals around the world.

Results: Among more than 300 responses received, 192 reports from 82 countries completed the survey. Most of the responders were hearing health professionals (55.6%), followed by consultants (17.8%) and managers (10.9%) of child hearing screening programs. Responses to the main questions and their branching questions were analyzed by the eight WHO world regions and by the four World Bank income categories. The results show that universal ECHS programs are only available in less than 10 high-income countries with relatively smaller territories in Europe and Western Pacific (e.g, Finland, New Zealand, and Sweden). High income countries with relatively large territories (e.g, Australia, Canada, and the United States) usually have some offerings of ECHS that vary depending on local resources. Low-to-middle-income countries usually either do not have or offer emerging ECHS programs in some pockets of areas. These findings highlight the health inequity among nations and the reduced health accessibility in countries with lower resources compared to those with more resources.

Discussion: The findings reveal substantial global disparities in ESHS. Universal ECHS is rare and appears concentrated in smaller, high-income nations, while larger, lower-resource countries demonstrate fragmented or absent programs. These patterns suggest that national wealth alone does not guarantee universal implementation, and that geographic scale and infrastructure may influence program feasibility and availability.

The limited availability of ECHS in many regions raises concerns regarding the delayed identification of progressive or acquired childhood hearing loss, potentially widening developmental inequities. Strengthening surveillance systems beyond the newborn period and supporting scalable, context-sensitive screening models may be critical steps toward reducing global disparities in access to hearing health care. Coordinated international efforts are needed to improve equitable access to early detection and intervention services worldwide.

Planned Session 07

Hearing Screening
PS 07-6

Early Hearing Loss Detection in India: Survey Insights from a High-Burden, Low-Resource Context

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India, home to more than 1.46 billion people, has one of the world's largest child populations, with approximately 25 million births annually. The burden of childhood hearing loss (HL) is substantial: an estimated 25,000–30,000 infants are born each year with permanent HL, and an additional 50,000–60,000 children acquire HL by age six. Despite this scale, India does not yet have a comprehensive national policy for the early detection and intervention of childhood HL.

Delivering equitable hearing care in India is uniquely challenging. The country's division into 28 states and 8 union territories is accompanied by extreme geographic, economic, and infrastructural diversity. These disparities intersect with India's multilingual and multicultural landscape, influencing health literacy, parental awareness, and access to care. Early identification is further constrained by a severe shortage of audiologists in rural and underserved regions, limited hearing screening capacity in preschools and anganwadi centers, and fragmented referral and follow-up pathways.

In alignment with the World Health Organization's 2026 theme, "From Communities to Classrooms – Hearing Care for All Children," the Coalition for Global Hearing Health Working Group conducted a global survey examining preschool and school-age hearing screening practices. Among the 75 survey responses, 41 answered the question "Is early childhood hearing screening available" in their city, region, or India as a country.

The actual hearing screening offerings vary, with urban areas and high-resource areas have more access to hearing screenings than rural areas or lower resourced areas. Only 6 cities reported early childhood hearing screening being offered to the children at various ages, with the most common age at 1 year old. Most of other responses indicate variable offerings or services only offered to children with risk factors or as a follow-up to failed newborn hearing screenings. In addition, although respondents reported innovative community-driven screening initiatives and locally adapted practices compensating for the absence of national mandates, substantial gaps persist. The challenges include limited use of standardized screening protocols, shortages of trained personnel, low parental follow-up rates, inconsistent referral systems, and financial barriers to timely diagnosis and intervention.

India's scale and geographic inequities make it a uniquely important context for early HL detection and intervention in low- and middle-income settings. Addressing these gaps is critical for speech, language, and educational outcomes, and for reducing long-term social and economic inequities affecting millions of children.

Planned Session 08

The Impact of Early Intervention on Audiological Rehabilitation

PS 08-1

A new and only tool to assess and differentiate the effects of hearing and cognitive function on speech understanding in 5-10 minutes

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Objectives: Hearing loss and cognitive decline often coexist in aging populations but remain under-screened in community settings due to the lack of a single, brief, self-administered tool. This study validated the Integrated Digit-in-Noise Test (iDIN), which uniquely combines speech-in-noise assessment with a cognitive load component using variable digit lengths (2- to 5-digit sequences) to simultaneously estimate auditory thresholds and working memory demands, enabling differentiation of peripheral hearing versus central cognitive contributions to speech perception difficulties.
Methods: In a multicenter sample of 601 community-dwelling Chinese older adults (mean age 76.0 ± 8.8 years, 56% female, mean education 6.4 ± 4.4 years, all Han Chinese), the iDIN was administered via smartphone or telephone. It yielded a primary 3-digit speech reception threshold (SRT) for hearing evaluation and a cognitive index (difference between backward and forward 3-digit SRTs). Hearing loss was defined by better-ear pure-tone average ≥35 dB HL at 0.5-4 kHz, and cognitive status by education-adjusted Montreal Cognitive Assessment (MoCA) scores. Receiver operating characteristic curves identified optimal cutoffs.
Results: Mean 3-digit SRT was -4.3 ± 7.0 dB SNR; a cutoff of ≤-7.7 dB SNR identified hearing loss with 85% sensitivity, 73% specificity, and area under the curve (AUC) of 0.86. The cognitive index averaged 5.03 ± 7.32 dB; for mild cognitive impairment (MoCA <22), ≥3.3 dB cutoff achieved 74% sensitivity and 76% specificity (AUC=0.81); for probable dementia (MoCA ≤15), ≥5.5 dB yielded 83% sensitivity and 77% specificity (AUC=0.87). Importantly, the cognitive index showed no significant correlation with peripheral hearing thresholds (r=0.09, p=0.08), confirming its independence.
Conclusions: The iDIN provides a rapid (<10-minute), language-tailored, accessible screening solution that accurately detects and distinguishes hearing loss from cognitive impairment effects on speech understanding—even in the presence of co-occurring conditions. This positions it as a promising, unique instrument for broad implementation in primary care and community geriatrics to enable timely dual referrals and interventions.

Keywords: Integrated Digit-in-Noise Test, Hearing screening, Cognitive screening, Speech perception, Older adults

Planned Session 08

The Impact of Early Intervention on Audiological Rehabilitation

PS 08-2

Different time courses of maturation for learning and generalization following auditory training in children

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Auditory training is widely used to enhance perceptual and language-related abilities in children; however, the developmental relationship between learning and generalization, i.e, the ability to transfer training gains to untrained tasks or stimuli, remains insufficiently understood. In particular, it is unclear whether these processes mature in parallel or follow distinct developmental trajectories, and how training parameters should be optimized to support both efficient learning and effective transfer. In this talk, I will present converging evidence from two studies demonstrating that learning and generalization exhibit different time courses of maturation in childhood, with generalization often being limited following focused training regimens. Conversely, increased variability in testing or training conditions may substantially impair children's performance. Together, these findings raise important theoretical and practical considerations for the design of developmentally sensitive auditory training protocols.

In the first study, we examined frequency discrimination (FD) learning in children aged 7–9 years, focusing on the developmental relationship between learning maturity and generalization. Children showed marked variability in their learning trajectories, with some exhibiting adult-like learning and others demonstrating poorer learning ability and more limited gains. Generalization was assessed to an untrained frequency and to the untrained ear following single- or multi-session training. Performance on untrained tasks was strongly predicted by early performance in the trained task, indicating that the foundations for later generalization are established at the initial stages of learning. Nevertheless, adult-like learning did not guarantee adult-like generalization, with only a small subset of children demonstrating both adult-like learning and adult-like generalization. Together, these findings indicate that auditory learning and its generalization do not mature contemporaneously: mature learning appears to be a necessary, but not sufficient, condition for mature generalization, supporting the notion of distinct developmental time courses for learning and transfer.

To account for these patterns, we propose a developmental framework for auditory learning and generalization in school-age children, suggesting that outcomes are shaped by the maturity of two interacting mechanisms: bottom-up, task-related sensory processing that supports efficient statistical learning, and higher-order executive and learning functions that encompass attentional and memory processes during acquisition as well as consolidation mechanisms supporting long-term retention.

In the second study, we examined the effects of increased variability in testing materials on children's performance (ages 7-10), based on the assumption that exposure to diverse exemplars promotes more abstract and thus transferable representations. Using a talker discrimination (TD) task based on fundamental frequency and formant changes, we varied stimulus type (words vs. sentences) and variability (stimuli fixed within a run vs. changing across trials) and examined their effects in children and adults. Increased variability, implemented as trial-by-trial changes in stimulus content, significantly impaired performance in children, particularly when the task relied on limited linguistic context. These effects were substantially weaker in adults and were modulated by age in children, pointing to developmental constraints in perceptual anchoring that may be especially challenging in variable training paradigms.

Taken together, these findings highlight a fundamental challenge in the design of auditory training for children. Although variability is often proposed as a means to promote generalization, it may also increase task demands and hinder statistical learning, particularly in children whose perceptual and cognitive systems are still maturing. Effective training protocols therefore require a developmental perspective that distinguishes between the mechanisms supporting learning and those supporting transfer. Rather than assuming that strategies that facilitate generalization in adults will apply directly to children, the present findings support the view that training programs should be tailored to the child's developmental stage, balancing the need for stability to support learning with the gradual introduction of variability to scaffold generalization over time.

Planned Session 08

The Impact of Early Intervention on Audiological Rehabilitation

PS 08-3

From Data to Dialogue: How Families are Redefining Hearing Outcomes

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Background:
Early identification and intervention have transformed communication and developmental outcomes for children who are deaf or hard of hearing. Yet, measures of "success" are often defined through professional or biomedical lenses that under-represent family priorities. This project responds to the guiding principles, of patient and public involvement (Cochrane, 2017), which call for equity, inclusion, and meaningful collaboration with lived and living experience experts. The project aims to embed the voices of parents, caregivers, and young people with lived experience, from diverse cultural, linguistic, and geographic backgrounds, in defining a Core Outcome Set that reflects real-world experiences of childhood deafness and rehabilitation in Australia.

Methods:
The AusChildDeafness - Community Advisory Group was established within the NHMRC-funded Australian National Childhood Hearing Health Outcomes Registry (ANCHOR) to guide the development of a national Core Outcome Set. Drawing on the GRIPP2 framework and Timothy R. Clark's Four Stages of Psychological Safety, parents and caregivers were supported as co-researchers through orientation workshops, peer mentoring, Auslan-accessible meetings, and culturally responsive facilitation. Input was gathered through iterative workshops, surveys, and reflective discussions.

Results:
Family partners meaningfully shaped the prioritisation and framing of outcomes, ensuring that the final Core Outcomes Set encompassed domains such as family wellbeing, social participation, and identity, alongside traditional audiological and linguistic measures. Diverse perspectives from regional, multilingual, and culturally varied families enriched the constructs of 'hearing-' or 'deafness-related outcomes' as both relational and developmental.

Conclusion:
Co-production grounded in psychological safety and inclusion advances the vision for impactful consumer involvement. By recognising diversity as essential evidence, not variance, this approach strengthens the design and translation of early-intervention research in audiology.

Planned Session 08

The Impact of Early Intervention on Audiological Rehabilitation

PS 08-4

Effect of Early Deafness on the Discrimination of Pure Tone, Syllable, and Intonation

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Introduction
During the early childhood, adequate auditory input is essential for the maturation of auditory pathways and the development of auditory discrimination abilities. In children with congenital deafness, delayed access to sound (i.e. late CI implantation) can influence cortical auditory development and affect later speech and language outcomes. Both subjective and objective evaluations are required to assess auditory discrimination abilities. Subjective assessment in a behavioral task may reflect active listening performance and listening effort, while objective electrophysiological neural measures capture pre-attentive neural discrimination. In Indonesia, research on auditory outcomes in children, especially those with cochlear implants remains limited, moreover studies those combine both behavioral and electrophysiological assessments. Thus, this study examines how the timing of hearing onset influences auditory discrimination in normal-hearing children, early cochlear implant recipients, and late cochlear implant subjects.

Methods
Fifteen children aged 7-10 were divided into three groups: normal-hearing (NH, n=6), early implanted CI (at age 3 y.o, n=4), and late implanted CI (at age > 3 y.o, n=5) were recorded in three hearing centers across Jakarta, Indonesia. The participants were tasked to differentiate three types of stimuli: pure tones (1000 Hz / 1500 Hz), syllables ('ba' / 'pa' / 'ga'), and tonal sound (positive Ya / negative Ya) delivered through loudspeakers (70 dB-SPL). The children responded to this game-based test by watching the monitor screen for instructions and pressing buttons on a gamepad after hearing sound stimuli. Due to mixed data distributions, Kruskal-Wallis and Welch's ANOVA tests, Fisher's Least Significance Difference was used as the main statistical method for statistical analysis. Data was processed using MATLAB, SPSS, and JASP.

Results
Across all tasks, the normal-hearing (NH) group outperformed both early and late CI users. In the pure tone task, NH listeners showed the highest accuracy (0.821 ± 0.290) despite slower responses (2,275 ± 92.5 ms), while early (0.656 ± 0.261) and late CI (0.632 ± 0.246) users responded faster with lower and more variable accuracy; reaction times did not differ significantly between early (1,730 ± 916.82 ms) and late CI (1,693 ± 978.73 ms) groups ($p = 0.514$). In the tonal task, the NH group achieved significantly higher accuracy than both CI groups ($p < 0.001$; 0.804 ± 0.108). However, their reaction time (912.31 ± 233.1 ms) fell between that of early CI users (1,091.67 ± 720.45 ms) and late CI users (749.76 ± 352.24 ms). No significant difference in percentage accuracy ($p = 0.917$) was found between early (0.544 ± 0.147) and late CI users (0.536 ± 0.155). For the syllable task, significant group effects were observed ($p < 0.05$), with NH listeners showing the best speed–accuracy performance (572.7 ± 125.7 ms, 0.992 ± 0.019), and early CI users demonstrating higher accuracy (0.731 ± 0.177) but slower responses (1,248.5 ± 472.9 ms) than late CI users (1,064.8 ± 416.4 ms).

Conclusion
Children with normal hearing performed the best, with the highest accuracy and fastest reaction times. Children who received cochlear implants early were more accurate than those implanted late, but they required more time to respond, indicating a different listening strategy. Further research and analysis on the objective electrophysiological evaluations such as mismatch negativity are needed to confirm these subjective results.

Keywords: Cochlear Implantation, Auditory Discrimination, Auditory Cortex Development, Hearing Speed-Accuracy Test

Planned Session 08

The Impact of Early Intervention on Audiological Rehabilitation

PS 08-5

Audiological outcomes of auditory brainstem (ABI) implant in postlingual patients: Malaysian experience

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Auditory brainstem Implant (ABI) is a one of the choices of otological implants for candidate who has postlingual bilateral profound sensorineural hearing loss and is ineligible for cochlear implantation (CI) due to anatomic constraints. The suitable postlingual candidates for ABI can be divided into tumour and non-tumour cases. Bilateral vestibular schwannomas in neurofibromatosis type 2(NF2) is the main cause for tumour cases. For non-tumour cases, the main causes are labyrinthitis ossificans from bacteria meningitis, extensive cochlear otosclerosis and temporal bone fractures that involve the cochlea or internal auditory canal.

NF2 is an autosomal dominant genetic syndrome with increased risk of central nervous system tumours including bilateral vestibular schwannoma, meningiomas and ependymomas. They often develop postlingual profound sensorineural hearing loss as their disease progresses and may not suitable for CI. Recent trials have shown that the majority of NF2 patients implanted with ABI achieve some speech discrimination and environmental sound awareness with meaningful auditory sensations. Minority of ABI users achieve open set speech discrimination and the majority of them still rely on lip-reading to enhance their verbal communication needs.

For non-tumour postlingual cases, recent data revealed superior audiological outcomes with ABI, when compared with NF2 patients. A significant number of non-tumour patients (cochlear ossification cases and bilateral labyrinthine fractures in head trauma) achieve open set speech perception and recognition and could engage in normal conversation without lip reading.

We have performed 9 cases of ABI in postlingual patients from June 2016 to June 2023. The patients' age ranged 27 to 59 years old. Seven patients had neurofibromatosis Type 2 (NF2) with bilateral acoustic neuromas and 2 patients had post meningitis cochlear ossification bilaterally. All of them implanted via translabyrinthine approach with most of them had 12 electrodes stimulated during switch on at 2 months post surgery. Their hearing was restored significantly after the implantations.

However, the improvement was variable. Both patients with cochlear ossifications performed better compared with NF2 patients audiologically during follow up.

Despite the improvement in current ABI technology with multi-channel ABI system, several challenges still remained. The most notable limitation is the unpredictable and often highly variable audiological outcomes especially in NF2 patients. The location and size of the tumour, the duration of deafness, the surgical removal techniques, position of the ABI array, number of pitch electrodes, perceptual levels, ABI stimulation rate and non-auditory side effects may determine the final audiological outcomes in postlingual hearing loss ABI patients.

Planned Session 09

Auditory Implants: Outcomes & Future Directions II
PS 09-1

Toward optogenetic hearing restoration

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When hearing fails, cochlear implants (CIs) provide open speech perception to most of the currently more than a million CI users. CIs bypass the defective sensory organ and stimulate the auditory nerve electrically. The major bottleneck of current CIs is the poor coding of spectral information, which results from wide current spread from each electrode contact. As light can be more conveniently confined, optical stimulation of the auditory nerve presents a promising perspective for a fundamental advance of CIs. Developing optogenetic stimulation for auditory research and future hearing restoration requires efforts toward development and characterization of appropriate channelrhodopsins, their viral gene transfer to cochlear neurons, as well as medical device engineering. The presentation will summarize the current state of the art and plans for developing gene therapy of the auditory nerve and optical CI as well as their combination for improved hearing restoration by optogenetic sound coding.

Planned Session 09

Auditory Implants: Outcomes & Future Directions II
PS 09-2

Tailoring Cochlear Implants: The Path to Personalization

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Personalization in cochlear implants is increasingly recognized as a crucial component for enhancing auditory outcomes and quality of life for users. As the demand for individualized solutions grows, current approaches often fall short, facing limitations in adaptability and effectiveness. This presentation aims to underscore the necessity for personalized cochlear implant strategies and to address the challenges posed by existing solutions.

Preoperative considerations play a vital role in the success of cochlear implantation. Early diagnosis and timely rehabilitation are imperative, as delays can hinder optimal outcomes. Recent advancements in technology, particularly artificial intelligence (AI), present promising opportunities to overcome traditional barriers. AI can facilitate earlier diagnosis, enhance rehabilitation processes, and ultimately improve user experiences by providing tailored solutions that adapt to individual needs. Personalization may significantly improve outcomes by addressing potential issues that could adversely affect performance before they become evident, ensuring that users receive tailored support from the outset.

While surgical customization of implant electrodes and techniques is important, it does not represent the primary challenge in achieving personalization. More critical are the advancements in implant hardware and user interfaces; these remain significant challenges in the field. Enhancements in user interfaces must prioritize flexibility and adaptability, enabling devices to better meet the unique hearing needs of individuals.

The integration of hearing aid technologies further contributes to personalization through improved customization, logging, and feedback mechanisms. AI-driven fitting techniques allow for real-time adjustments and refinements, ensuring that users receive a more tailored auditory experience that aligns with their gradual needs over time.

An illustrative example of innovative rehabilitation will be presented, showcasing the application of Automatic Speech Recognition (ASR) systems. Such technologies offer novel avenues for effective rehabilitation, enhancing user engagement and overall satisfaction.

In conclusion, the path to personalized cochlear implants involves a multifaceted approach, addressing preoperative issues, refining surgical methodologies, advancing hardware interface technologies, and leveraging cutting-edge AI solutions. By integrating these innovations and emphasizing the importance of personalization, we can significantly improve auditory outcomes, proactively tackling challenges that may affect success well before they are recognized. This presentation will explore these themes, shedding light on the future directions of cochlear implant personalization.

Planned Session 09

Auditory Implants: Outcomes & Future Directions II
PS 09-3

Quality of life in hearing improvement surgery including cochlear implant

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Objective: Adults with severe-to-profound sensorineural hearing loss often experience substantial impairment in health-related and hearing-related quality of life (QOL). We prospectively evaluated the magnitude and pattern of QOL impairment in cochlear implant (CI) candidates and quantified postoperative changes after cochlear implantation within a nationwide multicenter framework in Japan.
Study Design: Case-control study with prospective follow-up.
Setting: Twenty-one hospitals participating in a national otologic surgery and QOL working group.
Patients: Adult patients scheduled for cochlear implantation were enrolled and compared with normal-hearing controls. QOL was also contrasted with other otologic surgery groups within the same cohort to contextualize the degree of preoperative impairment.
Interventions: Cochlear implantation with standardized QOL assessments obtained preoperatively and postoperatively (6 and 12 months).
Main Outcome Measures: Generic health-related QOL (SF-36), hearing-related QOL (SSQ12), and CI-specific QOL (Nijmegen Cochlear Implant Questionnaire; NCIQ), including subdomain analyses.
Results: Preoperatively, CI candidates demonstrated markedly reduced QOL compared with normal-hearing controls on generic (SF-36) and hearing-related (SSQ12) instruments, and their QOL was significantly lower than that observed in other otologic disease groups within the cohort, indicating a particularly high burden prior to implantation. Following surgery, hearing-related QOL (SSQ12) improved significantly by 6 months. Generic SF-36 improvements were more apparent over time, with several domains—especially those reflecting social and mental well-being—showing clearer gains at 12 months than at 6 months. CI-specific QOL measured by the NCIQ improved postoperatively in most subdomains; notably, social interaction continued to improve between 6 and 12 months, whereas other subdomains showed less additional change after the early postoperative period. These findings suggest that while auditory benefits and related QOL gains emerge early, social participation and broader psychosocial recovery may require longer-term adaptation and support.
Conclusions: Adults undergoing cochlear implantation experience profound preoperative QOL impairment, but cochlear implantation yields meaningful postoperative improvement across hearing-related, generic, and CI-specific QOL domains, with social functioning showing a delayed trajectory of recovery. These results support comprehensive perioperative counseling and highlight the importance of sustained postoperative rehabilitation focused not only on hearing outcomes but also on social reintegration and long-term QOL.

Planned Session 09

Auditory Implants: Outcomes & Future Directions II
PS 09-4

Auditory plasticity through training in children using hearing aids and cochlear implants

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Auditory plasticity in children with hearing loss is best promoted by providing input to each ear through the most appropriate therapy or device as soon as possible. Despite early intervention, gaps in spoken communication remain due to challenges providing both the fidelity of sound acoustics to each ear for understanding what was said and important binaural cues for where the speaker was relative to other sound sources. Whereas therapy is commonly provided to facilitate language acquisition through the "what" auditory pathways, relatively little training has targeted the "where" auditory pathways in children. In a series of studies, we examined the use of multisensory and repetitive training to encourage auditory plasticity in the "where" pathways in children using bilateral cochlear implants (CIs) or a unilateral CI and hearing aid in the other ear (bimodal). Results suggests some benefits of training for spatial perception in both groups with particular utility of multisensory training in children with bimodal hearing.

Planned Session 10

The Role of Hearing Aids in Cognitive Health and Aging

PS 10-1

Associations of hearing aid use with health-related outcomes

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The purpose of this presentation is to report associations of hearing loss and hearing aid use with several health-related outcomes, including cognitive function, health-related quality of life, and depressive symptoms. This study will present results from several epidemiological cohort studies of the general population, including the Epidemiology of Hearing Loss Study, Beaver Dam Offspring Study, and the Medical University of South Carolina Longitudinal Cohort Study of Age-related Hearing Loss. Each of these studies have in-depth data related to hearing (including pure-tone audiometry) and general health outcomes. Results suggest that hearing loss is associated with various negative impacts on health, including poorer cognitive function, health-related quality of life, and depressive symptoms, and that these associations are strongest for participants with more severe levels of hearing loss. In general, hearing aid users (versus non-users) showed better outcomes in terms of cognitive function and health, although these relationships varied by hearing loss severity. In general, study findings suggest that hearing loss can negatively impact general health and cognitive function and that hearing aid users may perform better on tasks of cognitive function and may have slightly better health-related quality of life.

Planned Session 10

The Role of Hearing Aids in Cognitive Health and Aging

PS 10-2

Hearing loss, Hearing aid use and Risk of Dementia in Older Adults. Can Hearing Aids Mitigate the Risk?

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Background: Hearing loss has been associated with an increased risk of dementia. It is not fully understood why hearing loss is a risk factor and a causal relationship between hearing loss, cognitive decline and dementia has not been established. Furthermore, it is not known whether alleviation of hearing loss with hearing aids will mitigate the risk of dementia.
Materials and Methods: 573 088 persons, 50 years or older living in the region of Southern Denmark (298 006 women [52%]; mean [SD] age, 60.8 [11.3] years) with 23 023 cases of dementia were identified from the National Danish Register, the National Patient Register and the National Prescription Register. 94298 adults, 50 years or older with hearing loss were identified from a clinical database with audiograms from 143794 adults as well as from the National Patient Register. Information about hearing aid acquisition was obtained from a database containing information about requested subsidy for a hearing aid purchase.
Results: Overall hearing loss was associated with an increased risk of dementia with an adjusted hazard ratio (HR) of 1.07 (95% CI, 1.04-1.11) compared with having no hearing loss. Out of 12060 cases of dementia, 3020 were hearing aid users and 1296 were not hearing aid users despite having a hearing loss. Hearing aid users had an increased risk of dementia with HR of 1.06 (95% CI, 1.01-1.10) whereas hearing aid non-users had an increased risk of dementia with HR of 1.20 (95% CI, 1.13-1.27).
Discussion and Conclusion: Hearing loss was associated with dementia especially among those not using hearing aids. This suggests that the use of hearing aids may mitigate the risk of dementia in people with hearing loss. The mechanism is poorly understood, but hearing aids may benefit the cognitive health in the brain by reducing the cognitive load.

Planned Session 10

The Role of Hearing Aids in Cognitive Health and Aging

PS 10-3

The Impact of Hearing Aids on Cognitive Health in Aging Adults

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As the global population ages rapidly, cognitive decline and dementia have emerged as major public health challenges, imposing substantial burdens on individuals and society. Identifying modifiable risk factors that may prevent or delay the onset of dementia is a central goal of geriatric health research, and hearing loss has recently gained attention as an important and potentially modifiable risk marker. Hearing loss is highly prevalent among middle-aged and older adults and has been consistently associated not only with auditory impairment but also with cognitive decline, social isolation, depressive symptoms, and reduced quality of life.

Epidemiological and longitudinal cohort studies have repeatedly demonstrated that greater severity of hearing loss is associated with a significantly increased risk of dementia. Notably, this association often persists even after adjustment for age, education, socioeconomic status, cardiovascular risk factors, and depressive symptoms, suggesting that hearing loss may function as an independent risk marker rather than merely a byproduct of aging or a correlate of comorbid conditions. The accumulation of large-scale population-based studies and national registry data utilizing objective measures such as pure-tone audiometry has further strengthened the evidence linking hearing loss to cognitive decline and dementia.

Several theoretical mechanisms have been proposed to explain the relationship between hearing loss and cognitive impairment. According to the cognitive load hypothesis, degraded auditory input requires greater allocation of cognitive resources for speech perception, thereby reducing the resources available for higher-order cognitive processes such as working memory and executive function. Prolonged cognitive strain may ultimately lead to depletion of cognitive reserve. The sensory deprivation hypothesis posits that reduced auditory stimulation may induce structural and functional changes in the auditory cortex and associated neural networks, accelerating cognitive decline. Additionally, hearing loss can impair communication and reduce social participation, leading to social isolation and depressive symptoms, both of which are well-established risk factors for cognitive decline. These mechanisms are likely to interact and operate synergistically over the course of aging rather than acting in isolation.

Within this context, hearing aid use has been proposed as a potential intervention capable of mitigating multiple pathways linking hearing loss and cognitive decline. By restoring auditory input, reducing listening effort, and facilitating social engagement, hearing aids may contribute to the preservation of cognitive health in older adults. Observational studies have reported that hearing aid users experience slower rates of cognitive decline or demonstrate better performance in specific cognitive domains, particularly episodic memory and executive function, compared with non-users. Some large cohort studies have also suggested an association between hearing aid use and reduced risk of incident dementia.

However, the majority of this evidence is derived from observational studies, which are inherently limited by potential selection bias and residual confounding. Hearing aid users may differ systematically from non-users in terms of education, health awareness, or access to healthcare, making it difficult to establish causal relationships. Randomized controlled trials are therefore essential to address these limitations. The Aging and Cognitive Health Evaluation in Elders (ACHIEVE) trial represents a landmark multicenter randomized controlled study comparing a hearing aid–based intervention with a health education control in older adults with mild to moderate hearing loss over a three-year follow-up period. While the primary analysis did not demonstrate a significant reduction in overall cognitive decline in the full study population, subgroup analyses revealed that participants at higher risk for cognitive decline derived measurable cognitive benefit from the hearing intervention. These findings suggest that the cognitive effects of hearing aid use may not be uniform across all older adults but may be more pronounced in vulnerable subgroups.

Systematic reviews and meta-analyses further reflect this heterogeneity. Some studies report modest improvements in specific cognitive domains, such as executive function, following hearing aid use, whereas evidence for global cognitive improvement or dementia prevention remains inconsistent. Importantly, many cognitive assessments rely on auditory stimuli or verbal instructions, raising the possibility that observed post-intervention improvements may reflect enhanced test performance rather than true cognitive change. This concern underscores the need for future studies employing visually based or more refined cognitive assessment tools.

In parallel, critical perspectives have cautioned against oversimplifying hearing aids as a definitive solution for dementia prevention. A clear distinction must be made between the strong association of hearing loss with dementia risk and the causal claim that hearing aid use prevents dementia. Overstating the preventive effects of hearing aids may generate unrealistic expectations and inadvertently reinforce stigma or fear by directly linking hearing loss to dementia.

From both clinical and public health perspectives, the value of hearing aids extends beyond dementia prevention. Hearing aid use is consistently associated with improved communication, enhanced social participation, maintenance of functional independence, and better quality of life—factors that indirectly support cognitive health. Accordingly, early identification of hearing loss and appropriate auditory rehabilitation should be regarded as essential components

of comprehensive care for older adults, regardless of their direct effects on dementia risk.
In conclusion, hearing loss is a prevalent and important risk marker associated with increased risk of cognitive decline and dementia in older adults. Hearing aid use may attenuate cognitive decline in certain high-risk populations, but current evidence is insufficient to conclude that hearing aids universally prevent dementia. Rather than a single preventive strategy, hearing aids should be conceptualized as a key intervention supporting healthy aging by reducing cognitive load and promoting social and functional engagement. Future research incorporating long-term follow-up, real-world hearing aid use metrics, and multidimensional intervention strategies is needed to more precisely elucidate the relationship between hearing aid use and cognitive health.

Memory assessment in hearing aid clinics: Is it feasible to implement in a National Health Service (NHS) setting?

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Introduction: Hearing loss is common amongst older adults, and the number of older adults being referred to our NHS hearing aid clinics is growing. Hearing aids provide important quality of life benefits, and may also have a role in protecting cognitive health. Effective hearing aid use requires cognitive skills including working memory, which may be affected in older adults. Therefore, it is important that audiologists develop skills to recognise memory difficulties in this population so they can tailor their care to help patients make the most of their hearing aids.

Methods: We performed 2 pilot studies introducing a brief memory assessment in routine NHS hearing aid appointments for newly referred older adults. The results of the first pilot informed the design of the second pilot, and is therefore summarised briefly. In the first pilot based at UCLH, we included patients aged >=65 and used the AD8 questionnaire, and a visually-adapted shortened version of the Montreal Cognitive Assessment (mini-MoCA) for people with hearing loss. For the second pilot, we included another site, Southend University Hospital (SUH), which serves a different demographic profile and has a different clinic structure. In the second pilot, we focused on memory assessment tools that may be easier to implement than those used in the first pilot. Half of the participants (aged >=60 and with no existing dementia diagnosis) performed the Test Your Memory (TYM) test, and the other half were asked a series of 7 questions from a memory checklist (MC) developed by the London Dementia Clinical Network. In both pilots, clinical audiologists were trained to conduct the memory assessments and discuss the results with the participant, and a researcher recorded timings and observed reactions. An extra

15 minutes was allocated to the appointment in both pilots. Participants were contacted at 3 months regarding GP follow-up, onward actions, and acceptability of the memory assessment. In the second pilot, those with identified memory concerns were given simple written hearing aid instructions post-fitting, received a troubleshooting call within 2 days of hearing aid fitting, and were advised to involve a companion in future appointments.

Results: In the first pilot, 20 participants (average age 78.6 years) were recruited, taking on average 14 minutes to complete the memory assessment. Ten had a result indicating potential cognitive impairment. Two of these already had a dementia diagnosis, and one was subsequently diagnosed with dementia. In the second pilot, 108/336 eligible patients were approached, 63/108 (58%) were recruited. The median age was 70 years. Thirty-two completed the TYM, and 31 completed the MC. Their demographics are summarised in Table 1.

Table 1. Participant demographics

	UCLH participants (/23)	SUH participants (/40)	All participants (/63)
Median age, years (range)	77 (60-91)	68 (60-83)	70 (60-91)
Sex, M:F	12:11	18:22	30:33
Better ear pure tone average (dB)	44	33	39
Previous hearing aid experience, n (%)	16 (70%)	2 (5%)	18 (29%)
Attended alone, n (%)	13 (57%)	32 (80%)	45 (71%)
Ethnicity, n (%)			
White British	13 (57%)	39 (100%)	52 (83%)
Other White background	4 (17%)	0	4 (6%)
Asian Indian	5 (22%)	0	5 (8%)
Asian Other	1 (4%)	0	1 (2%)

Figure Table 1. Participant demographics

The average duration of memory assessment with results discussion was 7.6 minutes for the TYM, and 1.9 minutes for the MC. Fifteen (47%) participants had a TYM score suggesting memory difficulties across both sites, 9 (75%) at UCLH and 6 (30%) at SUH. Using the MC, none of the participants was identified as having a potential memory issue. Differences in results were identified between the two hospital sites, with a higher proportion of potential memory issues amongst UCLH participants compare to those from SUH, possibly associated with factors such as age, level of hearing loss, ethnic diversity and previous hearing aid experience. Trained clinical audiologists were observed to be confident and comfortable delivering the memory assessments and discussing the results. All participants reported that memory assessment was either acceptable or very acceptable. Of those 15 participants whose TYM scores suggested memory difficulties, 6 from UCLH and 6 from SUH were contactable at 3-months. Two of the UCLH participants did not follow-up with their GP, 2 agreed with their GP no further action required, and 2 were referred to a memory clinic, one of whom was subsequently diagnosed with a previous stroke likely to be the cause of memory impairment. None of the SUH participants contacted their GP regarding their memory.

Conclusions: A substantial proportion of older adults attending NHS hearing aid clinics, not previously known to have memory difficulties, were found to have potential memory impairment. The results may be associated with certain factors including age, hearing loss severity, ethnicity and previous hearing aid experience. Performing a brief memory assessment in hearing aid appointments therefore has the potential for earlier identification of memory difficulties in older adults, so that hearing care can be tailored to optimise hearing aid use in those identified as such. However, this approach has significant resource implications including training and additional time within audiology appointments. This highlights the importance of involving relevant stakeholders including professional organisations, commissioners and policy makers early in the discussion. Further research is needed to establish the best approach for audiologists to recognise memory difficulties in older adult patients and tailor hearing care for optimisation of hearing aid use.

Planned Session 11

(C)APD - Rehabilitation Issue
PS 11-1

Planned Session 11

(C)APD - Rehabilitation Issue
PS 11-2

Assessment of candidates for CAPD treatment

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Our ability "to use what we hear" - auditory processing - begins at the ear and ends when a response is executed. This process involves multiple steps – not all of which are auditory in nature. Because central auditory processing disorders (CAPDs) can look like, co-exist with, and/or lead to other language, listening and/or learning issues, differential diagnosis is needed to differentiate among disorders having similar symptoms. The central auditory processing (CAP) evaluation uses valid, well-normed tests that maximize auditory function and minimize other sensory, psychosocial, and/or neurocognitive skills, "teasing out " the auditory issue, if present, thus informing intervention. The type of processing disorder – central auditory or other - is revealed by examining performance patterns across all central auditory processing (CAP) test results- normal AND abnormal. This neurological central skill-based interpretation can rule out specific central auditory impairment as a contributing factor to a listener's daily "auditory" challenges OR identify specific breakdowns in central auditory function including auditory discrimination, binaural and temporal processing. Deficit-specific diagnosis leads logically to deficit-specific intervention – a balance of management and treatment strategies designed to minimize the deficit's impact on the listener's life (management) and reduce/resolve the deficit (treatment). Talk describes five commonly-observed patterns of performance across CAP tests and appropriate and effective management and treatment strategies for each.

Planned Session 11

(C)APD - Rehabilitation Issue
PS 11-3

Auditory training for auditory processing disorders: Should we do it and what smartphone apps are available?

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Auditory Training (AT), defined as "active engagement with sounds", aims to develop and improve auditory skills in sound detection, discrimination and identification (Musiek et al, 2007). These behavioural skills continue to mature and develop until early adolescence (Jutras et al, 2020), as reflected by extended maturation of auditory evoked potential electrophysiological responses. The auditory brain retains the ability for further change and adaptation beyond the early life and for the entire lifespan life (Irvine, 2018). This potential for change termed as. "plasticity", is driven both by bottom-up sensory input and also influenced by top down "higher order" mechanisms. AT aims to harness the plasticity of the brain, and targets both bottom up, sensory input driven, and top-down "higher order" mechanisms. Evidence for benefits of AT interventions suggests that these are effective, but there are still gaps in knowledge (Bigras et al, 2024). AT can be also self-administered by performing computer/ipad/iphone based game exercises or supported/provided by a parent or carer. There are several auditory training applications available for AT (e.g, Paglialonga et al, 2015), but despite their wide availability of apps, the quality and effectiveness of individual tools remain unclear. Some mobile/ computer applications are designed based on well -established scientific principles, while others may not have strong evidence supporting their use. This presentation will discuss why AT is a part of multifaceted intervention for APD, some key applications that can be used to implement auditory deficit driven AT in the English language and the evidence behind these to inform clinical management.

Planned Session 11

(C)APD - Rehabilitation Issue
PS 11-4

A comprehensive framework for assessing auditory processing functions in young children with developmental disorders associated with audition, cognition, and spoken language, based on Medwetsky's Spoken Language Processing Mechanisms

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The assessment of auditory functions in young children should reflect a series of skills to prepare for the understanding of spoken language. My team proposes a new comprehensive framework based on Medwetsky's Spoken Language Processing Mechanism (2009, 2011, 2024), with modifications, for assessing a hierarchy of auditory and spoken language processing functions in young children using behavioural and auditory electrophysiological testing techniques reflecting the functional integrity of the auditory neural system from peripheral level of hair cells level and all the way up to the auditory cortex. This hierarchy of functional assessments would help identify point/s of breakdown in the hierarchy from (1) acoustic signal transduction, (2) speech and non-speech sound detection, sound discrimination, and spoken word recognition, (3) attention allocation to degraded signals, (4) selective attention to signals with masking or contralateral competition, (5) auditory-linguistic integration, (6) sequencing of auditory words/ sentences, and (7) phonological awareness.

I will present the development of our new computerized cross-language Pediatric Monosyllabic Word Picture Identification Dichotic Listening Test (PeMoPiDLT) in Cantonese, Arabic, and English which serves levels (2) and (4) in the hierarchy. Some preliminary results from Cantonese-speaking children from Hong Kong will be presented.

Planned Session 12

Noise & Hearing
PS 12-1

Lowering the Permissible Noise Exposure Limit for Tender Ears: A Systematic, Cost-Effective Approach

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BACKGROUND: NIHL is preventable with an accurate understanding of risk factors and protective strategies. Nevertheless, NIHL remains prevalent in 24% (40 million) of the general U.S. population. Holding duration of noise-exposure constant, NIHL "risk" increases as intensity of the noise exposure increases. However, this risk model does not accurately account for individual susceptibility to NIHL, which explains why variable degrees of hearing loss have been observed in animals and in humans who have been exposed to the same noise exposure. Although sex, race, genetics, cardiovascular health, and a host of other factors are associated with NIHL risk, these factors have only explained a fraction of the large observed variance. Importantly, external-ear amplification also varies significantly across individuals (5-19 dB), and this project demonstrates that external-ear amplification can be predicted using body height. Further, it suggests that permissible noise exposure limits can be adjusted conservatively for persons with high external-ear gain, resulting in a higher in-ear noise exposure intensity level.

METHODS: Body height, head circumference, pinna length and width, and wideband tympanometry were used to predict the real-ear unaided gain (REUG) of 147 adult females and 127 adult males.

RESULTS: Body height was positively correlated with REUG from 1 to 2 kHz, and inversely correlated from 3 to 6 kHz. Overall (all frequencies combined), intersubject REUG varied 11 dB SPL. In a frequency-specific analysis at 2 and 3 kHz, REUG intersubject variability was as high as 22 dB SPL.

CONCLUSIONS: In a free field noise exposure that is determined to be "safe" (i.e., yields a noise dose lower than the noise limit/guideline), some individuals may experience 4x the risk of developing a NIHL compared to others due to higher in-ear sound levels as a result of high external-ear amplification, which varies considerably from person to person. Using a simple, non-costly proxy measurement of REUG - body height - these "tender ears" can be conservatively guided toward lower noise exposure limits.

Planned Session 12

Noise & Hearing
PS 12-2

Ototoxicity: Overview of ototoxicity and the International Ototoxicity Management Group

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Ototoxicity refers to damage to the inner ear caused by chemical or physical agents and is a growing concern in both clinical and occupational settings. In clinical practice, patients treated with aminoglycoside antibiotics or platinum-based chemotherapies, particularly cisplatin and its derivatives, are at high risk of developing hearing loss. In occupational environments, workers exposed to hazardous noise are often simultaneously exposed to ototoxic chemicals, including organic solvents (e.g. toluene, xylene, styrene), heavy metals such as lead, and asphyxiants such as carbon monoxide.

Evidence from animal models shows that noise and certain ototoxic chemicals can interact synergistically, producing auditory damage greater than the sum of their individual effects. This combined exposure represents a significant and under-recognised risk factor for hearing loss in the workplace.

There is an urgent need for comprehensive approaches to ototoxicity that encompass prevention, early detection, and clinical and occupational management. The International Ototoxicity Management Group (IOMG) was established to address these challenges from a global perspective, taking into account differences in health-care systems, occupational regulations, and access to specialised professionals.

This presentation will provide an overview of ototoxicity, review current evidence on chemical-induced hearing loss in occupational settings, and introduce the structure, aims, and achievements of the IOMG, including its working groups and recent outcomes.

Planned Session 12

Noise & Hearing
PS 12-3

Noise-induced auditory damage affects hippocampus causing memory deficits in a model of early age-related hearing loss

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A growing body of evidence identifies noise-induced hearing loss (NIHL) as a contributing factor to sensory aging and cognitive decline, including neurodegenerative conditions such as dementia and age-related hearing loss (ARHL). Although epidemiological and experimental studies have demonstrated a link between noise exposure and age-related auditory impairment, the molecular pathways underlying this relationship remain poorly defined. In particular, the mechanisms through which noise and aging interact to influence cognitive functions are still unclear.
We previously showed that early-life noise exposure accelerates the onset of cochlear dysfunction in a well-established ARHL animal model (C57BL/6 mice). In the present study, we extended these findings by examining central nervous system structures (the auditory cortex and hippocampus) to better understand the interplay between auditory deficits and memory impairment, as well as the combined impact of noise exposure and sensory aging on cognitive processes.
To this aim, 2-month-old C57BL/6 mice were exposed to repeated noise exposure (60 minutes per day; 100 dB SPL pure tone at 10 kHz for 10 consecutive days). Auditory function was assessed through auditory brainstem response (ABR) recordings, while spatial working memory was evaluated using the Y-maze test. Additionally, basal synaptic activity was analyzed via ex vivo electrophysiological recordings at 1, 4, and 7 months following the onset of noise exposure (corresponding to 3, 6, and 9 months of age).
Our results indicate that noise exposure, together with accelerated presbycusis onset, leads to long-lasting synaptic alterations in the auditory cortex. These changes are accompanied by impaired memory performance and increased oxidative and inflammatory damage in the hippocampus, a key brain region involved in memory processing.
Overall, our findings highlight a strong functional link between auditory and cognitive systems, suggesting that the combined effects of environmental noise and sensory aging represent a significant risk factor for both sensory and cognitive decline.

Keywords: Presbycusis; Cognitive decline; neuroinflammation

Planned Session 12

Noise & Hearing
PS 12-4

The Impact of Occupational Noise Exposure on Hyperacusis: A Longitudinal Population Study of Female Workers in Sweden

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Aim
This study assesses whether exposure to occupational noise is associated with an increased hazard of hyperacusis symptoms among women working in diverse occupations, and particularly among preschool teachers.

Method
We performed a retrospective longitudinal study using survey data collected in 2013 and 2014 from two cohorts of women. One cohort was randomly selected from the general population in the region of Västra Götaland, Sweden, and the other cohort comprised women with a preschool teaching qualification. In total, n = 8,328 women born between 1948 and 1989 were included in the analysis.
Hyperacusis symptoms were assessed using the self-reported year of onset and a single item addressing the occurrence of discomfort or pain from everyday sounds. In the main analysis, the outcome was defined as occurring at least a few times each week. Sensitivity analyses included stricter definitions: a) at least several times each week, and b) every day.
Occupational noise exposure was assigned to all time periods from the first to the last reported occupation throughout working life using the Swedish Job-Exposure Matrix (JEM) for noise, which categorises job titles into three noise exposure levels: <75 dB(A), 75–85 dB(A) and >85 dB(A). The preschool teacher occupation is assigned to the 75–85 dB(A) exposure interval. Other occupations in the noise exposure intervals above 75 dB(A) include workers in a kitchens or restaurants, bartenders, waitresses, dentists and cleaners. The exposure assignment by the JEM was coded with blinding to the outcome. Occupational noise exposure was defined by the occupation held at the reported year of hyperacusis onset, or the occupation held at the survey year if no event occurred.
The statistical analysis was performed using survival analysis with frailty regression models, with the hazard of hyperacusis analysed in relation to years of occupational noise exposure. We accounted for individual variation in survival times and adjusted the model for possible confounders including age, education, income, self-reported family history of hearing loss, and job change due to noise.

Results
In the main analysis, with the outcome defined as hyperacusis symptoms at least a few times each week, we identified n = 1,966 hyperacusis events occurring between 1960 and 2014. A significantly increased hazard was found among women working in occupations categorised in the interval 75–85 dB(A) noise exposure (HR: 2.6, 95% confidence interval, CI: 2.4–2.9), compared with the reference exposure interval <75 dB(A). The analysis showed that preschool teachers had a tripled hazard (HR: 3.4, 95% CI: 3.0–3.7). Crude Kaplan-Meier curves showed that preschool teachers had a higher rate of onset already early in working life compared with all the other exposure groups. The substantially increased risk among women working in early education was supported further by a sensitivity analysis in which childcare workers from the general population cohort were assessed together with the preschool teachers, rather than with other occupations in the general 75 to 85 dB(A) exposure group. Importantly, the increased risk remained for women working in other occupations than early childhood education in the noise interval 75 to 85 dB(A).
The highest exposure group >85 dB(A), with a total of only six hyperacusis events, had an increased hazard in the main analysis, but it was not statistically significant because of few events and a wide confidence interval (HR: 1.4, 95% CI: 0.6–3.0). However, in the sensitivity analysis where the outcome was defined as hyperacusis symptoms occurring every day, the hazard was statistically significant also in this exposure group (HR: 3.8, 95% CI: 1.4–10.3). In general, slightly higher hazard ratios was found in the sensitivity analyses which used more severe outcome definitions.

Discussion and conclusion
The study showed an increased risk (hazard) of hyperacusis at exposure levels below Sweden's occupational exposure limit (85 dB LAeq,8h) as well as in exposure below the lower action value (80 dB LAeq,8h). The increased risk was shown among workers in many commonly occurring occupations, but particularly high in the preschool teacher occupation. One explanation for the particularly high risk in preschools may be the difficulty of using hearing protection devices (HPDs) in speech-communication-intensive environments. Interestingly, a third of the hyperacusis events were found within the reference exposure group (<75 dB(A)) and many of these were related to working as elementary schoolteachers. This indicates that further studies should also address the possible underestimation of noise exposure in human-service occupations.
In conclusion, the results indicate a need for improved hearing prevention of hyperacusis and better noise control in all occupations with exposure levels from 75 dB(A). The results also provide an important evidence base for the management of occupational disability claims.

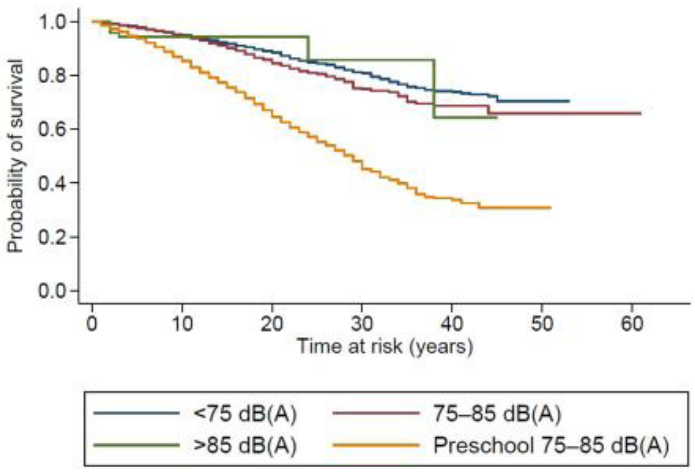


Figure Kaplan-Meier survival estimates showing the crude probability of onset of hyperacusis (at least a few times each week) in relation to person-time at risk (from first occupation to event or survey year) in occupational noise exposure groups assigned by the Swedish Job-Exposure Matrix for noise, with preschool teacher in a separate group.

Planned Session 13

Healthy Hearing & Equity
PS 13-1

Addressing barriers and exploring opportunities for equitable hearing health care

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Background and Aims: The World Health Organization estimates by 2050 2.5 billion people will experience hearing loss (HL), with 700 million requiring treatment. Comprehensive hearing evaluations, including word recognition tests (WRTs), are recommended for individuals with HL. While WRTs are a vital component of these evaluations, the availability of validated word lists in a variety of languages, and trained interpreters to score patient responses, is limited. We share our development process and solutions for addressing the lack of WRTs in non-English languages, using Hmong, a language in which word lists were not available as a case example.
Methods: Our work involves four phases: 1) creating four professionally recorded phonetically-balanced monosyllabic word lists in White Hmong dialect, 2) validating the word lists, 3) surveying audiologists throughout the U.S. to gauge interest in and feasibility of using non-English word lists, and 4) developing an AI-automated scoring system for Hmong WRTs to improve accessibility and clinical utility.
Results: For phases 1 and 2, we tested the Hmong WRT with 48 Hmong individuals, with varying degrees of HL and found WR scores were between 60-95%, aligning with accepted performance for the degree and configuration of HL in English-speaking patients. In phase 3, we surveyed 233 audiologists across the U.S. The majority of these individuals reported treating patients whose primary language is not English at least 1-5 times/month, while only 1/3 of these individuals had an interpreter available for the appointment. For phase 4, we are currently developing an AI-automated scoring of the Hmong WRT to support real-time translation of the word lists, which will be evaluated on 99 Hmong individuals. Results from the AI-scoring will be compared to scoring completed by a bilingual Hmong individual.
Conclusion: Together this work provides critical insights to barriers, opportunities, and solutions for improved access to equitable hearing health care.

Planned Session 13

Healthy Hearing & Equity
PS 13-2

How do ethnicity and upbringing influence perceptions of public stigma surrounding hearing loss

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Background and Aims
Adults with hearing loss (HL) often experience stigma, fostering negative attitudes toward HL and hearing devices. This can reduce help-seeking and contribute to social isolation, anxiety, and low self-esteem. Perceptions of disability, HL, and hearing aid use vary across cultures, highlighting the need to consider cultural norms in stigma research.
A recent large scale survey (n = 393) assessing self, public, and affiliate stigma in relation to hearing loss, identified key predictors of HL stigma and found a significant effect of ethnicity on public stigma among participants from diverse ethnic communities across the UK, including individuals with and without HL. This project aims to explore how ethnicity and upbringing shape perceptions of public stigma surrounding hearing loss.

Methods
Semi-structured interviews were conducted with individuals with (n = 20) and without hearing loss (n = 20) from diverse ethnic communities. The interview content was informed by the survey findings. Questions included "What do you think other people think about people with hearing loss?", "Why do you think people think like that?", and "Growing up, what did you hear about people with hearing loss?" Transcripts were analysed using Braun and Clarke's framework for thematic analysis, following an inductive approach to capture themes arising from participant narratives.

Results
Preliminary coding of transcripts from persons with HL yielded five themes: assumptions and misconceptions about HL, instances of discrimination, awareness and lived experience with HL, acceptance of HL and changes in attitudes over time. These narratives revealed an interplay between stigma and acceptance, pointing to both cultural differences and similarities in the way HL is understood and perceived.

Conclusion
Understanding stigma within its socio-cultural context can inform more equitable and culturally responsive hearing care by acknowledging personal histories and lived experiences.

Planned Session 13

Healthy Hearing & Equity
PS 13-3

Barriers and facilitators to culturally responsive paediatric hearing care in England

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Background:
In England, children from South Asian communities have a higher risk of hearing loss, yet paediatric hearing health inequalities remain under-researched. This project explores barriers and facilitators for hearing care professionals based in England to provide culturally responsive services and South Asian parents/carers access to and engagement with hearing care services.

Methods:
Semi-structured interviews were conducted with hearing care professionals (paediatric audiologists, heads of services, and Teachers of the Deaf) and South Asian parents of Deaf children. The interview guide used the Capabilities, Opportunities, and Motivations model of Behaviour change (COM-B) as a theoretical framework. Patient and Public Involvement informed the use of lay language in recruitment documents and interview guides. Interpreters were provided to parents on request. Transcripts were first coded inductively to identify barriers and facilitators, and then deductively using the theoretical domains framework.

Results:
Barriers and facilitators influencing professionals' provision of culturally responsive hearing care included knowledge on culturally responsive practice, environmental and culturally responsive resources, affordability of interpreters, workforce diversity and support, cultural beliefs within extended family, multidisciplinary collaboration, and community-based assumptions and misconceptions. For South Asian parents, factors affecting access to and engagement with hearing services included community and family support, geographical location, frequent hospital visits, communication gaps, language support, commitment to child's wellbeing, and emotional distress.

Conclusion:
Factors influencing provision and access to culturally responsive hearing care services are complex and interwoven. Barriers in capability (knowledge), opportunity (language support), and motivation (cultural beliefs), can be effectively addressed, by mapping these determinants to relevant intervention functions, policy categories, and behaviour change techniques using the Behaviour Change Wheel, thereby supporting delivery of culturally responsive hearing care.

Keywords: Culturally responsive hearing care, South Asian community, accessibility.

Planned Session 13

Healthy Hearing & Equity
PS 13-4

What is culturally responsive care and how to promote culturally responsive hearing services?

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Background and Aims:
One in six Australians lives with hearing loss. Hearing loss is 2–5 times more prevalent among people from diverse ethnic backgrounds (i.e, migrants and communities that speak a language other than English at home). But use of hearing services and hearing aids remains low in these communities despite availability of government-subsidised hearing services in Australia. This project aimed i) to identify the most important elements of culturally responsive hearing care, and ii) to co-design, implement and evaluate training to facilitate culturally responsive practices in hearing clinics.

Methods:
Phase 1 focused on identifying the key elements of culturally responsive hearing care from the perspectives of people from diverse ethnic communities, clinicians and experts in culturally responsive care.
• In-depth qualitative interviews: 46 individuals from diverse ethnic communities with hearing difficulties (representing 15 different language backgrounds) and family members who had a relative (e.g, child, parent, partner) with hearing difficulties participated in interviews.
• Delphi study: 45 Australian and international experts in hearing healthcare, cultural responsiveness, and health equity participated in a 2-round electronic Delphi study to identify and prioritise culturally responsive practices for hearing clinics.
Phase 2 focused on co-designing practical and feasible implementation strategies to facilitate the most important practices identified in Phase 1, followed by implementation and evaluation.
• Co-design workshops: Some workshops were conducted with clinic managers to ensure all interventions were feasible. Implementation strategies included an online training program, reminder cards, and translated client resources.
• Development of online training program: The program was co-designed with community representatives and included separate modules for receptionists and clinicians, incorporating videos based on real clinical experiences, interactive activities, and reflective questions.
• Implementation: Selected government and private clinics then implemented the intervention.
• Evaluation: Evaluation was conducted 2–3 months post-implementation using questionnaires and semi-structured interviews with clinicians, clinic managers, and receptionists to assess cultural responsiveness, acceptability, perceived impact on practice, and barriers and facilitators to implementation.

Results:
Phase 1:
In relation to the most important culturally responsive practice, receptionists should:
• Ask if the client speaks a language other than English at home and offer a free interpreter.
• Ask about family involvement preferences.
• Ask about clinician gender preference.
Clinicians should:
• Ask clients about their expectations of the appointment.
• Check understanding of assessment instructions.
• Encourage clients to stop them when they don't understand.
• Help clients understand the benefits and limitations of options.
• Discuss assistive listening devices and communication strategies.
• Inform clients about resources in their local community for hearing problems.
• Provide multilingual resources.
• Ask if clients have other questions/concerns before leaving.
Phase 2:
• Workshops with clinic managers identified training, reminder cards, and translated materials as appropriate strategies to implement in their clinics to help reception staff and clinicians conduct the culturally responsive practices identified in phase 1.
• Evaluation revealed high acceptability and positive impact of the strategies (i.e. online training program, translated materials, and reminder cards) among participants.
• Participants reported implementing key culturally responsive practices and applying them in client interactions. Some believed these practices may take additional appointment time, but others noted that these practices could decrease workload by reducing the need for repeat appointments.
• The training videos were identified as one of the most impactful components of the online training program, creating memorable scenarios that brought cultural responsiveness "to the front of mind" and helped staff understand the client perspective they typically do not observe (e.g, what happens when clients return home without adequate understanding).
• Key facilitators for implementation of culturally responsive practices included supportive team cultures with open communication, low organisational barriers in smaller clinics, the ability to share learnings across the team, and training serving as an effective reminder of existing but forgotten practices.

• Participants identified time constraints, staffing shortages, and system issues (e.g, appointment booking systems not consistently flagging interpreter needs) as barriers to culturally responsive practices.
• Some participants with extensive experience in clinics working with CALD clients reported that the training served as a useful validation or confirmation of their current practices, or as a helpful reminder of best practice approaches.

Conclusion:
Culturally responsive practices can be successfully integrated into clinics and have potential to improve equitable hearing care access and outcomes. Implementation barriers could be addressed through organisational support, adequate time allocation, and system improvements. Online training in culturally responsive hearing care is an acceptable and effective intervention that supports inclusive client-centred care that benefits all clients.

Planned Session 13

Healthy Hearing & Equity
PS 13-5

Community-based hearing care

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Age-related hearing loss that impairs daily communication is independently associated with adverse health outcomes, but the use of hearing aids by older adults is low and disparities exist. Community-based models of hearing care, including the incorporation of over-the-counter hearing technology and task sharing, are approaches that may reduce barriers and address disparities. Within hearing care, particularly for older adults, community-based models have previously received limited study when considering hearing health equity, despite national and international recommendations.

The HEARS (Hearing health Equity through Accessible Research & Solutions) intervention was designed as a structured hearing care program delivered by community health workers in a community setting that incorporates provision of a low-cost amplification device with education and counseling on age-related hearing loss. The HEARS approach has been tested via multiple pilot studies and a larger randomized controlled trial and found to be safe, feasible, acceptable, and efficacious and builds the evidence supporting community-based models of hearing care.

Through a public health lens, this presentation will introduce basic social epidemiologic concepts underlying the rationale behind community-based hearing care. The presentation will review current understanding of hearing health disparities in the United States as an example of existing gaps in care, including within high-income countries. In exploring community-based hearing care as a promising approach to advancing hearing health equity, findings from the HEARS randomized controlled trial and accompanying studies will be discussed, which include diverse settings and partnership with diverse communities in the US and globally. Finally, the presentation will cover the necessary components to executing rigorous and responsive community-based hearing care, which includes leveraging innovative mobile technologies, over-the-counter devices, and the support of growing international guidance. This presentation will serve as a primer on community-based hearing care as an approach to advance hearing health equity and actionable steps to joining the effort.

Planned Session 13

Healthy Hearing & Equity

PS 13-6

Readability and accessibility of online information about hearing/hearing loss treatments

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Background and Aims: Globally, between 55% and 86% of adults report using the internet to seek health information about symptoms, diagnoses, treatments, and general wellness. For many people, online resources are the initial point of contact with the healthcare system and often shape decisions about whether, when, and how to pursue professional care. In the context of hearing health, accessible and trustworthy online information may therefore influence help seeking, uptake of hearing services, and adherence to recommended interventions, such as hearing aids.

Our objective was to identify common barriers that limit equitable access to hearing health information and to generate actionable recommendations for clinicians, health communicators, and web developers to improve online resources and support timely, informed help seeking.

Methods: This study evaluated the accessibility of online hearing health information through a two stage, mixed methods approach, combining systematic web sampling with qualitative usability testing. Stage 1 (Web Page Survey) examined readability (how easily content can be understood by the general public), information quality (accuracy, completeness, and trustworthiness), and language and translation options (availability and fidelity of non-English content). Stage 2 (User Experience Testing) investigated user experience through think aloud sessions.

Stage 1 Web Page Survey

Search strategy: Google searches were performed from within five English speaking countries (Australia, Canada, New Zealand, the United Kingdom, and the United States) using the search terms "hearing loss" and "hearing aids". The top five returned webpages for each country-term combination were captured for analysis.

Analysis: Webpages were categorised by source type (government, commercial, and nonprofit organisations). Each webpage was assessed for readability using Flesch-Kincaid Grading Level, information quality using DISCERN quality assessments, and language support by documenting available translation options and engaging professional translators to evaluate translation fidelity.

Stage 2 User Experience Testing

Participant testing: The three highest ranked webpages from the Australian searches of both "hearing loss" and "hearing aids" were selected for usability evaluation. Adult participants representing a range of ages and hearing histories completed think aloud sessions while pretending to seek hearing health information for themselves or people close to them on each webpage.

Analysis: Sessions were audio recorded and screen captured, then thematically coded to identify usability barriers and facilitators related to navigation, clarity of content, accessibility features, and perceived trustworthiness. Participants also completed post-session questionnaires to assess their impression about webpage content, quality, and personal factors (the novelty and comprehension of information to the reader).

Results:

Stage 1 Web Page Survey

From the 32 webpages assessed, 34% were sourced from USA, 22% from the UK, 19% from New Zealand, 13% from Australia, 9% from global organisations, and only 3% from Canada. Translations were available for 10 webpages. Translation quality was overall good but sometimes varied for webpages depending on language. Most webpages required reading skills well above the recommended sixth grade level for accessible health information, ranging from 6 - 17 USA grade level. Government and nonprofit webpages generally offered higher quality hearing aid information than commercial sites.

Stage 2 User Experience Testing

User experience data were gathered for six webpages identified in Australian searches to explore how people engaged with the content. Across the user experience component, participants consistently gravitated toward webpages that used clear and

straightforward language, incorporated engaging elements such as videos and images, and came from sources they recognised and trusted. They also expressed a strong preference for webpages that prioritised informative content rather than sales focused messaging.

Conclusion: Online hearing health information available in Australia, Canada, New Zealand, UK, and the USA was written in language that was more complex than recommended readability levels, of variable quality, and with limited availability in languages other than English. Searches across the various countries showed an over-representation of information from USA based organisations. User experiences with webpages were positive, with users identifying the importance of content and comprehensiveness, information delivery, webpage layout and navigation, accessibility and availability of translations, and credibility. Accessibility of online hearing health information could be improved by simplifying language, including high quality translations in languages other than English, providing good quality information and utilising pictures, diagrams and videos.

Planned Session 14

Counseling and Psychosocial Support in Audiology Rehabilitation

PS 14-1

HearChoice: A digital decision tool to educate, engage and empower adults with hearing loss

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Background

Despite a high prevalence of hearing loss and effective interventions, uptake of hearing healthcare is low. Factors include poor knowledge of how to seek help for hearing difficulties, and sub-optimal support for decision-making. These issues can be addressed through the provision of clear and accessible information, and guided support in decision-making.

HearChoice, an online, interactive, and modular decision-support intervention, was co-designed with people with lived experience together with other key stakeholders including representatives of professional bodies, hearing care professionals (HCPs), and advocacy groups.

This research aimed to (i) understand help-seeking and decison-making needs, (ii) co-develop HearChoice, guided by the COM-B behaviour change theory and implementation science, (iii) evaluate the effectiveness of HearChoice, and (iv) develop an implementation plan for sustainability and scale-up across Australia. The overall aim is to empower adults with hearing loss by offering them informed choice and control to assist in decision-making.

Materials and Methods

There were four work packages (WPs).
WP1: to conceptualise HearChoice, and understand barriers and enablers to help-seeking and decision-making among adults with hearing loss (AwHL). AwHL (N = 16) participated in semi-structured interviews, and HCPs (N = 9) in focus groups, to understand the barriers and enablers to help-seeking and decision-making. These were further examined in surveys with AwHL (n=300) and HCPs (n=43).

WP2: to co-develop the web-based app informed by WP1. Workshops and Think Aloud sessions with AwHL co-designed the wireframe and minimal viable products using a participatory, iterative approach. HCPs also provided iterative feedback and input. User-testing of a beta version was conducted with eight AwHL using interviews and usbility questionnaires.

WP3: to evaluate clinical-effectiveness of HearChoice via a three-timepoint, online RCT (n=841) across 3 months, and a process evaluation (n=18). The active control group was a one-page option grid in an online pdf format. Participants were recruited from a global research panel recruiting from Australia.

WP4: to co-design an implementation plan to facilitate future scale-up and sustainability. This includes realworld use in audiology clinics (n=5).
WPs 1-3 have been completed. WP4 and data analysis for WP3 is ongoing.

Results

WP1: Key barriers and facilitators help-seeking (n=28) and decision-making (n=14) were identified, underpinned by the COM-B model, resulting in a conceptual framework. Key factors identified from AwHL were: knowledge of the signs of hearing loss, hearing management options, costs and funding (Capability); the ready availability of information and opportunities for help-seeking, and other health and personal issues (Opportunity); positive beliefs about hearing management (Motivation). The AwHL survey of adults with hearing loss confirmed that the findings from the qualitative study generalised to a larger audience. The most important pieces of information were cost and funding, with 86% of participants rating these as "extremely" or "very" important. Overall, 74% reported support for HearChoice.

Planned Session 14

Counseling and Psychosocial Support in Audiology Rehabilitation

PS 14-2

Ecological Momentary Assessment

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Ecological Momentary Assessment (EMA) has emerged as a powerful methodological approach for capturing real-world experiences of hearing and listening beyond laboratory and clinic-based assessments. In audiology, traditional outcome measures often rely on retrospective questionnaires or controlled test conditions, which may fail to reflect the dynamic and context-dependent nature of everyday listening. EMA addresses this gap by collecting repeated, in-the-moment self-reports during daily life, typically via smartphones. This presentation provides an overview of the principles of EMA and discusses its growing relevance for audiological research and clinical practice. EMA enables the assessment of subjective listening experiences such as speech understanding, listening effort, and hearing-related participation in natural acoustic environments. By minimizing recall bias and capturing contextual information (e.g, listening situation, background noise, social setting), EMA offers a more ecologically valid perspective on hearing performance and hearing device outcomes. Recent applications of EMA in audiology demonstrate its potential to complement established laboratory measures, to enhance the evaluation of hearing aids and cochlear implants, and to support patient-centered care. EMA data can reveal within-person variability in listening experiences and highlight discrepancies between clinical test results and everyday functioning. These insights are particularly valuable for understanding complex hearing needs and for optimizing individualized rehabilitation strategies. The talk will also address practical considerations, including study design and data analysis, as well as challenges related to standardization and clinical implementation. Overall, EMA represents a promising tool for advancing audiological outcome assessment by bringing the measurement of hearing closer to the realities of everyday life.

Planned Session 14

Counseling and Psychosocial Support in Audiology Rehabilitation

PS 14-3

Examining Mental Fatigue in Auditory Rehabilitation: Impact of Hearing Loss and Tinnitus

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Purpose: Hearing loss, tinnitus and mental fatigue are multidimensional. The purpose of this study was to identify and determine the degree of mental fatigue in patients with hearing loss and/or tinnitus participating in audiological rehabilitation, and to examine the usefulness of a self-reported Mental Fatigue Scale (MFS) in this patient group.
Method: Patients undergoing audiological rehabilitation at the Department of Audiology and Neurotology, Karolinska University Hospital, Sweden, 2011-2017, who completed a self-reported MFS questionnaire were investigated. Patients were assessed with the Tinnitus Handicap Inventory (THI). Data and medical records on 76 consecutive patients were analysed in this retrospective pilot study.
Results: The study population had an age range of 38-65 years, of whom 69.5% females and 30.5% males. Most had normal hearing (37%) or mild-to-moderate hearing loss (46%). Only 17% had severe-to-profound hearing loss. A total of 56.5% had tinnitus, of whom 39.5% scored ≥57 on the THI, indicating severe tinnitus, whereas 43.5% reported no tinnitus. The MFS scores, ranged 13-42.5 points, were divided into three severity levels: 10.5-15, 15.5-20 and ≥20.5. In total, 67% of the patients had severe MFS scores of 20.5 or more. Most of the participants (90%) with a THI score ≥57 belonged to the severe MFS group. A significant positive correlation between MFS and severe tinnitus were found.
Conclusions: The study reveals that severe mental fatigue is more common in patients with severe tinnitus than sole hearing loss. The results of the present study indicate that the self-reported MFS seems to have multidimensional questions and could be used as a diagnostic instrument for this patient group. There is a need of specific guidelines on the treatment of patients with hearing loss and/or tinnitus who have mental fatigue.

Keywords: tinnitus, comorbidities, extended audiological rehabilitation, hearing impairment, mental fatigue, mental fatigue scale (MFS), severity of tinnitus

Planned Session 14

Counseling and Psychosocial Support in Audiology Rehabilitation

PS 14-4

Social-emotional well-being and adult hearing loss: Clinical recommendations

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Best-practice in audiological rehabilitation should consider hearing care in the context of personal well-being, and take a holistic client- and family-centred approach. This presentation aims to provide evidence-based recommendations to ensure the inclusion of social-emotional wellbeing in audiologic rehabilitation clinical practice.

The proposed 5-step plan includes: Identifying the client's social-emotional wellbeing; Including family members in audiological rehabilitation; Incorporating social-emotional needs and goals in an individualized management plan; Relating identified hearing needs and goals to rehabilitation recommendations; Using counseling skills and techniques to explore and monitor social-emotional well-being.

Each component of the plan will be discussed, and clinical considerations presented. The comprehensive recommendations offer guidance to hearing care professionals seeking to ensure that clients' social-emotional well-being is considered throughout the rehabilitation journey. By implementing the strategies within the 5-step plan, hearing care professionals can play a pivotal role in fostering the well-being of their clients, thereby enhancing the effectiveness of audiological rehabilitation

Planned Session 14

Counseling and Psychosocial Support in Audiology Rehabilitation

PS 14-5

Impact of Hearing Loss on Emotion Detection and How Hearing Aids May Help

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Background:
Hearing loss affects more than speech intelligibility; it also disrupts access to prosodic cues that convey vocal emotion. Difficulty detecting emotions in speech can negatively influence interpersonal communication, social participation, and psychosocial wellbeing. Despite advances in hearing aid technology, emotional perception is not routinely considered within audiological rehabilitation.

Objectives:
This study examined the impact of hearing loss on vocal emotion detection and evaluated whether hearing devices can improve emotion discrimination. We further explored how laboratory findings relate to real-world emotional communication difficulties.

Methods:
The study recruited 21 adults with hearing impairment (11 female, 10 male), aged 50–85 years. Emotion discrimination was assessed using a controlled set of validated emotional speech stimuli. A staged testing protocol was used, beginning with an unaided baseline condition, followed by two aided conditions: participants were fitted with hearing aids and over-the-counter devices. Measures were collected at initial fitting and again after a three-week acclimatisation period. Real-world outcomes during the home trial were captured using the NAL Ecological Momentary Assessment (NEMA).

Results:
Hearing loss was associated with reduced accuracy in detecting vocal emotions, particularly for subtle or acoustically complex emotions. Users of both sets of hearing devices demonstrated improved emotion classification compared to unaided listening, with the largest gains seen for challenging emotions such as surprise, relief, and fear, and with no further gains after a three-week acclimatisation period. Individual differences in outcomes were partly predicted by unaided perceptual measures and performance on a cognitive task. Real-world data from NEMA confirmed that participants experienced emotion recognition difficulties in daily communication and social interactions, aligning with self-reports from a standardised emotion questionnaire.

Conclusions:
This research confirmed that hearing aids can enhance the perception of vocal emotions in people with hearing loss, particularly for more complex emotions. The findings underscore the clinical potential of advanced hearing technologies to support social interaction and emotional engagement, with benefits extending beyond audibility to psychosocial functioning, and to inform future technologies that better preserve prosodic cues to emotion. The results also highlight the importance of addressing emotional communication in counselling and audiological rehabilitation.

Keywords: vocal emotion detection, hearing devices, prosodic cues

Planned Session 15

Auditory Implants: Surgical Considerations
PS 15-1

Monitoring hearing preservation during CI surgery: 5-stage promontory testing

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Background
During CI surgery, several potential sites of damage that may result in residual hearing loss, such as approach to the cochlear lumen and insertion of the electrode. Promontory ECochG may be used to monitor cochlear functions throughout phases of surgery, including the opening of the cochlea and insertion of the sheath of the CI insertion tool. The goal current study is to use intra-operative promontory ECochG measurements and pre- and postoperative audiometry to determine at which stage of surgery the cochlear function is potentially compromised.

Methods
In a prospective multicenter clinical trial, 20 adult patients with significant residual hearing at the lower frequencies (< 80 dB HL at 500 Hz) indicated for cochlear implantation are included. All participants will be implanted with a Cochlear Slim Modiolar Electrode (SME). Intra-operative promontory ECochG is performed with acoustic broadband clicks to assess thresholds at baseline, after the extended round window or cochleostomy approach, insertion of the sheath of the insertion tool, insertion of the electrode and positioning of the lead in the mastoid. Pure tone audiometry was performed after approximately 1 week and 3 months postoperatively.

Results
Preliminary results will be presented of 20 patients. In 18 of the patients reliable promontory ECochG thresholds could be obtained. A significant intraoperative decline (> 5 dB loss) was observed in 3 patients (17%) of the patients during the surgical steps as described above. The postoperative tone audiometry showed a (near) complete loss in approximately one third, partial loss in one third and (near) complete preservation (< 10 dB loss) of residual hearing in the remainder third of the patients.

Conclusion
Partial or complete loss of residual hearing using the SME is not uncommon and more often occurs in the period after implantation then during the implantation procedure itself.

Keywords: CI, surgical monitoring, ECochG

Planned Session 15

Auditory Implants: Surgical Considerations
PS 15-2

Aligning the coiling planes of the cochlea and the electrode array

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Slim modiolar electrode arrays are susceptible to tip fold-over during cochlear implantation, particularly when the coiling direction of the electrode array is misaligned with the intrinsic coiling plane of the cochlea. Although surgeons are advised to align these planes during insertion, accurate intraoperative recognition of cochlear orientation often relies on subjective spatial interpretation.
We retrospectively reviewed cochlear implant surgeries performed between January 2010 and December 2021, focusing on the cochlea's orientation as perceived in the surgical microscopic view. CT datasets and intraoperative video recordings were analyzed in 220 cases. The angle between the cochlear coiling plane and the horizontal plane ("slope angle") was measured. The mean slope angle was 12.1°, but substantial inter-surgeon variability was observed, reflecting differences in patient positioning and individual surgical preference. This variability indicates that a single reference angle is not universally applicable, and that reliance on mental reconstruction alone may be unreliable. In addition, not all surgeons routinely use preoperative computer-based simulations.
To establish a simple, surgeon-independent anatomical reference, we analyzed preoperative CT data from 65 ears and defined a plane containing the long and short processes of the incus ("plane of the incus"). Three-dimensional reconstruction demonstrated that the angle between the plane of the incus and the cochlear coiling plane averaged 34.6° (95% CI 23.4–45.7°), with no significant differences by side or age at surgery.
Visualization of the incus during surgery therefore provides a practical and reproducible cue for determining the cochlear coiling plane. Improved understanding and alignment of coiling planes during electrode insertion may help reduce the risk of tip fold-over in slim modiolar electrode arrays.

Planned Session 15

Auditory Implants: Surgical Considerations
PS 15-3

Automatic analysis of cochlear response during CI surgery for hearing preservation

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Background: ECochG has emerged as a valuable tool to guide surgeons during hearing-preservation cochlear implant surgery. The major impediment to implementation remains the need for expert interpretation of ECochG signals within the operating theatre. This would be overcome by automated analysis of ECochG signals.

Methods: Retrospective analysis of a database of real-time ECochG recordings made during cochlear implant surgery. ECochG was recorded directly from the most apical electrode, while a high-intensity acoustic tone pip (500 Hz @ 108 dB, presented with alternating polarity) was delivered to the external ear canal. These ECochG recordings were replayed in real-time to test automated analytic approaches. The cochlear microphonic (CM) and auditory nerve neurophonic (ANN) were derived in real time. Two analytic approaches were tested. Rules-based algorithms to detect fluctuations in ECochG signal amplitude that are thought to be of clinical significance. AI approaches were explored using post-operative acoustic hearing loss as the ground truth.

Results: CM and ANN could be reliably derived using all automated methods. Rules-based algorithms were as good as or better than humans at predicting ECochG changes associated with loss of residual hearing (e.g, a real-time drop of >30% in CM amplitude or a simultaneous drop in CM and ANN). Machine- and deep-learning approaches also successfully predict ECochG changes associated with a loss of residual hearing.

Conclusions: Automated detection of ECochG could be implemented in cochlear implant systems to help guide hearing-preservation cochlear implant surgery. This would allow widespread dissemination of the technology.

Planned Session 15

Auditory Implants: Surgical Considerations
PS 15-4

Outcomes of cochlear implantation in patients with far-advanced otosclerosis

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Cochlear implantation has emerged as an effective intervention for individuals with far-advanced otosclerosis, a condition characterized by abnormal bone growth in the middle ear that can lead to significant hearing loss. The World Hearing Center has conducted research evaluating the audiological and quality-of-life outcomes following cochlear implantation in this patient population. The findings indicate that patients with far-advanced otosclerosis experience marked improvements in hearing thresholds and speech perception post-implantation, with many demonstrating enhanced communication abilities and overall social engagement. Moreover, patient satisfaction scores reflect a positive impact on quality of life, highlighting the importance of timely intervention. The World Hearing Center emphasizes the importance of a comprehensive pre-surgery assessment to tailor the cochlear implant solution to individual needs, maximizing the potential for successful outcomes. Continued research is essential to further understand the long-term benefits and refine the candidacy criteria for cochlear implantation in patients affected by this condition.

Planned Session 15

Auditory Implants: Surgical Considerations
PS 15-5

Cochlear Damage: Auditory Consequences and Clinical Significance of the Threshold Equalizing Noise (TEN) Test

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Introduction
Sensorineural hearing loss is often associated with damage to the sensory structures of the cochlea, particularly the outer hair cells (OHCs) and inner hair cells (IHCs). Damage to OHCs leads to reduced sensitivity to weak sounds, poorer frequency selectivity and a reduced dynamic range, while damage to IHCs disrupts the transduction of acoustic signals into neural activity (Moore, 2004). It is possible that the IHCs and/or neurons are completely non-functional over one or more regions in the cochlea. These regions are referred to as cochlear dead regions. Detection of a tone of a particular frequency via IHCs and neurons with CFs different from that of the tone, is often called "off-frequency listening" (Johnson-Davies and Patterson, 1979; Patterson and Nimmo-Smith, 1980; Patterson and Moore, 1986).

Cochlear Dead Regions: Prevalence and Perceptual Consequences
Cochlear dead regions are common among adults with sensorineural hearing loss (Vinay & Moore, 2007; Cox et al. 2011; Pepler et al. 2014) and can change how sounds are perceived. Tones that fall within dead regions are often heard as distorted or noise-like because detection relies on neighboring neurons (Moore, 2004).

The Threshold Equalizing Noise (TEN) Test
A simpler and faster test, designed for use in clinical practice, involves the measurement of detection thresholds for sinusoidal tones in a special background noise, called threshold-equalizing noise (TEN) (Moore et al, 2000; Moore et al, 2004). In the TEN(HL) test (Moore et al, 2004), the noise was designed to produce equal masked thresholds in dB HL over the frequency range from 500 to 4000 Hz. Previous studies carried out on the test-retest measurements, indicate reliable results, showing little variation across repeated sessions (Pepler et al. 2014; Vinay et al, 2017).

Clinical Importance in Norway
Identifying cochlear dead regions is important in hearing rehabilitation. In Norway, there is increasing focus on testing for dead regions to better predict who will benefit from selective amplification and to support individualized hearing-aid fitting. Combining behavioral tests and including TEN test as part of the test battery, allows clinicians to provide effective rehabilitation in sensorineural hearing loss individuals with cochlear dead regions.

Conclusion
Cochlear dead regions can significantly affect auditory perception and limit the effectiveness of standard (full band) amplification. The TEN test offers a fast, reliable and practical method for detecting cochlear dead regions. The growing emphasis in Norwegian clinical practice on assessing dead regions and understanding their amplification benefits highlights the potential to improve individualized hearing-aid fitting and auditory outcomes.

Planned Session 16

Patient Engagement and Satisfaction in Teleaudiology Fitting

PS 16-1

Development and implementation of national teleaudiology guidelines

Rebecca BENNETT

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This presentation describes the development and implementation of Australia's national teleaudiology guidelines, and examines their relevance to patient engagement and satisfaction during teleaudiology appointments, including hearing aid-related care. Evidence from a national program of research will be presented, incorporating clinician perspectives, consumer experiences, and post-pandemic service delivery trends.

Consumer survey findings collected during the peak of COVID-19 indicate that teleaudiology uptake was low, despite generally positive outcomes reported by those who accessed teleaudiology. Findings suggest that many consumers were not aware teleaudiology was available, and barriers to future uptake were strongly influenced by concerns regarding privacy and confidentiality, as well as preferences for in-person services. Clinician perspectives highlighted that implementation of teleaudiology is shaped by multiple factors, including training needs, clinician confidence, and assumptions about which clients are "suitable" for teleaudiology.

Post-pandemic follow-up data showed that teleaudiology is now widely offered in Australia, with high reported client satisfaction, and a substantial proportion of teleaudiology appointments replacing in-person appointments. However, ongoing challenges remain, including internet reliability, digital literacy, and variability in how clinics measure patient outcomes and satisfaction.

Together, these findings suggest that national teleaudiology guidelines play a critical role in supporting patient engagement and satisfaction by promoting transparent communication, consistent consent and privacy practices, and equitable access to high-quality hearing care across both in-person and remote delivery models.

Planned Session 16

Patient Engagement and Satisfaction in Teleaudiology Fitting

PS 16-2

Synchronous remote fine-tuning in aural rehabilitation: Clinical outcomes, patient engagement, and long-term effects

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The rapid expansion of digital technologies in audiology has prompted renewed examination of traditional approaches to aural rehabilitation, particularly regarding patient follow-up, continuity of care, and patient engagement. In this context, remote clinician–patient interaction and synchronous fine-tuning enable real-time optimization of hearing devices in response to hearing-related concerns. This study synthesizes findings from two randomized controlled trials evaluating synchronous remote fine-tuning and follow-up among first-time and experienced hearing-aid users.

Across the included trials, synchronous remote fine-tuning yielded clinical outcomes comparable to, and in some domains superior to, those of in-clinic care. First-time hearing-aid users demonstrated significant short- and long-term improvements in hearing-aid benefit, satisfaction, and self-reported hearing performance. Experienced users exhibited similarly sustained benefits, consistent with outcomes observed in traditional aural rehabilitation, suggesting that remote fine-tuning supports long-term rehabilitation beyond the initial fitting phase. Remote care was also associated with high patient engagement, reflected in adherence to follow-up schedules, active participation during fine-tuning sessions, and consistently high levels of patient-reported satisfaction.

These engagement-related findings suggest that remote rehabilitation may strengthen patients' sense of involvement and shared decision-making, potentially enhancing self-management and sustained hearing-aid use. Building on this clinical evidence, a health economic evaluation is underway to estimate direct and indirect patient-related costs associated with traditional in-person rehabilitation compared with synchronous remote fine-tuning. Reduced logistical burden and increased flexibility may further enhance patient satisfaction and improve the efficient use of healthcare resources.

Planned Session 16

Patient Engagement and Satisfaction in Teleaudiology Fitting

PS 16-3

Improving access through teleaudiology: Insights from patients and providers

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Background: Access to hearing healthcare is shaped by economic, geographic, and social barriers, particularly in underserved communities. Telepractice has emerged as a promising strategy to address these gaps by reducing travel burden, expanding workforce reach, and supporting continuity of care. However, successful implementation depends not only on technological feasibility but also on patient and provider readiness, digital access, and locally appropriate service models.

Objectives: This presentation examines patient and provider perceptions of teleaudiology hearing aid fittings and follow-up care with the goal of identifying cross-cutting barriers, facilitators, and implementation considerations relevant to global audiology practice.

Methods: A qualitative needs assessment was conducted at a nonprofit speech and hearing clinic in rural Mexico. Semi-structured interviews were completed with 31 parents of pediatric patients who were deaf or hard of hearing and 12 clinic staff members. Interviews were conducted in Spanish, transcribed verbatim, and analyzed using thematic analysis with a hybrid inductive-deductive approach. Findings were interpreted through an implementation lens to identify factors influencing acceptability and feasibility.

Results: Participants represented substantial linguistic, educational, and socioeconomic diversity, including Indigenous language use, and variable health literacy and access to digital resources. Smartphone-based internet access and messaging applications (i.e. WhatsApp) were widespread, though no patients had prior telehealth experience. Both patients and providers identified potential benefits of teleaudiology, including reduced travel burden, lower indirect costs, and improved continuity of care. Key challenges included digital literacy, internet reliability, communication quality, uncertainty about quality of care, and the perceived need for hands-on, on-site facilitation to support hearing aid management.

Conclusions: Insights from this case study in rural Mexico highlight teleaudiology's potential to improve access when embedded within patient-centered, contextually responsive care models. Findings underscore the importance of addressing social determinants of health, patient/staff readiness, and technology infrastructure to ensure successful implementation. Lessons from this work have broader relevance for global audiology practice, informing policy considerations, workforce models, and future directions in telepractice.

Planned Session 16

Patient Engagement and Satisfaction in Teleaudiology Fitting

PS 16-4

Expanding horizons of teleaudiology: Rethinking access and equity in hearing health care

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The global burden of hearing loss continues to increase and is recognized as a major public health concern. With aging populations and the COVID-19 pandemic, the demand for accessible and sustainable hearing health services has increased, and there has been growing research interest in the potential of teleaudiology as a remote model of care delivery. Advances in digital communication technologies, remote diagnostic platforms, and device connectivity have also enabled audiological services to extend beyond conventional clinical environments.

The concept of teleaudiology was initially introduced to address geographic barriers to care, leading to investigations into its potential as a remote care model. However, access to hearing health care is influenced by multiple factors, including digital literacy, socioeconomic status, disparities in digital infrastructure, and cultural perceptions of hearing loss. These factors affect whether individuals can meaningfully benefit from remote services. Therefore, before implementing teleaudiology models, health care professionals should consider not only technical feasibility but also equity and inclusion.

This session provides a general overview of teleaudiology, including its development, current applications, and future directions within both clinical and public health contexts. The session will also consider how remote hearing care may contribute to more sustainable and inclusive hearing health care.

Planned Session 17

Audition and Neuroplasticity
PS 17-1

Functional near-infrared spectroscopy as a biomarker for speech perception and listening effort

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Understanding how auditory cortex encodes speech and reorganises after deafness and following cochlear implantation is central to neuroplasticity and outcome prediction. Conventional neuroimaging is often affected by cochlear implant (CI) associated electromagnetic artefacts, limiting reliable longitudinal study of auditory cortical function in CI users. Functional near-infrared spectroscopy (fNIRS) overcomes this barrier: it is silent, portable, CI-compatible, and suitable for repeated measurements of cortical speech processing before and after implantation.

This talk summarises cross-sectional and longitudinal fNIRS studies of cortical responses to auditory and visual speech in normally hearing adults and in individuals undergoing cochlear implantation. Bilateral superior temporal cortex (STC) and inferior frontal gyrus (IFG) were examined using event-related paradigms with clear, degraded, and visual-only speech.
fNIRS provides robust measures of auditory speech processing. In normally hearing listeners, auditory speech elicits reliable STC responses that scale with intelligibility and predict individual speech perception performance, while left IFG activity reflects listening effort and later linguistic processing.

In CI candidates, auditory cortical responses are reduced pre-implantation but recover within six months after activation, with greater STC recovery associated with better speech understanding. Visual speech also recruits auditory cortex after implantation, and auditory- and visual-evoked responses develop in parallel. Increased visual-speech activation of auditory cortex predicts improved, not poorer, CI outcomes, indicating synergistic audio-visual plasticity rather than maladaptive cross-modal reorganisation.

Planned Session 17

Audition and Neuroplasticity
PS 17-2

Neural Encoding and Auditory Perception in Cochlear Implant Users

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The overall goal of this line of research is to improve our understanding of auditory neural encoding of electrical stimulation and its relationship to perceptual outcomes in cochlear implant (CI) users. In this presentation, I will summarize results from three sets of studies.
The first set of studies identified cochlear nerve (CN) response properties that predict speech perception outcomes. We found that both the quality of the electrode-to-neuron interface (ENI) and the speed of recovery from neural adaptation were significant predictors of speech perception performance. Poorer ENIs and prolonged adaptation recovery were associated with poorer speech perception, particularly in noise. The speed of neural adaptation explained additional unique variance in speech perception beyond ENI measures alone. Together, these parameters accounted for substantially more variance under high-noise conditions and explained approximately 50% of the variance in speech recognition scores at a +5 dB signal-to-noise ratio.
The second set of studies developed distinct measures to separately assess the number of available CN fibers and their neural health. We showed that the effect of increasing the interphase gap (IPG) of biphasic pulses can be used to estimate CN fiber count, whereas neural synchrony primarily reflects fiber health. Stimulation level offsets and the IPG effect on the maximum slope of the eCAP input/output function were effective for comparing CN fiber counts across groups. In contrast, the phase-locking value (PLV), which quantifies trial-by-trial phase coherence across eCAP sweeps, was identified as the preferred metric for assessing neural synchrony.
The third set of studies examined the relationship between CN neural synchrony, auditory perceptual sensitivity to temporal envelope cues, and speech perception outcomes. Reduced neural synchrony was associated with prolonged within-channel gap detection thresholds and poorer speech perception performance in CI users.

Planned Session 17

Audition and Neuroplasticity
PS 17-3

Understanding Speech in Noise Difficulties in Cochlear Implant Users through Intracochlear eCAEP Cortical Measures

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One of the most persistent challenges for cochlear implant (CI) users is understanding speech in noisy environments. Despite remarkable technological progress, many users continue to experience difficulty separating target speech from background noise. These difficulties arise from several inherent limitations of electrical hearing: restricted spectral resolution, broad current spread, limited access to temporal fine structure, and inconsistent binaural cues. As a result, CI users often depend heavily on cognitive resources to decode masked speech, leading to rapid breakdown of comprehension under noisy conditions and highlighting the need for objective neural markers that explain variability across users.

To probe the neural mechanisms underlying these challenges, we developed a direct intracochlear cortical measure: electrically evoked cortical auditory evoked potentials (eCAEPs) recorded through the implant electrodes themselves. This near field approach validated in children and adults provides high SNR, artifact free recordings of P1 and N1 cortical components within minutes and without requiring patient cooperation. The method overcomes limitations of scalp EEG, which suffers from muscle noise, impedance variability, and long preparation times. Intracochlear recording isolates true cortical activation by subtracting a zero stimulation (0 CU) trace from a Most Comfortable Level (MCL) trace, effectively eliminating device related artifacts. These methodological advances, demonstrated across multiple cohorts of bilateral CI users, show that near field cortical recordings can be obtained reliably in clinical settings using only the implant hardware.

Across 54 ears from 37 participants, reliable intracochlear eCAEPs were recorded in every case. Early implanted children often within the first two years showed short, well synchronized P1/N1 latencies and larger amplitudes, consistent with typical auditory cortical maturation. Adults implanted later in life exhibited prolonged cortical latencies and frequent P2 splitting, suggesting increased processing effort and reduced temporal precision. Age at implantation emerged as the dominant predictor of cortical timing, with early implantation producing near normative P1 latencies in approximately 91% of pediatric ears. These findings underscore the neurodevelopmental advantage of early auditory stimulation and the ability of intracochlear cortical responses to reflect long term auditory plasticity.

The central finding of this work is that intracochlear eCAEPs show a strong, systematic relationship with speech in noise (SiN) performance. Earlier cortical latencies are associated with better auditory function, especially in noise, where temporal precision is essential for parsing speech envelopes and segregating competing signals. Participants with shorter P1 and N1 latencies achieved significantly better SiN and speech in quiet (SiQ) outcomes. The correlations between P1 latency and SiN ($r \approx -0.75$), and between N1 latency and SiN ($r \approx -0.63$), were among the strongest reported and substantially exceeded those obtained with scalp recorded CAEPs. Adding eCAEP latency to regression models increased the variance explained in SiN performance from ~60% (age at implantation alone) to ~73%, showing that intracochlear cortical timing contributes unique and clinically meaningful predictive value. These results indicate that latency is not merely a developmental marker, but a functional index tied directly to real world communication abilities.

The mechanisms underlying these relationships can be understood by considering how CIs encode sound. Electrical stimulation compresses the spectral envelope and removes temporal fine structure cues, reducing phonemic distinctiveness especially in noise. Spread of excitation flattens spectral contrast between speech and background sounds, complicating cortical separation. Binaural hearing is also compromised in many CI users due to interaural place mismatches or sequential implantation, both of which introduce cortical asymmetry. Consequently, listeners rely more heavily on top-down resources and must recruit additional cortical processing, reflected in delayed P1/N1 latencies, increased P2 splitting, and weaker cortical activation. Intracochlear eCAEPs provide a unique window into these neural bottlenecks, allowing measurement of cortical timing with resolution and SNR unattainable through noninvasive approaches.

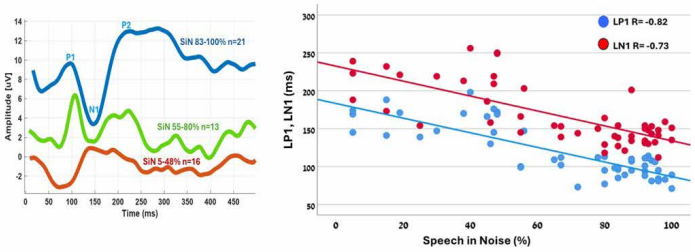


Figure Left: Grand average intracochlear eCAEPs for participants grouped by speech in noise performance levels.
Right: Linear associations between P1 and N1 latencies and both speech in noise and speech in quiet scores.

The single figure accompanying this abstract demonstrates these relationships:

Left: grand average intracochlear eCAEPs for participants grouped by SiN performance.

Right: linear associations between P1/N1 latencies and both SiN and SiQ scores.

On the left, listeners with better SiN scores show early, high amplitude P1/N1 peaks, whereas those with moderate or poor

SiN abilities display progressively delayed, reduced responses. This pattern reflects the efficiency of early cortical encoding. On the right, scatter plots show strong negative correlations between latency and speech scores. Participants with long latency cortical responses struggle to decode speech in noise, while those with short latencies perform substantially better. Together, the figure integrates physiological and behavioral profiles and visually emphasizes that cortical timing is a key determinant of SiN performance.

This neurophysiological–behavioral linkage has important clinical implications. Intracochlear eCAEPs provide an objective, repeatable biomarker that does not require attention or behavioral responses, making them suitable for infants and difficult to test populations. They allow early identification of slow or asymmetric cortical responses, support individualized programming (including electrode specific adjustments), and aid in counseling families. In adults, they reveal experience driven plasticity: longer CI use is associated with gradual latency shortening, though not reaching the levels observed in early implanted children. Tracking cortical improvement over time adds a valuable dimension to rehabilitation and may help clinicians differentiate between neural limitations and device related constraints.

Finally, this work lays the foundation for neuroadaptive, closed loop cochlear implants, in which cortical responses recorded through the implant automatically guide stimulation adjustments. Using eCAEP latency as a real time biomarker, future processors could optimize noise reduction strategies, spectral allocation, or stimulation rates to reduce listening effort and improve SiN perception. Such systems could ultimately enable individualized, dynamic auditory processing tailored to each user's cortical profile.

In conclusion, intracochlear eCAEPs offer a transformative approach to understanding why speech in noise remains difficult for CI users and how cortical auditory timing predicts individual success. The data demonstrate a direct and quantifiable relationship between cortical latency and real-world speech outcomes. The accompanying figure illustrates these effects clearly and highlights the promise of intracochlear cortical recording as a clinically actionable biomarker for precision CI programming and next generation neuroadaptive hearing systems.

Audition and Neuroplasticity

PS 17-4

Neural correlation of tracking speech in adverse listening condition

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The ability to selectively attend to speech in noisy environments is essential for everyday communication, yet this ability declines with age due to increased cognitive and sensory demand. Neural tracking of continuous speech offers a promising approach to quantifying auditory encoding. However, it remains unclear how aging impacts neural encoding of naturalistic speech under noise.

In this study, we investigated age-related differences in auditory cortical responses to speech under clean and speech-shaped noise (SSN) conditions using a temporal response function (TRF) encoding model. EEG signals were recorded from younger (n = 17) and older (n = 15) adults while they listened to 2-minute Korean narratives. For the noise condition, the SNR was individually adjusted to correspond to each participant's 50% speech recognition threshold (SRT). To assess speech comprehension and attention, participants answered speech-related questions after each trial. TRFs were estimated for delta and theta bands, and TRF peak amplitudes and latencies were analyzed.

The results revealed reduced behavioral accuracy and slower reaction times in older adults, particularly in noise. Theta-band TRFs showed increased amplitudes and delayed peak latencies in older adults, with significant age and noise effects observed for P1, N1, and P2 components. Notably, N1 latency was affected by both age and noise, with older adults showing marked delays under noise conditions.

These findings suggest that TRF-based auditory encoding models can capture distinct age-related neural response patterns to speech in noise, reflecting both early sensory processing changes and late-stage cognitive effort. This approach may offer a neural marker for age-related auditory decline and contribute to future diagnostic and rehabilitative strategies.

Planned Session 17

Audition and Neuroplasticity
PS 17-5

Neurofeedback training of auditory selective attention

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Background:
Speech comprehension in noisy environments presents significant cognitive challenges, particularly for individuals with hearing impairments. Conventional hearing aids primarily focus on sound amplification to ensure audibility but often fail to improve listening in noisy settings, highlighting the importance of central auditory processing. Auditory selective attention, a key aspect of central, non-linguistic processing that is not language-specific, modulates neural representation to enhance the target signal over background noise. Moreover, research indicates that individual variations in the attentional modulation of cortical auditory evoked potentials (CAEP) correlate with speech-in-noise performance. Previous neurofeedback training (NFT), designed to enhance attentional modulation, improved word-in-noise perception in normal-hearing English speakers, which lays a building block for developing evidence-based rehabilitation of speech-in-noise perception. As a follow-up, this study aims to determine if such training can extend to speakers of different languages and to sentence-in-noise (SiN) tasks.

Methods:
Young normal-hearing adults participated in three- to four-week NFT sessions utilizing a gamified audiovisual brain-computer interface. That is, participants were instructed to attend to one of two simultaneous speech streams: a female voice saying "Up" five times and a male voice saying "Down" four times. The target speech was visually indicated by coins placed above or below a center line. Based on the attentional state, decoded from single-trial EEG, a rocket icon moved up or down, either collecting or missing the coins. Speech-in-noise perception was assessed before and after training via SiN tasks, where participants repeated sentences presented against multi-talker babble at varying signal-to-noise ratios (SNRs).

Results:
Following the training, attentional modulation was strengthened, as shown by an increased attentional modulation index: the ratio of CAEP amplitude to onsets of attended versus ignored speech. SiN performance, measured by the number of accurately repeated keywords, also improved under challenging SNR conditions.

Conclusion:
These findings support the potential of NFT to enhance sentence-based speech-in-noise perception in both English and Korean speakers. Further research involving larger populations, including those with hearing loss, will contribute to the development of evidence-based rehabilitation strategies for speech-in-noise perception, potentially improving daily communication quality.

Planned Session 18

International Best Practices in Audiology
PS 18

International Best Practices in Audiology

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This session features an international collection of panelists who will each review the status of clinical practice guidelines in a global region. Panelist presentations for each global region will focus on relevant themes, including: 1) The model for delivery hearing healthcare services, 2) Formal education and training of audiologists or other hearing healthcare service providers, 3) Existing policies for licensing, regulating, or registering hearing healthcare service providers. 4) Standards, core competencies, and/or clinical practice guidelines for hearing health care, and 5) Immediate and long-term goals and methods for advancing the quality of hearing healthcare services. Individual presentations will be followed by a panel discussion about strategies for developing context appropriate and economically feasible guidelines and delivery models for enhancing global standards of hearing healthcare services. The round table session will include ample opportunity for audience questions and participation in discussions.

Planned Session 18

International Best Practices in Audiology
PS 18-3

The shifting landscape of Audiology in Africa

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Hearing loss remains a significant and growing public health concern on the African continent. Current estimates indicate that approximately 40 million people in Africa live with disabling hearing loss, representing a regional prevalence of 3.6% (WHO, 2024). Projections suggest that this number will rise to over 54 million by 2030, driven by population growth, epidemiological transitions, and persistent health system challenges. The scale of this burden underscores the urgent need to expand, strengthen, and diversify Audiology services across the continent.

Since the last World Congress of Audiology in 2024, several noteworthy developments have taken place within African Audiology. One example is the establishment of new training pathways, such as Botswana's inaugural Audiology programme, which marks a significant milestone for Southern Africa. As additional countries seek to build Audiology capacity, ensuring that emerging curricula are contextually relevant becomes essential. African training programmes must integrate local epidemiology, community health beliefs, sociocultural perceptions of hearing loss, and region specific barriers to care to ensure that graduates are prepared for real world service delivery.

Moreover, the leading etiologies of hearing loss in Africa differ substantially from those seen in other regions. For instance, infectious diseases, untreated otitis media, and ototoxic medications remain prominent contributors to auditory impairment in many African settings—conditions that contrast sharply with patterns observed in countries such as South Korea. These epidemiological differences have important implications for prevention strategies, early detection programmes, and models of care.

This presentation will outline the key shifts occurring in Audiology across Africa, highlight innovations in training and service delivery, and discuss how context specific knowledge can inform international best practices. In doing so, it reinforces the importance of global collaboration while advocating for African led solutions tailored to the continent's unique needs and realities

Planned Session 19

Pediatric Audiological Diagnosis
PS 19-1

Optimisation of visual reinforcement audiometry: A scoping review

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Objective: Visual reinforcement audiometry (VRA) is a well-established behavioural clinical procedure used to assess hearing in infants and young children. We conducted a scoping review before undertaking VRA research projects to investigate: (i) personalised auditory stimuli [e.g, filtered speech] and visual rewards [e.g, video extracts and animated GIFs], and (ii) machine learning to detect responses [see WCA presentations on each of these by Visram]. The aims of the scoping review were to:

1. Provide a comprehensive mapping of the literature on various aspects of VRA procedure and how these affect test outcomes, and
2. Identify where gaps in the evidence base exist.

The findings have already received more than 4000 views (Visram et al [2025]: https://doi.org/10.1080/14992027.2024.2397716).

Design: A pre-registered scoping review was conducted.

Study sample: The search identified more than 1000 records. Fifty-nine original articles were included in the review.

Results: The findings can be summarised under eight headings: (i) reinforcement, (ii) auditory stimuli, (iii) auditory localisation, (iv) transducers, (v) age/developmental age, (vi) automated testing/screening, (vii) developmental delay/complex needs, and (viii) other test/patient factors.

The review identified a number of factors that improved response behaviour, including:

- increased variety and complexity of visual reinforcers,
- short reinforcer durations,
- providing comfort breaks.

Benefits of modifying the traditional clinical VRA procedure typically include at least one of the following: (i) increased number of behavioural responses, (ii) increased total number of minimum response levels, and/or (iii) reduced testing time.

Intermittent conditioning (e.g, 50% of conditioning trials rewarded) did not have an impact on response behaviour, and neither did the suprathreshold presentation level used during the initial conditioning phase.

More responses were achieved for younger (around 12 months) than older (around 18–24 months) infants. Once infants were developmentally ready to condition to play audiometry, this allowed for a more comprehensive hearing evaluation.

Gaps in the evidence base: Non-peer reviewed reports of developments that may bring potential benefits, but still require an evidence base, include:

- Customisation of acoustic stimuli and visual rewards. These have the potential to increase infant attention and maximise outcomes, particularly where traditional testing has not been successful. Further research is needed to determine the effectiveness of such adaptations, and the specifics of their applicability to determining MRLs.
- Application of modern technologies to automate aspects of test procedures. This includes the detection of responses, helping to improve clinical efficiency and patient outcomes.

Conclusions: VRA is a successful behavioural hearing test for most infants of developmental age around 7–24 months, with well-established protocols describing its clinical implementation. Further evidence is needed to assess potential benefits of different reinforcers, different auditory stimuli (e.g. filtered familiar sounds), and technologies to assist response detection.

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Planned Session 19

Pediatric Audiological Diagnosis
PS 19-3

Striking the right balance: Uncovering the best minimal test battery for middle ear assessment in children

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A key component of pediatric audiology practice is the accurate evaluation of children's middle ear function. Yet clinicians continue to face practical challenges in selecting efficient, evidence-based diagnostic protocols that are robust across a wide range of clinical presentations. Children may exhibit various complaints, such as speech-language delays, recurrent otitis media, hearing problems, or failed hearing tests, or they may not exhibit any overt auditory symptoms at all. Overly comprehensive test batteries may be impracticable in hectic clinical settings, and relying solely on complaint-driven testing in this situation runs the danger of under- or over-assessment. This presentation examines the idea of a simple yet thorough test battery for middle ear evaluation in children that can be used consistently, regardless of the current complaint.

The concept of a minimum test battery pertains to optimizing test selection to enhance diagnostic yield, efficiency, and interpretability, rather than diminishing diagnostic rigor. The presentation comprises utilizing three primary components: wideband acoustic immittance (WAI), acoustic stapedial reflex measures, and otoacoustic emissions (OAEs), all grounded in recent research and clinical practice. Collectively, these metrics offer supplementary insights into middle ear transmission properties, neuronal integrity, and cochlear condition, facilitating a more thorough understanding of middle ear function in children.



Figure Advancing Pediatric Middle Ear Assessment

WAI has emerged as a particularly powerful tool in pediatric populations, offering information about energy transfer through the middle ear across a wide range of frequencies. WAI is more sensitive to changes in the mechanics of the ear canal and middle ear as they grow, and it is better at finding middle ear problems like otitis media with effusion, negative middle ear pressure, level of fluid, and ossicular abnormalities than conventional 226-Hz tympanometry. Evidence from pediatric cohorts highlights WAI's ability to differentiate different middle ear pathologies, supporting its role as a primary tool for assessing the middle ear across infancy and childhood.

Acoustic stapedial reflex testing adds additional perspective on middle ear and auditory pathway function. When interpreted alongside WAI, reflex thresholds and growth functions can help distinguish between conductive, cochlear, and neural contributions. In pediatric populations, reflex measures remain underutilized, yet they offer valuable diagnostic clarification when behavioral responses are limited or inconsistent.

Otoacoustic emissions primarily reflect cochlear outer hair cell function but are critically influenced by middle ear status. Children's reduced or absent OAEs often indicate middle ear transmission deficits, not cochlear pathology. Integrating OAEs into a minimal test battery allows clinicians to assess the functional consequences of middle ear dysfunction on cochlear signal transmission and to monitor changes over time or following medical or surgical intervention.

This presentation evaluates current research findings, including clinical insights from published pediatric WAI studies, to demonstrate the strategic integration of these three metrics into a simplified, complaint-independent diagnostic methodology. Case examples will illustrate how this minimal test battery improves diagnostic confidence, minimizes superfluous testing, and facilitates clinical decision-making in prevalent pediatric middle ear conditions.

Ultimately, determining the "right balance" in pediatric middle ear evaluation requires moving beyond single-test paradigms toward integrated, developmentally suitable protocols. By adopting a minimal test battery based on WAI, acoustic stapedial reflex, and OAEs, clinicians are enabled to achieve a more efficient, sensitive, and clinically meaningful assessment of middle ear function in children, supporting early identification, targeted intervention, and improved long-term auditory outcomes.

Learning Objective: Upon conclusion of this presentation, participants will be able to recognize and implement an evidence-based minimal test battery, comprising wideband acoustic immittance, acoustic stapedial reflex measures, and otoacoustic emissions to evaluate middle ear function more efficiently and accurately in pediatric patients exhibiting diverse clinical presentations.

Planned Session 19

Pediatric Audiological Diagnosis
PS 19-4

Children's DPOAE Amplitude Differences Across Countries Suggest A Hidden Public Health Crisis

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Introduction: The amplitudes of otoacoustic emissions (OAEs) reflect the health of the outer hair cells in the inner ear. OAE amplitudes are sensitive to cochlear insults caused by ototoxic drugs, noise exposure, environmental factors, and aging (Reavis et al, 2008; Poling et al, 2019; Paping et al, 2022). Such insults may cause OAE amplitude reductions before resulting in hearing threshold shifts. Studies in the United States reported that OAE amplitudes are more robust among African than Caucasian Americans because of the protective effects of melanin (Boothalingam et al, 2018). The OAE amplitudes of Asian American are reported to be somewhat in between those of African and Caucasian Americans. Chung and colleagues (2026), however, showed that Cambodian children had significantly lower distortion production OAEs (DPOAEs) than American children, which contradicts the general observations across different race groups within the same country. The World Health Organization (2012) reported that the prevalences of hearing loss in different countries are negatively related to the gross national income per capita (GNI) and, for children, the literacy rates of their parents. WHO (2016) also suggest that 75% of hearing loss in low-to-middle income countries are preventable and 50% in high income countries are preventable. The purposes of the current study are: 1) to compare DPOAE amplitudes of children living in Brazil, Cambodia, Poland and the United States; and 2) to examine the relationship between the average DPOAE amplitudes of children living in different countries and their countries' GNI as well as other factors associated with social determinants of health. Such information may shed light on whether external factors related to social determinants of health may have affected children's cochlear integrity.

Method: A total of ~2000 children in Brazil, 493 children in Cambodia, ~1000 children in Poland, and 506 children in the US between 3 and 18 years were administered otoscopy, tympanometry, and DPOAE tests at 6 frequencies from 1.5-6 kHz. Present DPOAEs are defined as those with a signal-to-noise ratio of +6 dB. The DPOAEs of children with unremarkable otoscopy findings, Type A tympanogram, and present DPOAEs at 4 of 6 test frequencies were included in the analysis. Results from ears with excessive wax or tympanograms other than Type A were excluded. All children were tested using the same pieces of equipment which were calibrated before conducting the tests.

Results: The average DPOAEs of children from the four countries were calculated from the results at 1.5-6 kHz and 3-6 kHz. The results showed that the average DPOAE amplitudes increased from Brazil, Cambodia, Poland, to the United States. Although the differences were observed at all frequencies, the disparity is more prominent at higher frequencies than at lower frequencies.

The plot of average DPOAE amplitudes versus the four countries' gross national income per capita suggests that children living in countries with higher GNI generally have higher average DPOAE amplitudes (i.e, US and Poland).

Discussion:
In this study, the average DPOAE amplitudes of children increased from Brazil, Cambodia, Poland, and the US (i.e, observed pattern: Brazil < Cambodia < Poland < US). The US and Polish children we tested were primarily Caucasians whereas the Brazilian children were more diverse and the Cambodian children were homogeneously Asian. Based on the OAE pattern reported in the literature for children living in the same country, the predicted pattern should be Poland = US < Brazil < Cambodia. This is because individuals with higher amount of melanin in their skin/inner ear usually have higher OAE amplitudes (Dreisbach et al, 2007; Shahnaz, 2008, i.e,).

Our findings suggested that children living in high income countries (Poland and the US) tend to have higher DPOAE amplitudes than those in middle income countries (Brazil and Cambodia). As

countries with higher incomes tend to have superior education systems, stronger healthcare infrastructure, higher adult health literacy, better economic stability and income, better access to quality healthcare, safer and cleaner environments, and better social protection and employment, it is possible that factors associated with social determinants of health have affected children's DPOAE amplitudes which reflect cochlear health.

Future studies need to examine the causes for the DPOAE amplitude differences and to reduce/eliminate factors that may induce subclinical cochlear damage.

Planned Session 20

Speech & Language Disorders
(Voice Disorders & Hearing Loss)

PS 20-1

Perception of voice cues in school-aged children with hearing aids

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Hearing aids have been developed and optimized for enhancing speech perception, and clinical tests accordingly characterize device outcomes mostly based on measures of perception of words and sentences. Yet, there are other aspects of human speech than lexical content that hearing aids can also help with. The human voice, for example, provides talker-specific information such as the speaker's identity and their emotional state. Voice cues can also help enhance speech intelligibility in complex acoustic environments, for example, when they are used for the segregation of the target and background speech signals.

Voice-related perceptual mechanisms, especially related to vocal emotions, are important for the healthy development of children. Yet, since there are no established clinical tests for voice perception, it remains unknown to what degree children with hearing aids can perceive and make use of voice cues. Further, studies with children using hearing aids can be complicated due to the interactions of developmental aspects with hearing-related factors. In our research, we address this complexity by 1) focusing on two specific voice cues, voice pitch (F0, related to the glottal pulse rate) and vocal-tract-length (VTL, related to the speaker's size and speech formants), which have been shown to provide speaker gender information and which we can systematically alter from the same speaker using speech analysis-resynthesis technique; 2) developing custom-made child-friendly tests with game-like computer or humanoid robot interfaces; 3) using the baseline data collected from age-matched control groups with typical hearing to account for developmental effects and hence, isolate the effects of hearing loss.

In this talk, I will present our studies with school-age children and teenagers (5-18 years) with hearing aids and age-matched children and teenagers with typical hearing. In Study 1, we measured voice cue sensitivity for F0 and VTL, expressed in just-noticeable-differences (JNDs), using an adaptive staircase procedure. In Study 2, we measured voice gender identification where we have manipulated F0 and VTL cues to synthesize voices that could sound female or male. In Study 3, we measured vocal emotion recognition using pseudospeech recorded with three emotions: happy, sad, and angry. In Study 4, we measured speech-on-speech perception using child-friendly coordinate response measure (CCRM), with a single-talker masker.

Our results with children with typical hearing indicate that all aspects of voice perception tested in the studies show a strong development over many years. However, the individual data show large variation, perhaps indicating differences in individual developmental trajectories, and the age at which development plateaus also differs across the different voice tests. In children with hearing aids, in general, there is also a developmental trajectory; however, for some tests, this deviates from the developmental trajectory of the control group. Examples of this are the VTL JNDs, related to perception of formant frequencies, and hence, also of spectral resolution, as well as vocal emotion recognition. Individual data indicate that many children with hearing aids have scores at the age-expected levels, while some children's scores are lower. For those children with hearing aids whose scores fall outside the age-typical range, there is no clear hearing-related or demographic factor that can explain this difference.

The overall findings indicate that, once adjusted for age, many children with hearing aids seem to benefit from their hearing aids for voice perception. However, some aspects of voice perception, such as perception of VTL and vocal emotions, seem to be especially challenging. This challenge perhaps reflects the suprathreshold effects of sensorineural hearing loss and to what degree these can be compensated by hearing aids. The group data that show developmental trajectories imply a possibility that voice perception in children with hearing aids perhaps will continue beyond the age range of the present study. We hope our data will be of support for new clinical tests that can provide a comprehensive evaluation of the perceptual abilities of children with hearing aids so that the devices could be further improved.

Planned Session 20

Speech & Language Disorders
(Voice Disorders & Hearing Loss)

PS 20-2

Multifaceted voice characteristics in partial deafness individuals.

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Introduction

Hearing impairment affects a big part of the population (around 6%) worldwide and is continuously increasing. The reasons include industrial noise, respiratory infections, exposure to new technologies, intense city noise and elderly. Apart from hearing impairment, people affected often suffer from social isolation, communication problems, tendency to limit professional and social activities as well as depression and dementia. They also often develop voice problems that deteriorate the overall quality of living.

Partial deafness (PD) is a hearing impairment that is characterized by normal hearing thresholds at low frequencies and deep hypoacusis at high frequencies. In pure tone audiometry (PTA), it is represented by an abrupt vertical slope of the threshold curve at high frequencies. In contrary to other types of hearing impairments, traditional hearing aids in PD, despite sound amplification, do not improve speech discrimination. A real breakthrough in partial deafness treatment was first in the world partial deafness cochlear implantation performed by professor Henryk Skarżyński of Institute of Physiology and Pathology of Hearing in Warsaw, Poland. This first cochlear implantation in PD adult was successfully performed in 2002. Two years later first cochlear implant was received by PD child (partial deafness cochlear implantation, PDCI).

Materials and methods

Followed by that, at Institute of Physiology and Pathology of Hearing in Warsaw we performed the first worldwide in-depth studies of how PD affects voice. Our study showed that people with PD present voice abnormalities detected objectively (acoustic analysis using multi-dimensional voice program by Kay Pentax, MDVP). We examined voice samples of 392 individuals (229 PD patients and 163 in control groups). Voice samples were recorded in standardized conditions of anechoic chamber, using phonetically equilibrated speech samples in Polish.

Results

We concluded that PD in children leads to voice disturbances represented mainly by increase of fundamental frequency F0 and decrease of variation of fundamental frequency vF0. As for amplitude parameters, increase of amplitude variation vAm and decrease of smoothed amplitude perturbation quotient sAPQ, were noted. PD voice was also characterized by decreased noise-to-harmonic ratio NHR and soft phonation index SPI. Statistical changes vs normal hearing individuals were also observed in parameters of tremor, namely decrease of frequency tremor intensity index FTRI. In PD adults we noted statistical changes in most of parameters, particularly increase of vF0, Jitt, Jitta, APQ, sAPQ, RAP, vAm, Shim%, PPQ, sPPQ, DSH, NSH, DUV, and NHR. No statistical change was found in F0, SPI and VTI. Comparison between children and adults showed that, changes in children voices referred to fewer number of acoustic parameters, and they were more short-term. F0 was increased in children, whilst presented no statistical increase in adults. In children acoustic parameters values and directions of changes were more variable and presented more irregularity.

Further studies compared influence of PD on voice between females and males. Among 15 acoustic parameters of voice in females, 12 presented changes of statistical importance, in particular F0, Jita, PPQ, sPPQ, vF0, ShdB, Shim%, APQ, sAPQ, NHR and VTI. The remaining three parameters, SPI, DUV and NUV were also changed compared to the control group; however, statistical significance was not achieved. Compared to the control group, only F0 and SPI decreased, and all other parameters increased in PD females. In males, 14 parameters showed statistically significant changes: Jita, PPQ, sPPQ, vF0, ShdB, Shim%, APQ, sAPQ, vAm, NHR, VTI, SPI, DUV, and NUV. The only parameter that did not achieve statistical significance was F0. Compared to the control group, all parameters were increased in male patients with PD. None of the parameters showed significant decrease. Changes in the acoustic characteristics of voice, both in females and males with PD, were seen in the majority of parameters describing changes in frequency, amplitude, presence of noise components, irregularities, and voice breaks. Directions of changes in acoustic voice parameters were mostly the same in females and males with PD, showing increases that achieved statistical importance. Considering the study results and comparative statistical analysis we concluded, that acoustic parameters of voice in adults with PD did not present gender differences.

To double check the influence of PD on voice changes, apart from multi-dimensional voice program, we also performed analysis of the same voice samples using VOXplot objective voice assessment tool. The results achieved in the study showed that major differences can be observed in 13 VOXplot parameters measured in voice samples of PD adults compared to those in control group. Both multiparametric indices noted a statistical increase: AVQI achieved value 4,96 (SD=0,8) vs 0,35 in control group and ABI achieved value 6,24 (SD=0,89) vs 1,23 in control group. Both MDVP and VOXplot showed abnormalities in PD voices compared to control groups. Intraclass correlation coefficient analysis showed a high level of consistency between the results achieved in both systems.

As the next step of our study we analysed nasality in PD individuals. PD patients presented nasality of different degree, whilst control group individuals presented no nasality in their voices. In objective analysis within PD group 10 subjects presented nasality of degree 1 (50%), 6 individuals presented degree 2 (30%) and 4 individuals presented degree 3 (20%). Average nasality level was 21 dB (SD 4,5). Pearson test was then performed to look for correlations with the length of partial deafness. R index achieved value of 0,33 which

represents a positive correlation. We concluded that, similarly to other types of hypoacusis, PD causes nasality.
Conclusions
Partial deafness causes voice abnormalities vs control groups in adults and children. Changes in PD children refer to a fewer number of parameters and both values and directions of those changes present more irregularity. Changes in adults presented more stability and referred to more parameters. The presence of voice abnormalites in PD adults were confirmed by two separate and independent analyses performed by MDVP and VOXplot. No gender differences were found in voice abnormalities in PD adults. Similarly to other hearing impairments, PD appeared to cause nasality and its level correlates with the length of partial deafness.

Planned Session 20

Speech & Language Disorders
(Voice Disorders & Hearing Loss)

PS 20-3

The Current states of clinical audiology practiced by Speech-Language-Hearing-Therapists in Japan

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In Japan, the professions of speech-language pathology and audiology are combined into a single qualification: Speech-Language-Hearing Therapists (SLHTs), commonly referred to as STs. To become an ST, one must complete a specific educational track and pass a national examination provided by the Ministry of Health, Labour and Welfare. STs specializing in the hearing domain work mainly in hospitals and rehabilitation centers, but a few in educational settings. For children, STs focus on early language acquisition, which is vital for cognitive development in addition to hearing aids/cochlear implant fittings. For adults, STs address age-related hearing loss, which is linked to risks of depression and dementia. However, the number of STs work in audiological field remains limited. This is because the majority of STs are assigned to adult language and swallowing disorders. To address this issue, a committee of Japan Audiological Society conducted a survey to investigate the current state of clinical audiology practiced by STs and to identify potential solutions.

Planned Session 20

Speech & Language Disorders
(Voice Disorders & Hearing Loss)

PS 20-4

Mandarin Fricative-Affricate Nonsense-Word Test: From Lab to Market – Insights from Malaysia

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Malaysia is a multi-ethnic and multicultural country in which the Chinese community is the second largest ethnic group, comprising approximately 22.2% of the total population in 2025. Mandarin plays an important role among the Malaysian Chinese community, as it is the primary medium of teaching and learning in Chinese vernacular schools. In audiology clinics, speech perception assessment should ideally be conducted using a patient's native language to ensure accurate reflection of real-life performance. Although Mandarin speech perception tests have been developed in Taiwan and Mainland China, these materials may not be directly applicable to Malaysian Chinese populations due to differences in vocabulary usage and dialectal influences across regions.

Mandarin comprises 22 consonants, approximately half of which are high-frequency consonants, including five fricatives (/f/, /s/, /ʂ/, /ɕ/, /x/) and six affricates (/ts/, /tsʰ/, /tʂ/, /tʂʰ/, /tɕ/, /tɕʰ/). These high-frequency consonants play a crucial role in speech intelligibility. Conditions such as presbycusis, ototoxicity, and noise-induced hearing loss commonly affect high-frequency hearing sensitivity, resulted in reduced ability to detect or discriminate high-frequency consonants. Consequently, there is a clear need for a speech perception test that emphasizes high-frequency consonants to accurately assess speech perception abilities among Mandarin-speaking individuals in Malaysia.

Researchers from the National Universiti of Malaysia (Universiti Kebangsaan Malaysia – UKM) have been developing a Mandarin speech perception test that emphasizes high-frequency consonants since 2018. This presentation summarizes the development timeline of the Mandarin Fricative–Affricate (MFA) Nonsense Word Test, from its initial development phases through validation and commercialization.

In Phase I, the primary objective was to select high-quality digitally recorded nonsense word tokens as test materials. The stimuli consisted of three vowels (/a/, /i/, /u/) combined with six Mandarin fricative and affricate consonants (/s/, /ʂ/, /ts/, /tsʰ/, /tʂ/, /tʂʰ/, corresponding to "s", "sh", "z", "c", "zh", and "ch" in Pinyin), arranged in a vowel–consonant–vowel (VCV) format (e.g, /usu/, /asa/, /isi/). A total of 180 VCV tokens were recorded by one male and one female native Mandarin speaker. Acoustic waveform and spectrographic analyses were conducted to identify and exclude tokens containing idiosyncratic acoustic features. The remaining tokens were evaluated for sound quality by two Mandarin-speaking listeners with phonetic training using a five-point rating scale. Tokens rated as good (4) or excellent (5) were subsequently validated by 21 young native Mandarin-speaking adults. Tokens with the highest identification scores were selected as the final stimuli for the MFA Nonsense Word Test. The finalized test materials comprised seven female-talker lists and seven male-talker lists, with each list containing the same 18 VCV tokens presented in a randomized order.

In Phase II, the focus shifted to establishing preliminary normative data of the MFA Nonsense Word Test. Sixty-five native Mandarin-speaking young adults with normal hearing participated in this phase. A pilot study involving 10 participants was first conducted to identify seven presentation levels corresponding to performance levels of approximately 10%, 20%, 50%, 80%, and 90%. The remaining 55 participants (49 females, 9 males) completed identification testing at intensity levels ranging from 0 to 30 dB HL in 5-dB steps monaurally. Psychometric functions plotted across intensity levels revealed that identification performance increased significantly with intensity, approaching a plateau around 25 dB HL. No significant talker-gender effect was observed except at 5 dB HL. Confusion matrix analyses showed that the most frequent perceptual confusions occurred between alveolar and retroflex consonant pairs (e.g, "c–ch", "s–sh", and "z–zh").

Given the persistent alveolar–retroflex confusions observed at 30 dB HL and the lack of test–retest reliability data, Phase III aimed to further examine (i) confusion patterns at higher presentation levels, (ii) discrimination ability for alveolar–retroflex contrasts, and (iii) test–retest reliability. Forty-three normal-hearing native Mandarin-speaking young adults (26 females, 17 males; aged 20–24 years) participated. Identification and discrimination tasks were conducted in a sound-treated audiometric room using insert earphones at 65 dB HL. Discrimination ability was assessed for three consonant contrasts (/c–ch/, /z–zh/, and /s–sh/ in Pinyin). Results showed that participants achieved mean correct identification of 82.9%, with 14.8% place-of-articulation confusions and 2.3% manner-of-articulation confusions. Alveolar–retroflex confusions persisted even at higher presentation levels, although participants demonstrated discrimination ability significantly above chance. The average intraclass correlation coefficient (ICC) of 0.93 indicated excellent test–retest reliability.

Despite the test's clinical relevance, a language barrier existed for audiologists and audiology students who do not speak Mandarin. Therefore, Phase IV focused on developing and evaluating a structured training module for administering the MFA Nonsense Word Test. The module consisted of self-learning materials (a user manual and seven training videos) and supervised practical sessions. Content validation of the user manual by six audiologists yielded an

excellent content validity index (CVI = 0.83). Thirty-four audiology students participated in workshop training, with confidence and perception measured at three time points. Results showed significant improvements in confidence and perception following training.

This research project also led to the filing of five copyrights, highlighting the role of intellectual property protection in supporting the translation of academic work. In 2022, a collaboration was established with Demant Malaysia Sdn. Bhd, a global leader in hearing healthcare headquartered in Denmark, to commercialize the MFA Nonsense Word Test. Through this university–industry partnership, the MFA test has been embedded into Interacoustics Affinity Compact 4.0 equipment, enabling wider clinical access and direct public benefit. At present, 21 units of MFA test is available in hospitals in Malaysia.

In summary, researchers from UKM have systematically developed, validated, and translated the MFA Nonsense Word Test from laboratory research to clinical application and commercialization. Each phase addressed specific knowledge gaps and further strengthened the reliability and usefulness of the test. This work also highlights the importance of protecting intellectual property and transferring technology from universities to industry, so that research outcomes can be translated into practical tools. Through collaboration with industry partners, university-developed innovations can be made widely available and ultimately benefit patients, clinicians, and the broader community.

Planned Session 21

Cognition & Central Plasticity after Auditory Implants
PS 21-1

Cochlear implant in patients with inner ear malformations: Selection, surgery, results

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Objective. Complex middle and inner ear malformations are considered an important limitation for cochlear implant (CI) with traditional microscopic techniques. The aim of the present study is to describe our experience in the audiological and surgical management of patients with inner ear malformations that underwent cochlear implant.

Study Design. Case series with chart review of consecutive patients.

Setting. A tertiary referral center: University Hospital of Modena, Italy.

Subjects and Methods. Children with ear malformations that underwent cochlear implantation between January 2014 and January 2024 were selected. The audiologic and neuroradiologic assessment showed profound hearing loss and malformation of the middle and inner ear in all children. A complete review of anatomic features, surgical results, and audiologic outcomes was performed. The surgical technique is described step-by- step, and the outcomes are detailed.

Results. 25 patients (mean age, 3.6 years; range, 2.8-9 years) underwent a transattical/endoscopic-assisted CI procedure, in other cases a subtotal petrosectomy with cochlear implant was done. All children showed varying degrees of auditory benefit, as measured by routine audiometry, speech perception tests, and Categories of Auditory Performance scores (mean, 6). No immediate or late postoperative complications were noted.

Conclusion. The endoscopic-assisted approach proved to be successful in cochlear implantation. The direct visualization and magnification allow exploration of the tympanic cavity; confirmation of all anatomic features, with strict control of the course of the facial nerve, round window area, and inner ear; and performance of the cochleostomy with adequate insertion of the array.

Planned Session 21

Cognition & Central Plasticity after Auditory Implants
PS 21-2

Can cochlear implants reduce developmental risks of single sided deafness in children?

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Developmental risks of single sided deafness in children (SSD) stem from poor spatial hearing and include effects on language, academics, and cognitive functions. Early identification of SSD is possible through newborn hearing screening programs and we are learning that the etiology of childhood SSD is often due to unilateral auditory nerve aplasia and congenital cytomegalovirus amongst other congenital and acquired causes. Cochlear implants (CIs) in appropriate candidates provide the only effective means of stimulating the deprived ear. In this presentation, present data regarding the benefits and costs of CIs in children with SSD for brain and behavioral function will be shared. Multi-channel EEG at initial CI stimulation reveal a novel pattern of brain activity whereby one cortical hemisphere is dominant regardless of left or right sided SSD. Ongoing CI use appears to stimulate ear-driven development, resulting in more typical patterns of cortical responses from both ears and improved speech perception from the CI. Yet, asymmetric hearing remains and benefits of bimodal hearing are subtle even in children who had normal binaural hearing prior to the onset of SSD. These issues might explain why many children with SSD wear their CIs less frequently over time. Together, the data suggest that benefits of CI in children with SSD may not always be sufficient to motivate ongoing device use.

Planned Session 21

Cognition & Central Plasticity after Auditory Implants
PS 21-3

Cortical volumetric changes before and after cochlear implantation in postlingually deaf adults: Correlation with speech perception abilities

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This study aims to analyse the volumetric changes in brain MRI after cochlear implantation (CI), focusing on the speech perception in postlingually deaf adults. We conducted a prospective cohort study with 16 patients who had bilateral hearing loss and received unilateral CI. Based on the surgical side, patients were categorized into left and right CI groups. Volumetric T1-weighted brain MRI were obtained before and one year after the surgery. To overcome the artifact caused by the internal device in post-CI scan, image reconstruction method was newly devised and applied using the contralateral hemisphere of the pre-CI MRI data, to run FreeSurfer. We conducted within-subject template estimation for unbiased longitudinal image analysis, based on the linear mixed effect models. When analyzing the contralateral cerebral hemisphere before and after CI, a substantial increase in superior frontal gyrus and superior temporal gyrus (STG) volumes was observed in the left CI group. A positive correlation was observed in the STG and post-CI word recognition score in both groups. As far as we know, this is the first study attempting longitudinal brain volumetry based on post-CI MRI scans. We demonstrate that better auditory performance after CI is associated with structural restoration in central auditory structures.

Planned Session 21

Cognition & Central Plasticity after Auditory Implants
PS 21-4

Functional Imaging for Diagnostics and Prognostics of Cochlear Implantation

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While pediatric cochlear implants (CIs) significantly improve auditory perception, clinical outcomes remain highly variable. Traditional behavioral assessments often fail to capture the underlying neural mechanisms driving this divergence. Functional near-infrared spectroscopy (fNIRS) offers a safe, non-invasive, and motion-tolerant neuroimaging solution to bridge this gap, providing real-time insights into cortical plasticity and auditory processing.
Recent findings demonstrate that while CI users may achieve comparable accuracy in basic sound discrimination, they exhibit distinct, asymmetric neural activation patterns—specifically a greater reliance on left-hemisphere compensatory mechanisms during complex speech tasks. Crucially, coordination between specific auditory and higher-order cognitive regions serves as a powerful neural predictor of behavioral success. Identifying these synchronous activation patterns allows for the objective assessment of a child's progress post-implantation. This neuroimaging approach holds significant clinical value for developing targeted, personalized rehabilitation strategies that address both fundamental auditory functions and the cognitive demands of language processing.

Planned Session 22

Recent Advances in Hearing Aid Technology
PS 22-1

Multibeam processing technology improves hearing group conversations in a real-world food court environment

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Hearing aid wearers often report difficulty with their ability to communicate effectively in noisy settings, which can lead to increased listening effort, fatigue, and social withdrawal. While laboratory studies provide controlled environments for testing hearing aid features, they often fail to capture the complexities of real-world listening scenarios. This study aimed to address this gap by evaluating a novel multibeam processing technology designed to improve signal-to-noise ratio by adaptively tracking multiple talkers in real-time during group conversations in noisy environments. Using the PICO framework, this study was designed as follows:

Population: Twenty experienced older adult hearing aid users with sensorineural hearing loss

Intervention: The Signia Pure C&G 7IX receiver-in-the-canal hearing aid using advanced adaptive beamforming and scene analysis architecture that can steer multiple beams to active speakers within the front hemi-sphere simultaneously.

Comparison: The same hearing aid with the multibeam processing turned off, and set instead to use split processing technology with monaural beamformers.

Outcomes: Participants listened to scripted conversations between two researchers and rated their experience using a 7-point Likert scale for 10 conversation criteria, including speech intelligibility, sound quality, background noise reduction, and listening effort. Participants also provided preference ratings for seven aspects of the conversation while the hearing aid programs were alternated.

Results: Both hearing aid settings received positive ratings across all criteria, indicating general satisfaction with the aid's performance in noisy environments. However, the intervention setting with multibeam processing technology was rated significantly higher for five key criteria: understanding, clarity, focus, listening effort, and background noise reduction. Preference ratings revealed that 80% of participants favoured the intervention program overall, with significant preference for all seven rated aspects, including sound quality, speech clarity, and reduced listening effort.

Conclusions: By testing the hearing aid in an ecologically valid environment that provided a challenging and realistic setting, characterized by diffuse background noise and reverberation, the study demonstrated that multibeam processing technology is highly effective in complex listening environments, providing significant benefits to hearing aid wearers during group conversations in noisy settings.

Contibutors: Niels Soegaard Jensen, Homayoun Kamkar Parsi, Sascha Bilert, and Susan Scollie

Planned Session 22

Recent Advances in Hearing Aid Technology
PS 22-2

Speech perception outcomes with microphone & receiver in the ear (M&RIE) hearing aids in individuals with hearing impairment

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The advancements in hearing aid (HA) technology have been also towards capturing the sounds effectively by preserving natural acoustic cues to improve listening experience. Conventional placement of microphones in the behind the ear (BTE) and receiver in the ear (RIE) hearing aids is in the casing of the device that is worn behind the ear. This does not consider the pinna focus advantage. The placement of microphone i.e, in the casing of the device or/ and at the entrance of the ear canal, has an effect on localization and speech perception. To address this aspect, an additional microphone is being included along with the traditional receiver in the ear hearing aids i.e, the Microphone & Receiver in the Ear (M&RIE) technology. This configuration intends to preserve individual pinna cues in the RIE designs and facilitate speech perception and localization.

There is literature to support the merits of pinna focus advantage. However, research-based evidence is required to ascertain these facts. There is a dearth of research reports on the comparison of performance with M&RIE and RIE. In the present research, an effort was made to compare the performance of the traditional RIE and M&RIE in adults (n=28) with bilateral mild to moderately severe sensorineural hearing loss.

The performance of each participant in terms of speech identification scores (SIS) in quiet, speech identification in noise (SNR-50), speech quality, and localization were measured in two aided conditions, 1) RIE hearing aid with a standard receiver (RIE-SR) 2) the same hearing aid with a Microphone & Receiver in the Ear (RIE-MR). Both the aided conditions were programmed identically except for the use of standard receiver and microphone & receiver in the ear which was a variable. Prior to measuring the performance in the two aided conditions, the real ear verification was performed to ensure appropriate gain matched to NAL-NL2.

Method: The speech identification in quiet and in noise was evaluated in sound treated rooms using phonemically balanced sentences in Kannada language. The speech was presented in a sound field using a calibrated audiometer. The presentation level of speech was at 45 dB HL. The speech identification scores were obtained in quiet. The speech perception in noise was assessed by measuring the signal-to-noise ratio required for 50% sentence recognition (SNR-50). The presentation level of speech was constant at 45 dB HL. The subjective speech quality was assessed using a 10-point rating scale for clarity, pleasantness, loudness, naturalness, and overall impression.

The horizontal plane localization was assessed using broadband white noise as stimulus in a localization set-up. The performance on localization task was quantified using accuracy and RMS error measures. Statistical analyses were performed between the two HA conditions using appropriate statistics.

Result: The speech identification scores in quiet were significantly higher in the RIE+MR condition compared to the RIE+SR condition ($p < 0.001$). Similarly, SNR-50 values were significantly lower in the RIE+MR condition, demonstrating superior speech-in-noise performance with the M&RIE configuration compared to the RIE+SR condition.

The speech quality ratings revealed statistically significant improvements for the RIE+MR condition across all evaluated parameters of quality. A more natural and clearer listening experience was reported by the participants with M&RIE condition.

There was an improvement in localization with M&RIE technology. It was noted that the localization accuracy was significantly higher and the RMS error was significantly lower in the RIE+MR condition compared to the RIE+SR condition.

Inference: The findings of this study demonstrate that including a third microphone within the receiver-in-ear hearing aid configuration provides significant perceptual benefits without altering audibility. By capturing sound at the entrance of the ear canal, M&RIE technology preserves individual pinna-related acoustic cues (to some extent) that are essential for speech perception, spatial localization, and natural sound perception. Overall, the results highlight the importance of microphone placement in optimizing hearing aid outcomes.

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Planned Session 22

Recent Advances in Hearing Aid Technology

PS 22-3

Speech-in-noise listening in hearing aids with DNN-based real-time sound cleaning

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Despite decades of progress in electroacoustic design and signal-processing algorithms, speech understanding in complex, noisy listening environments remains a primary limitation of contemporary hearing aids. Conventional noise reduction approaches, including directional microphone processing, provide only modest improvements to speech intelligibility in the real world and often degrade performance under adverse signal-to-noise ratios (SNRs). Recent advances in hearing aid architectures incorporating deep neural networks (DNNs) enable data-driven modeling of speech and noise characteristics, offering the potential to improve speech-in-noise performance beyond the constraints of traditional, rule-based noise reduction strategies. In the present study, we evaluated the efficacy of a commercially available DNN-enabled hearing aid in a free-field speech understanding task using the coordinate response measure (CRM) corpus with noise background. Target speech was presented from five possible locations on separate trials, and background was presented simultaneously in the surrounding field. In addition, listeners performed separately on a listening effort task (ACALES; Adaptive Categorical Listening Effort Scaling) in which effort was assessed as a function of varying SNRs. Finally, listeners were provided subjective questionnaires assessing speech and other sound qualities. For each assessment, we compared multiple configurations of the DNN-enabled device (DNN-on versus DNN-off) as well as comparison devices with traditional noise reduction technologies. Results demonstrated a significant benefit of DNN-based noise reduction, evidenced by higher CRM accuracy across all target azimuths. The largest improvements in behavioral performance were observed for laterally presented targets (±120°), where the DNN-enabled configuration significantly outperformed both the same device with the DNN processing disabled and the comparison hearing aid devices. The ACALES results showed a significant improvement in SNR for comparable levels of listening effort with the DNN enabled compared to disabled, and subjective ratings for qualitative measures of speech quality were significantly higher than in devices without the DNN-based noise reduction. The results reported here demonstrate the benefits of a DNN noise reduction feature presently available to improve listener performance across multiple objective measures while retaining subjectively preferred sound qualities. Ongoing work is investigating the limits of this new technology in ever complex listening environments.

Planned Session 22

Recent Advances in Hearing Aid Technology

PS 22-4

"Free us from noise": Based on the evolution of deep learning technology

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Modern hearing aids provide significant benefit in quiet environments, but many users still experience difficulty understanding speech in complex acoustic situations such as multi-talker environments, reverberant spaces, and background noise. Conventional approaches based on fixed beamforming, spectral subtraction, and rule-based dynamic range compression often fail to provide sufficient speech clarity while preserving natural sound quality.

In this presentation, we introduce a next-generation hearing aid processing framework based on artificial intelligence-driven speech enhancement combined with adaptive dynamic range control. The proposed system is designed to improve speech intelligibility in real-world listening conditions while maintaining low latency and low power consumption suitable for wearable devices.

Unlike conventional directional microphones that rely only on spatial filtering, the proposed approach integrates spatial cues, spectral features, and temporal speech characteristics to selectively enhance target speech while suppressing competing sounds. The system also incorporates an adaptive loudness processing stage that optimizes amplification across frequencies according to the user's hearing profile.

A key feature of the proposed framework is its ability to provide selective enhancement depending on the relative position and distance of sound sources, enabling improved performance in situations where traditional beamforming is limited. This allows more robust speech understanding in environments such as conversations in noise, public spaces, and group discussions.

Prototype hearing aids implementing the proposed processing were evaluated in laboratory and real-world listening scenarios. Preliminary results show improved speech clarity and reduced listening effort compared with conventional digital hearing aids, particularly in multi-speaker environments.

The presented approach demonstrates the potential of AI-based signal processing to overcome long-standing limitations of hearing aid technology and to enable more natural and effective listening assistance for users with hearing loss.

Planned Session 23

Cutting-edge Research in Vestibular Function and Disorders

PS 23-1

Potential application of Hydrops MRI in otology

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Objective. Differentiation between sudden sensorineural hearing loss (SNHL) and Meniere's disease (MD) can be challenging, as both may present with overlapping symptoms, particularly in cases that do not fully meet the diagnostic criteria for either disorder. Additionally, discrepancy between clinical MD and radiological endolymphatic hydrops (EH) has emerged since the development of Hydrops MRI. This study aims to explore the potential application of Hydrops MRI in otology.

Methods. All patients with inner ear disorders underwent an inner ear test battery comprising audiometry, cervical and ocular vestibular-evoked myogenic potential (cVEMP and oVEMP) tests, and bithermal caloric test, followed by Hydrops MRI.

Results. The sensitivity (69-92%) and specificity (78-96%) values varied from each laboratory for detecting EH via Hydrops MRI, probably due to candidate selection, various equipments and the grading system employed.

Conclusion. The application of Hydrops MRI allows 1) to differentiate between MD and sudden SNHL, i.e. unclassified acute-onset SNHL; 2) to determine the affected side of EH i.e. delayed EH or asymptomatic EH; and 3) to confirm the EH concomitant with other disorders i.e. otosclerosis or cranial nerve schwannoma. Notably, not all differentials for EH can be visualized on Hydrops MRI. One of the existing gaps to be filled is that updated Hydrops MRI fails to identify distortion, i.e, rupture, collapse, fistula or fibrosis of the inner ear compartments, akin to what histopathological evidence can demonstrate. Hence, enhanced ultrahigh resolution of Hydrops MRI is required for identifying fine structures of the inner ear compartments, which is in evolution.

Planned Session 23

Cutting-edge Research in Vestibular Function and Disorders

PS 23-2

Direct assessment of gravity sensors to improve peripheral vestibular diagnosis

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Current vestibular assessments for patients with dizziness rely heavily on the sequential activation of peripheral sensors, central brainstem relay neurons, and alpha motor neuron pools innervating the neck, extraocular, or postural musculature. This indirect approach can miss peripheral pathology at the level of the otolith organs (utricle and saccule). Addressing the limitations of these traditional methods, a non-invasive, direct assessment of vestibular otolithic sensors could greatly advance the field and ultimately improve care for patients with dizziness complaints. We hypothesize that short-latency linear vestibular sensory evoked potentials (L-VsEPs) can be elicited in humans using linear acceleration transients and recorded non-invasively through far-field evoked potential electrophysiology from the scalp. Building on our animal work, we developed a newly designed head motion system that generates linear acceleration transients and enables far-field recordings in human participants. Importantly, pilot use of our newly designed head motion system demonstrates feasibility for clinical translation as the system is compact, non-invasive, and delivers short, low-amplitude motion pulses that are well tolerated. Furthermore, the present study focuses on identifying the optimal stimulus for human L-VsEPs by systematically varying either peak acceleration or jerk (rate of change of acceleration). Preliminary data indicate that L-VsEP responses are more linked to jerk than to acceleration, consistent with otolith transduction dynamics described in animal models. This talk will introduce the L-VsEP concept for a general audiology audience and show how it complements existing measures. Attendees will gain a clear understanding of what L-VsEPs measure and how this approach can evolve into a clinic-potential assessment to improve diagnosis and management of balance disorders.

Planned Session 23

Cutting-edge Research in Vestibular Function and Disorders

PS 23-3

Live imaging of the inner ear in animal model of Meniere's disease

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The main histopathological feature of Meniere's disease is endolymphatic hydrops. Recently, many reports have supported the possibility that vasopressin (VP) is closely linked to the formation of endolymphatic hydrops in Meniere's disease. Based on this, we developed a clinically relevant animal model of Meniere's disease, in which a VP type 2 receptor agonist was administered after electrocauterization of the endolymphatic sac. Here, we report live imaging of the internal structure and functional changes of the inner ear during an acute attack of Meniere's disease using our animal model. In this model, the developing endolymphatic hydrops was visualized in vivo using optical coherence tomography, there was no rupture of Reissner's membrane, and low-tone hearing loss and vertiginous attacks were observed. These results indicate that an acute attack might be caused by the abrupt development of endolymphatic hydrops. This is the first report of live imaging of developing endolymphatic hydrops during an acute attack of Meniere's disease.

Planned Session 23

Cutting-edge Research in Vestibular Function and Disorders

PS 23-4

Prospect of gene therapy for vestibular dysfunction

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For many patients with genetic deafness, the disease burden extends far beyond hearing loss. Dizziness, imbalance, delayed motor milestones, increased fall risk, and cognitive fatigue are hallmarks of vestibular dysfunction — a frequent yet systematically underrecognized feature of hereditary hearing disorders. Although over 150 genes have been implicated in sensorineural hearing loss, and many are co-expressed in both cochlear and vestibular sensory epithelia, vestibular function is still rarely assessed in clinical practice and almost never incorporated as a primary endpoint in gene therapy trials. This presentation argues that the vestibular system deserves far greater consideration—both as a window into disease mechanisms and as a legitimate therapeutic target in its own right.

This talk will review the prevalence and patterns of vestibular involvement across genetic hearing loss etiologies, the underlying pathophysiological mechanisms and the principles of inner ear gene therapy. We will contrast gene replacement strategies with gene correction approaches. Each strategy carries distinct advantages and limitations regarding packaging capacity, transgene expression durability, immunogenicity, surgical delivery routes, and the fundamental challenge of reaching the appropriate cell populations within the critical therapeutic window.

As a concrete translational example, we will focus on clarin protein deficiencies. Biallelic loss-of-function mutations in CLRN1 cause Usher syndrome type IIIA, characterized by progressive sensorineural hearing loss, retinitis pigmentosa, and variable vestibular impairment. In mouse models, Clrn1 knockout results in congenital profound deafness with largely preserved vestibular function. Loss-of-function mutations in CLRN2 cause progressive non-syndromic hearing loss (DFNB117) with relatively spared vestibular function. Clrn2-deficient mice have progressive hearing loss with preserved vestibular function. Notably, combined Clrn1/Clrn2 deficiency in mouse models produces profound deafness associated with severe vestibular dysfunction, revealing overlapping yet non-redundant roles for these two proteins. What makes the clarin paradigm particularly instructive for the field is how differently the cochlear and vestibular end-organs respond to gene therapy, and how critically therapeutic outcomes depend on the timing of intervention relative to the natural course of degeneration in each organ. This dissociation carries a powerful translational message: even when the window for auditory rescue has closed, vestibular gene therapy may still yield meaningful functional benefit for the patient.

We therefore argue that the field urgently needs to integrate systematic vestibular phenotyping into the evaluation of genetic hearing loss. Comprehensive genotype–phenotype correlations that include vestibular status have the potential to refine candidate selection for gene therapy, predict organ-specific therapeutic windows, and inform the choice between replacement and correction strategies. Instrumental vestibular assessments combined with functional evaluations and validated patient-reported outcome measures, can provide both objective biomarkers and clinically meaningful endpoints for future trials.

As inner ear gene therapy advances from preclinical proof-of-concept to first-in-human studies, we have a unique opportunity to treat the whole labyrinth—not just half of it.

Planned Session 24

Hyperacusis/Misophonia
PS 24-1

Using resting-state fMRI to understand the differences between hyperacusis and misophonia

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Misophonia and loudness hyperacusis are debilitating sound intolerance conditions characterized by extreme emotional and physiological responses to everyday sounds. Although they frequently co-occur, their distinct neural correlates remain poorly delineated. In data-driven analysis, we identified neural connectivity–based markers of hyperacusis, misophonia, and co-occurring misophonia and hyperacusis compared to controls using resting state functional magnetic resonance imaging. Participants were rigorously categorized using structured interviews into misophonia-only (MI, n=27), misophonia with hyperacusis (MH, n=24), hyperacusis (HYP, n=14), and control (CTR, n=25) groups.
The hyperacusis group demonstrated distinct patterns of spontaneous functional connectivity spanning major large-scale networks, including the default mode, limbic, frontoparietal control, and somatomotor systems. Core misophonia-related connectivity changes were evident in both MI and MH groups, particularly within salience, somatomotor, and frontoparietal control networks, implicating disruptions in emotion regulation, motor inhibition, and attention. Misophonia-only participants showed distinct abnormalities in basal ganglia and subcortical circuits, supporting neural dissociation from the comorbid condition. In contrast, the comorbid group exhibited unique alterations in higher-order visual networks, potentially reflecting hyperacusis-related processes.
These results clarify the neurobiological distinction between misophonia and hyperacusis and highlight the need for precise diagnostic differentiation in both research and clinical practice. By identifying brain networks specifically associated with misophonia, our findings offer practical guidance for developing targeted, neuroscience-informed treatments. They further lend support to psychology-based interventions aimed at modulating dysfunctional connectivity within salience and cognitive control circuits in misophonia.

These results have been published recently.
Ajmera, S, Khan, R. A, Kim, G, Jain, N, Castro, A, Berenbaum, H, & Husain, F. T. (2025). Altered brain connectivity patterns in misophonia, with and without hyperacusis. Hearing Research, 109521.
Ajmera, S, Khan, R. A, Jain, N, Kim, G, Castro, A, Berenbaum, H, & Husain, F. T. (2025). Sparse machine learning of resting-state fMRI reveals brain-wide dysconnectivity in hyperacusis. Communications Medicine.

Planned Session 24

Hyperacusis/Misophonia
PS 24-2

Characteristics of Misophonia in the Korean Population

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This study investigated sound triggers, emotional responses, and audiological correlates of misophonia as part of an interdisciplinary cross-national project, reporting data from South Korea. A total of 103 individuals with misophonia and 45 controls completed validated questionnaires and discomfort index ratings for trigger and neutral sounds. Audiological assessments included pure-tone audiometry and loudness discomfort levels (LDLs).Pure-tone thresholds did not differ between groups, whereas LDLs were significantly lower in the misophonia group. The misophonia group showed significantly higher discomfort index scores for both trigger sounds and neutral sounds compared to controls ($p < 0.001$). Blackboard sounds elicited the highest discomfort. Hyperacusis, defined by HQ score > 22 and mean LDL < 77 dB, was identified in 11.7% of the misophonia group and was associated with significantly greater overall discomfort. HQ scores were positively correlated with discomfort index ($r = 0.536$, $p < 0.001$). Tinnitus was more prevalent in the misophonia group but was not associated with discomfort severity.Individuals with misophonia exhibit heightened sound-related discomfort extending beyond trigger sounds, with hyperacusis significantly amplifying overall discomfort, underscoring the need for comprehensive audiological evaluation.

Planned Session 24

Hyperacusis/Misophonia
PS 24-3

Clinical audiology practice patterns for sound hypersensitivity disorders

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Sound hypersensitivity disorders are characterized by the perception that ordinary sounds are uncomfortably loud, emotionally distressing, physically painful, scary, or some combination of all. These symptoms often have detrimental and life-altering psychosocial consequences. Despite the debilitating nature of sound hypersensitivity disorders, audiologists lack sensitive diagnostic tools and widely effective treatments. In this seminar, we will discuss barriers to effective audiological management of sound hypersensitivity disorders, with an emphasis on loudness and pain hyperacusis. We will discuss proposed neural mechanisms of these disorders, diagnostic approaches, and clinical management strategies.

Planned Session 24

Hyperacusis/Misophonia
PS 24-4

The effect of hyperacusis and sound-induced auditory fatigue on work ability and sick leave among women

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Background and aim
The prevalence rates of hearing-related symptoms such as hyperacusis and sound-induced auditory fatigue are high among women working in communication-intensive occupations. However, evidence on consequences for work function is limited. Therefore, this project investigated whether these symptoms are associated with poor work ability or self-reported sick leave. A particular focus was on women working in preschool or school.

Methods
The project included two sub-studies: (1) a cross-sectional survey performed in 2023, which was a follow-up of a longitudinal cohort study initiated in 2013–2014, and (2) a qualitative focus group study performed in 2024.
In sub-study 1, the quantitative survey study, a total of 6,430 women responded to the survey (response rate 64%). Half of the study population was initially randomly selected from the general population in the Region of Västra Götaland, Sweden. The other half was women with a preschool teaching qualification. The total sample analysed was 4,252 women 34–65 years old with a mean age of 53 (SD 8 years), excluding women older than 65 years and/or women who were retired. Hyperacusis was measured using the Hyperacusis Questionnaire (HQ; cut-off ≥22), while sound-induced auditory fatigue was measured using a single item and reporting occurrence at least a few times each week. The outcome on poor work ability was measured using the single item Work Ability Score (poor: 0–5) from the Work Ability Index. The outcome self-reported sick leave was measured using a single item and defined by yes-responses to current sick leave. We performed binomial generalised linear models to estimate relative risks. Because log-binomial models did not converge, we report odds ratios (OR). Given the low outcome prevalence (9–10%), ORs approximate RRs. We stratified by work in the preschool or school sector versus other sectors (non-preschool/school occupations). The models were adjusted for age, socioeconomic status, self-reported burnout, depression, hearing loss, and tinnitus. For the outcome of poor work ability, we also adjusted for current sick leave.

In sub-study 2, the qualitative study, we used focus group interviews to collect data and analysed the data using inductive thematic analysis. Two researchers performed the interviews. The interviews were professionally transcribed. The data was then analysed by the same two researchers. The analytical steps included reading and re-reading the transcripts, coding the data with focus on latent (interpretive) meaning, suggestions for initial themes, revision of themes, definitions of the themes and selection of illustrative quotes for each theme. Two additional researchers took part in the later stages of the analysis and refined the definitions of the themes.
In total, 18 women were included in four focus groups. The included women were selected from study 1 using a purposive sampling to ensure that they had experience of hyperacusis and/or sound-induced auditory fatigue, that they were currently working at least part-time, that they work or have previously worked in preschool, and that they were in working age (65 or younger) and not retired. We also made sure to include women with a range from poor to good self-reported work ability in order to capture different aspects of how hearing-related symptoms might affect the working situation.

Results

The quantitative survey study showed that the prevalence of the outcome poor work ability and sick leave were 9-10% and similar both in the preschool and school strata, as in other sectors. However, the occurrence of the predictors hyperacusis and/or sound-induced auditory fatigue was markedly higher in the preschool and school strata: hyperacusis 36%, sound-induced auditory fatigue 56%, and both combined 31%, as compared with in other sectors: 23%, 28%, and 16% respectively. Also, the statistical models showed that among women working in preschool or school, hyperacusis was associated both with poor work ability (OR 2.33; 95% CI 1.54–3.51) and sick leave (OR 1.62; 1.01–2.60). Sound-induced auditory fatigue showed similar patterns for both poor work ability (OR 2.79; 1.72–4.52) and sick leave (OR 1.84; 1.09–3.10). The association was strongest for women who both had reported hyperacusis and sound-induced auditory fatigue. The risk for poor work ability was OR 3.97; 2.23–7.06, and for sick leave OR 2.15; 1.18–3.92). Associations were not statistically significant among women working in other sectors.
The qualitative findings identified five main themes: (1) pedagogical work is hindered by an adverse sound environment and difficulties meeting central listening/cognitive demands; (2) acute stress reactions and negative emotions are triggered by loud sounds (e.g, screaming); (3) accumulating fatigue due to insufficient recovery opportunities at work, shifting recovery demands to private life; (4) persistent worry about own and children's hearing; and (5) predominantly individual coping strategies (avoidance behaviour, self-provided hearing protection, adapting tasks/hours) with limited organisational support.

Discussion and conclusions

Hyperacusis and sound-induced auditory fatigue are associated with increased risks of poor work ability and sick leave in communication-intensive education settings (preschools and schools), but not in other sectors. The qualitative study lends support to this finding as participants describe being exposed to an adverse sound environment, being hindered in their central working tasks, experiencing stress reactions triggered by the sound environment and having insufficient recovery opportunities at work. The findings also support prioritising organisational noise prevention at these workplaces, providing adequate recovery opportunities during working hours and providing access to hearing assessment and hearing rehabilitation. Including noise prevention, hearing conservation as well as hearing rehabilitation may support sustained work participation and reduce sickness absence in the educational sector.
In conclusion, there is a need for recognition and prevention of the negative impact from hearing-related symptoms on work functioning and work participation among workers in the educational sector.

Planned Session 25

To Tell or Not to Tell:
Navigating Hearing Loss Stigma

PS 25-1

The Big Picture: Overview of Our Research on Hearing Loss Stigma

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Stigma has long been implicated as a reason why adults with acquired hearing loss are slow to seek help and reluctant to take up and use hearing devices. In this research we aimed to develop a comprehensive understanding stigma using the Major and O'Brien (2005) identity threat model of stigma.

The key research questions were:
1. When and how is stigma-induced identity threat: (a) experienced by older adults with hearing loss and their families, and (b) responded to by older adults with hearing loss and their families in daily life?
2. What are the associations between adults with hearing loss and their families' experiences of stigma-induced identity threat, their responses to stigma-induced identity threat, and hearing aid use?

The research was conducted in two-phases using multiple methods. Phase 1 was an in- depth study involving 20 dyads of adults with hearing loss and their family members. Methods used were qualitative semi-structured interviews, Ecological Momentary Assessment (EMA), Conversation Analysis (CA), and self-report questionnaires. In addition 25 Hearing Care Professionals were interviewed about their perceptions/experiences of stigma related to hearing loss and hearing aids.

Phase 2 was a cross-sectional online survey of 331 adults with hearing loss and 313 family members from Australia, the United States of America and the United Kingdom.

In this special session the results of the program of research are presented with findings mapped onto the Major and O'Brien model of stigma-induced identity threat.

Planned Session 25

To Tell or Not to Tell:
Navigating Hearing Loss Stigma

PS 25-2

Hearing Loss Stigma: Experiences from Adults with Hearing Loss, Families, and Professionals

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Previous research has highlighted stigma among adults with HL, however, no work has simultaneously incorporated the perspectives of adults with hearing loss (HL), their family members, and hearing care professionals (HCPs). This study aimed to explore when and how stigma is experienced by adults with acquired HL and whether family members experience affiliate stigma in Australia.

Using a qualitative descriptive design, semi-structured interviews were conducted with adults with HL (n=20), their nominated family members (n=20), and HCPs (n=25). Thematic analysis generated insights into the perceptions, emotions, and contextual triggers related to hearing loss and hearing aid (HA) related stigma.

Findings revealed two core themes regarding stigma for adults with HL:
(1) the association of HL and HAs with stereotypes of ageing, disability, weakness, reduced intelligence, and difference.
(2) varied views across participant groups about the existence and experience of stigma.

Adults with HL and family members frequently reported that HL, more so than HAs, was linked to negative assumptions of decline and vulnerability. Adults described feeling judged, excluded, or treated as less capable in social or workplace settings when communication difficulties became noticeable. Many expressed embarrassment, sadness, or worry, while others reported being unbothered.

Adults with HL tended to focus on stigma related to the loss itself whereas HCPs mostly focused on stigma associated with the visibility of HAs. In contrast, most adults with HL and family members viewed modern HAs positively, describing them as small, discreet, and acceptable, whereas HCPs perceived appearance as a major barrier to uptake.

Specific situations played a central role in stigma experiences. Adults reported feeling more comfortable in peer groups or workplaces where others also had HL. Conversely, healthcare encounters were frequently described as stigmatising: participants recounted being shouted at, rushed, or ignored by healthcare workers and receptionists, which heightened feelings of difference and embarrassment. Experiences within families varied—some adults felt understood and supported, while others described frustration, teasing, or dismissive reactions from relatives.

Family members generally reported minimal affiliate stigma, rarely feeling embarrassed or negatively affected by their relatives' HL or HA use. However, some acknowledged awareness of societal stigma and recognised that their partners or parents sometimes internalised negative beliefs.

Overall, the findings highlight a mismatch between what adults with HL experience and what HCPs perceive as the central source of stigma. Interventions should therefore prioritise addressing attitudes toward HL itself and improving communication behaviours in healthcare contexts.

Planned Session 25

To Tell or Not to Tell:
Navigating Hearing Loss Stigma

PS 25-3

Responding to the Stigma of Hearing Loss: The Hidden Work of Adults with Hearing Loss, Families, and Clinicians in Hearing Care

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Stigma associated with hearing loss (HL) and hearing aids (HAs) continues to shape how adults with HL, their families, and hearing care professionals (HCPs) navigate communication in everyday life. Adults frequently face the dilemma of whether to disclose their HL or HA use, balancing concerns about social identity, anticipated reactions, and the visibility of devices. This study explored how these three stakeholder groups respond to and manage stigma in hearing care. Semi-structured interviews were conducted with 20 adults over 50 years of age with acquired HL, 20 family members, and 25 HCPs. Using a qualitative descriptive approach and thematic analysis, three overarching themes were identified:
1) Some people tell others about their HL and HAs, while others do not: Adults with HL varied widely in their comfort with disclosure, with some openly acknowledging their HL and others preferring to conceal it, sometimes for extended periods. Family members also differed in whether they disclosed on behalf of the adult, weighing respect for privacy against the risk of communication breakdowns. HCPs observed that disclosure was influenced by personal and contextual factors, including personality, age, gender, degree of HL, and prior experience with HAs.

2) Telling or not telling depends on the situation: Adults were more likely to disclose HL to close family and friends and trusted networks, close friends, or others with similar experiences, and less likely in unfamiliar or socially sensitive contexts. Disclosure was often driven by communication need, particularly when understanding was critical or listening environments were challenging. Family members similarly adopted selective disclosure strategies. HCPs described how situational cues, perceived importance of the interaction, and the adult's confidence shaped these decisions.

3) People deal with the stigma of HL and HAs in different ways: Adults and families engaged in a range of strategies to manage stigma, including humour, selective disclosure, pretending to understand, concealing devices, withdrawing from interactions, or delaying help-seeking and HA uptake due to concerns about ageing, appearance, or negative societal perceptions.
These findings highlight the often invisible, ongoing work undertaken by adults and families to negotiate stigma in daily life. Recognising this hidden labour has important implications for practice. Hearing care must move beyond a device focused model towards person- and family-centred approaches that explicitly acknowledge stigma, support adaptive coping, and create safer conditions for disclosure and participation.

Planned Session 25

To Tell or Not to Tell:
Navigating Hearing Loss Stigma

PS 25-4

Capturing Real-World Interactions: What Ecological Data reveals about Hearing Loss Stigma

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Ecological Momentary Assessment (EMA) has been shown to be a reliable, valid and increasingly utilised approach in hearing research. A review into the use of EMA to research stigma experiences found EMA to be a valid and possibly more sensitive means of capturing the prevalence of stigma experiences in daily life, when compared to the use of traditional retrospective surveys. This is important, as stigma is a product of social processes and experiences of stigma are strongly context-specific.

The aims of the current study were to use EMA for the first time to explore a) when and how stigma-induced identity threat is experienced by older adults with hearing loss and b) when and how they respond to such threats in daily life.
Twenty adults with mild to moderate hearing loss (mean age 69.4 years, 13 male, 11 hearing aid wearers) responded to EMA surveys over a 14-days period using a smartphone app. Each survey contained up to 17 questions about the context of the listening situation, how well they were hearing, what communication strategies they used (including if they told others about their hearing difficulties) and if they felt they were being treated differently because of their hearing loss.

A total of 633 listening event surveys were completed. Being treated differently was reported in 12% (n=79) of all the listening events by 12 of the 20 participants. When treated differently, in 84% (n=66) of these 79 events, participants reported being treated positively or very positively. The 13 listening events during which five participants were treated negatively were defined as stigma experiences. Stigma experiences were typically in the participants' home when communicating with family members who were aware of the participants' hearing loss.

Results for all EMA listening event surveys were generally similar for people who wore hearing aids and for those who did not, although some key differences were evident. Participants' scores on the self-report stigma measures were generally not predictive of reported incidences of stigma as measured by EMA. During the interviews, participants spoke broadly about stigma, although some reported they did not personally experience stigma associated hearing loss or hearing aids.

The real-world data collected showed that the adults with hearing loss did not experience stigma-induced identity threat in most of their reported listening events. However, although most listening events were within the home, with family and friends, a quarter of the participants still experienced some stigma during the 2-week data collection period.

Further research is required to investigate the contextual factors involved in real-world hearing loss stigma experiences. It is strongly suggested that EMA be incorporated into such future research.

Planned Session 25

To Tell or Not to Tell:
Navigating Hearing Loss Stigma

PS 25-5

Understanding hearing loss stigma and disclosure: Insights from adults and families across Australia, the United Kingdom, and the United States

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Although stigma has frequently been cited as a barrier to help-seeking and hearing aid use, it has rarely been examined using established stigma theory, and the role of stigma-related responses such as disclosure and concealment remains poorly understood. Further, while stigma is increasingly recognised as a relational and socially constructed process, the experiences of family members, including affiliate stigma, have received limited attention. Within the broader program of research on hearing loss stigma, the results of a series of earlier studies were used to identify key stigma-related constructs and responses, which informed the development of a large-scale international survey.

The aims of the survey study were to (1) explore the extent to which adults with hearing loss experience and respond to stigma-induced identity threat through disclosure or concealment; (2) investigate associations between stigma-related experiences, responses to stigma, and hearing aid use; and (3) examine experiences of affiliate stigma among family members and their associations with third-party hearing disability.

A cross-sectional online survey was conducted across Australia, the United Kingdom, and the United States, including 331 adults (50+ years) with self-reported hearing loss and 313 family members of adults with hearing loss. Survey measures captured key constructs of stigma-induced identity threat, disclosure and concealment, affiliate stigma, emotional responses, and hearing aid use. Descriptive analyses and multivariate modelling were undertaken.

Adults with hearing loss and their family members associated hearing loss and hearing aids with negative stereotypes, despite generally positive perceptions of modern hearing aids. Approximately one quarter of adults with hearing loss reported not disclosing their hearing loss to anyone or in any situation. Disclosure, alongside attitudes toward hearing aids, stereotypical beliefs, and personal characteristics, was significantly associated with hearing aid use. Family members reported low overall levels of affiliate stigma; however, many experienced feelings of sadness and helplessness, and low to moderate associations were observed between affiliate stigma and third-party hearing disability.

By quantitatively extending earlier phases of this research program, this international survey demonstrates that stigma-related beliefs and responses to hearing loss are evident across countries and affect both adults with hearing loss and their families. Findings highlight disclosure as a key response to stigma-induced identity threat and underscore the importance of addressing stigma and providing family-centred hearing rehabilitation.

Planned Session 25

To Tell or Not to Tell:
Navigating Hearing Loss Stigma

PS 25-6

Who do you tell about your hearing loss: A new model for understanding stigma related to hearing loss

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In this final presentation of the special session, the key findings from this program of research will be collated to present a a comprehensive understanding of stigma related to acquired hearing loss. The findings have been mapped onto the Major and O'Brien (2005) model for a holistic representation of how adults with hearing loss (HL) experience stigma-induced identity threat, how they respond, and the association with hearing aid (HA) use.

Findings were obtained using a range of methods across two phases of research. Phase 1 involved questionnaires, qualitative interviews, Ecological Momentary Assessment, and Conversation Analysis with 20 adults with hearing loss and their significant others. Phase 2 involved an international, online self-report survey with 331 adults with hearing loss and 313 significant others. Data from Phase 1 informed the survey used in Phase 2.

Findings support the view of stigma being context and relationship specific as suggested by the Major and O'Brien (2005) model. 'Not telling' was found to be a key way that the stigma of HL is responded to in everyday life. HL disclosure, in addition to attitudes towards HAs, stereotypical beliefs, and personal characteristics, were associated with HA use. Clinical implications are discussed, including how hearing care professionals might support adults with hearing loss and their significant others who experience stigma related to hearing loss and/or hearing aids.

Planned Session 26

Programming of Auditory Implants & Advanced Rehabilitation

PS 26-1

A Longitudinal Analysis of Vowel and Consonant Perception in Quiet and Noise using Anatomy-Based Fitting Cochlear Implant Map

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Purpose: Standard cochlear implant (CI) fitting often disregards individual cochlear anatomy, resulting in a frequency-to-place mismatch (FPM) that distorts spectral cues. This study evaluated the longitudinal efficacy of Anatomy-Based Fitting (ABF) in mitigating FPM. Specifically, we analyzed perceptions of vowels and consonants in both quiet and noise conditions among experienced adult CI users transitioning from conventional to anatomy-based maps.

Methods: A prospective longitudinal study was conducted with eight experienced adult MED-EL users (nine ears). Postoperative CT scans were analyzed using Otoplan software to localize electrode contacts and generate individualized ABF maps utilizing the Organ of Corti frequency allocation. Speech perception was assessed using nonsense consonant-vowel-consonant (CVC) tokens, targeting vowels (/a, i, u/) and plosives (/b, d, g, p, t, k/). Identification scores were measured in quiet and at +5 dB SNR at baseline (conventional fitting), and subsequently at 2 weeks, 3 months, and 6 months post-ABF activation.

Summary of Results: ABF mapping resulted in a significant apical shift in center frequencies compared to conventional maps, reducing the FPM. Participants demonstrated significantly higher identification scores for both vowels and consonants in the ABF condition than in baseline, across quiet and noise conditions ($p < 0.05$). Improvements were progressive over the six months, indicating successful acclimatization. Notably, perception of voiced consonants showed greater enhancement than voiceless consonants, suggesting ABF provides superior access to low-frequency voicing cues.

Conclusion: Correcting frequency-to-place mismatch via ABF significantly enhances spectro-temporal resolution for experienced users. The data support the clinical viability of ABF for improving vowel and consonant recognition, particularly in challenging listening environments, by providing a more natural tonotopic alignment.

Planned Session 26

Programming of Auditory Implants & Advanced Rehabilitation

PS 26-2

Clinical electro-acoustic management in cochlear implant users: Pediatric considerations

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The implementation of the 1–3–6 principle has markedly advanced early identification of hearing loss and timely intervention, leading to an increased rate of early cochlear implantation in the pediatric population. Despite these improvements, determining accurate hearing thresholds in infants and toddlers remains a significant clinical challenge when making implantation decisions. While electrophysiological assessments provide valuable objective information, reliable behavioral responses are still required to estimate functional hearing thresholds, and these responses often take time to emerge in very young children. In addition, hearing and listening abilities continue to develop throughout the first year of life, further complicating early clinical decision-making.

In real-world clinical practice, the timelines proposed by the 1–3–6 guideline are not always achieved as intended. Consequently, the diagnostic and intervention processes must be continuously monitored and flexibly managed by an experienced multidisciplinary team including medical, audiological, and rehabilitative professionals. Throughout this process, family counseling plays a crucial role, and both acoustic and electrical hearing must be carefully monitored to support optimal listening and language development.

This presentation reviews clinical practices from newborn hearing screening to age-appropriate speech and language development in children with hearing loss. Particular emphasis is placed on the practical challenges encountered in clinical settings and the importance of coordinated multidisciplinary management.

Planned Session 26

Programming of Auditory Implants & Advanced Rehabilitation

PS 26-3

Cochlear implant fitting by machine learning

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Introduction and Objective
Cochlear implantation is a standard treatment for severe-to-profound hearing loss, but its effectiveness relies heavily on accurate "fitting," specifically the setting of threshold (T) levels—the smallest sounds a user can hear. In children, this process is particularly challenging and time-consuming because they have no experience of hearing and cannot communicate feedback effectively to audiologists. While objective measures like the electrically evoked compound action potential (ECAP), measured as neural response telemetry (NRT), are used to assist fitting, results vary based on factors like electrode type and patient background. This study aimed to evaluate the relationship between ECAP thresholds and T levels across different electrode types and to clarify machine learning (ML) techniques could accurately predict postoperative T levels in children.
Methods
This retrospective study reviewed 124 ears of children under six years old who underwent cochlear implantation. We compared three electrode types: straight, perimodiolar, and slim modiolar electrodes and analyzed the differences in ECAP (NRT) thresholds and T levels at switch-on and six months postoperatively. To predict T levels, we introduced four machine learning algorithms: Lasso regression, Random Forest, Extreme Gradient Boosting (XGBoost), and Neural Networks and compared with a conventional simple linear regression model. The models used input variables including age, etiology, electrode type, insertion approach, and intraoperative NRT values. For predicting T levels at six months, the T levels measured at switch-on were also included as an explanatory variable.
Results
ECAP thresholds and T levels for slim modiolar electrodes were significantly lower than those for straight electrodes, particularly in the apical and intermediate regions of the cochlea, which suggests that slim modiolar electrodes are positioned closer to the spiral ganglion cells. Correlations between intraoperative NRT thresholds and postoperative T levels was stronger in the apical region and weaker in the basal region and it also tended to decrease over time (from switch-on to six months). Machine learning models generally outperformed the conventional linear regression model both at switch on (Lasso regression model) and at 6 months (the Random Forest model). The analysis of feature importance, which suggests what is the influential factor, revealed that while NRT thresholds were the most influential factor for initial predictions, the T level measured at switch-on became the most important variable for predicting T levels at six months. The inclusion of switch-on data significantly reduced prediction errors. Neural networks performed the poorest among the ML models tested.
Conclusion
The study concludes that machine learning techniques are superior to conventional statistical methods for predicting cochlear implant fitting levels. Specifically, Lasso regression is effective for initial switch-on levels, while Random Forest is best for longer-term predictions. These findings suggest that ML can serve as a valuable, objective tool to assist audiologists in cochlear implants fitting for young children, potentially reducing the reliance on difficult behavioral feedback.

Planned Session 26

Programming of Auditory Implants & Advanced Rehabilitation

PS 26-4

Remote programming of cochlear implant in adults: Current status within the French care pathway compared with international pratices

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Background
Remote programming of cochlear implants has emerged as a promising solution to improve access to care for implant recipients, particularly those living far from implant centers but not only. Several countries have already implemented teleprogramming in routine clinical practice, demonstrating its feasibility and safety. However, its implementation in France remains limited due to regulatory, organizational, and technical barriers.

Objective
This study aims to review the current status of cochlear implant teleprogramming in France and to compare it with international practices.

Methods
A narrative review of the literature and existing clinical practices was conducted. International experiences with remote cochlear implant programming were analyzed, including studies from. Key aspects such as technical requirements, clinical protocols, patient outcomes, and regulatory frameworks were reviewed. The current situation in France was described based on existing initiatives and institutional practices defined by the French Society of Otorhinolaryngology (SFORL)

Results
International studies report high patient satisfaction and comparable audiological outcomes between remote and in-clinic programming sessions. Teleprogramming has been successfully implemented in several countries using secure telehealth platforms and remote assistance from trained facilitators. In contrast, adoption in France remains limited, mainly due to regulatory constraints and organizational challenges. Nevertheless, increasing interest in telehealth and recent clinical studies may facilitate the development of teleprogramming solutions in the future.

Conclusion
Teleprogramming of cochlear implants represents a promising strategy to improve access to specialized audiological care. While widely implemented in several countries, its adoption in France is still emerging. Further research and regulatory adaptations are needed to support its broader implementation.

Planned Session 26

Programming of Auditory Implants & Advanced Rehabilitation

PS 26-5

Advantages and utilization of telemedicine for cochlear implant users

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Cochlear implantation (CI) has become an established and effective intervention for individuals with severe to profound hearing loss. However, successful CI outcomes depend not only on surgery itself but also on long-term postoperative management, including device programming (mapping), auditory rehabilitation, and continuous follow-up. These services traditionally require regular visits to specialized CI centers, which poses substantial challenges in regions where medical resources and hearing professionals are unevenly distributed.

In Japan, geographic barriers, limited availability of cochlear implant centers, and shortages of speech-language pathologists and audiologists place a significant burden on CI users and their families. Travel to tertiary centers is often time-consuming, costly, and physically demanding, particularly for older adults, children, and working or school-aged patients. These challenges may result in delayed adjustments, reduced follow-up frequency, and suboptimal hearing outcomes.

Telemedicine has emerged as a promising approach to address these barriers and improve access to CI care. Advances in communication technology and device connectivity have enabled remote programming, tele-audiology, and virtual follow-up consultations. During and after the COVID-19 pandemic, the importance of telemedicine became increasingly evident, accelerating its adoption and acceptance in hearing healthcare. Recent studies, including multicenter investigations in Japan, have demonstrated that remote CI mapping can be performed safely and effectively, with outcomes comparable to conventional face-to-face care.

This presentation focuses on the advantages and practical utilization of telemedicine for cochlear implant users. First, we discuss the clinical benefits of remote mapping and follow-up, including improved accessibility, reduced travel burden, and enhanced continuity of care. Telemedicine allows clinicians to provide timely adjustments and counseling while enabling patients to receive care in their home or local medical facilities. This approach is particularly valuable for patients living in rural or remote areas and for those with mobility limitations.

Second, we emphasize the importance of multidisciplinary collaboration in telemedicine-based CI care. Optimal outcomes require coordinated efforts among otologists, speech-language pathologists, audiologists, nurses, and rehabilitation specialists. In a telemedicine framework, collaboration with local healthcare providers is essential to ensure patient safety, technical support, and effective communication. Clear role allocation, standardized protocols, and shared decision-making are key elements for successful implementation.

Third, we highlight the role of referral networks in Japan. Early identification of candidates, timely referral to CI centers, and seamless coordination between community hospitals, hearing clinics, educational institutions, and tertiary centers are critical for achieving favorable outcomes. Telemedicine can strengthen these referral networks by facilitating information sharing, follow-up consultations, and joint management across institutions. Particular attention is given to pediatric and elderly populations, in whom early intervention and sustained support are especially important.

In addition, telemedicine offers resilience in times of public health emergencies and natural disasters. Japan is prone to earthquakes and other disasters that may disrupt access to medical facilities. Establishing telemedicine systems during normal times enables rapid continuation of care during emergencies, ensuring that CI users do not lose access to essential auditory management.

In conclusion, telemedicine represents a powerful tool to enhance cochlear implant care by improving accessibility, reducing regional disparities, and optimizing the use of limited healthcare resources. By integrating remote technologies with multidisciplinary collaboration and robust referral networks, telemedicine can support sustainable, patient-centered CI care. Future efforts should focus on standardization, evidence generation, and policy development to facilitate broader clinical adoption and integration into healthcare systems.

Planned Session 27

Clinical Applications of Bone Conduction Hearing Aids
PS 27-1

Bone Conduction Implantation – 20 years of activity in Australia

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Background:
Bone conduction implants were first introduced in the late 1970s, with broader clinical uptake occurring in the early 2000s. Since then, there have been multiple iterations in device design and expansions in candidacy criteria. Although hearing outcomes and complication rates of bone conduction hearing implants have been reported, population-level data remain limited.
Objectives:
We investigated the number of bone conduction implant (BCI) procedures performed in Australia over a 20-year period (June 2004 to June 2024), analysing age, sex, and temporal trends. We also examined the procedures and types of BCI devices used over 20 years at a large adult implant clinic.
Methods:
Procedural data were obtained from the Australian Institute of Health and Welfare (AIHW), and population data from the Australian Bureau of Statistics (ABS). Procedures were categorised by year, age group, sex, and adjusted for population changes. Clinic-specific activity was additionally classified by BCI type: percutaneous, passive transcutaneous, or active transcutaneous.
Results:
A total of 4,536 BCI procedures were performed in Australia over the 20-year period, with 118 explants recorded over the last five reporting periods. Procedure numbers gradually increased from 2004–05, peaking at 434 in 2016–17, then declined through 2023–24, including a reduction in 2021–22 coinciding with the COVID-19 pandemic. The 60–79-year age group consistently had the highest number of procedures, followed by the 40–59-year group. Minimal sex differences were observed. At the representative clinic (n = 320 implantations), changes in BCI type over time aligned with the introduction of new devices by manufacturers, with a peak in overall implant numbers in 2017.
Discussion/Conclusion:
Transcutaneous devices appear to be preferred over percutaneous devices, potentially due to lower complication rates. However, the annual number of BCI implantations in Australia appears to be declining, possibly reflecting wider candidacy criteria and increasing uptake of cochlear implants.

Planned Session 27

Clinical Applications of Bone Conduction Hearing Aids
PS 27-2

Bone conductive implants: What to choose and when

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Bone conduction hearing aids (BCHA) offer a valuable solution for individuals with conductive hearing loss, single-sided deafness, and specific otologic conditions. The World Hearing Center explores the therapeutic potential of BCHA by utilizing innovative technology that transmits sound vibrations directly through the skull bone to the inner ear, bypassing obstructions in the outer or middle ear. Our material consists of 755 implants, including Bonebridge, Osia, Sentio, Ponto, and Baha. Clinical applications of BCHA have shown promising outcomes, including improved sound localization, enhanced speech recognition in noisy environments, and overall patient satisfaction. The center's research highlights the importance of personalized fitting and follow-up care to optimize the effectiveness of BCHA, ensuring that each patient receives tailored support based on their unique auditory profile. Furthermore, ongoing studies evaluate long-term benefits and advancements in bone conduction technology, aiming to further improve accessibility and performance. This abstract underscores the significant role of bone-conduction hearing aids in modern audiological practice and their potential to improve the lives of individuals with hearing impairments.

Planned Session 27

Clinical Applications of Bone Conduction Hearing Aids
PS 27-3

Effect of skin on energy transmission of bone conduction transducers

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Bone conduction (BC) earphones rely on static force to maintain contact between the transducer and the skin. This applied force alters the viscoelastic properties of the skin, potentially affecting BC energy transmission. This study examines how static-force-dependent changes in skin viscoelasticity influence BC transmission through experimental measurements and finite element (FE) analysis. A test apparatus with controlled static force was built, and BC hearing thresholds were measured at the frontal position under static forces of 1–5 N. An FE model was also developed, incorporating published data on the variation of skin impedance with static force, to simulate BC transmission under the corresponding loading conditions. Simulation results showed that increasing static force altered skin impedance and produced notable changes in promontory velocity between 200 and 3000 Hz. The measured BC hearing thresholds, however, remained largely unchanged across the tested force range. Taken together, the experimental and numerical findings suggest that, at the frontal position, ear canal sound pressure generated via cartilage conduction dominates threshold determination, outweighing the contribution of skin property variations.

Planned Session 27

Clinical Applications of Bone Conduction Hearing Aids
PS 27-4

Bone conduction devices and active middle ear implants for adults

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While conventional air conduction hearing aids remain the first line option for most patients with hearing loss there are still patients that cannot use them. Reasons for this may be chronic otitis externa, ear canal atresia or stenosis, previous ear surgery, or intolerance to in ear devices. These are the patients for whom implantable hearing aids as bone conduction devices (BCDs) and active middle ear implants (AMEIs) have become central in hearing rehabilitation. Single sided deafness is another group of patients where a BCD may be indicated, transporting the sound through the skull bone to the hearing inner ear.
BCDs and AMEIs stimulate acoustically in contrast to cochlear implants (CI) where the stimulation is electric. BCDs can be either percutaneous with skin penetration as the first bone conduction device implanted in human, 1977 in Sweden, or transcutaneous, with intact skin, as models introduced during the last decade. Transcutaneous BCDs are further categorized as passive, where vibrations are generated in the external sound processor and thereafter transmitted through the skin, and active, where the vibrations are generated in the implant.
The first active transcutaneous BCD, Bonbridge TM, was introduced on the Swedish market in 2012, followed by two different kinds of atBCDs, Osia® in 2019 and Sentio Ti in 2024.
With new devices entering the market, clinicians face growing pressure to make well founded, unbiased decisions based on evidence rather than technology driven marketing. This highlights a need for clear clinical guidelines supporting indication assessment, surgical decision making, postoperative management, long term follow up and impartial evaluation.
This speech will synthesizes a recent narrative review of implantable hearing technologies in adults (1), clinical outcomes from two original studies evaluating atBCDs in adults with conductive or mixed hearing loss (CMHL) and single sided or asymmetric hearing loss (SSD/AHL) (2, 3), with clinical experience.
The aim is to provide a clinically oriented overview of available atBCDs and AMEIs, audiological outcomes, patient reported benefit, device use, and complications.
Indication criteria and limits compared to other implants as well as various aspects of evaluating the real benefit of atBCDs will be discussed.

Consensus

Most people agree that:
- conventional hearing aids are the first choice for most forms of hearing loss
- reconstructive otosurgery is the first choice if the possibility of hearing aid independence exists
- implantable hearing aids may be considered for patients who have an inadequate effect from conventional hearing aids or are unable to use them
- patients with bilateral hearing loss benefit greatly from implantable hearing aids
- the incidence of skin infection is lower with transcutaneous implants than with percutaneous implants
- active middle ear implants generate a more authentic sound quality than bone conduction implants, but the surgery is more demanding and with a higher risk of complications
- a hearing solution for patients with unilateral hearing loss should always be considered

Opinions differ regarding:
- which hearing solution is best for patients with single-sided deafness
- whether care givers should be more conservative with providing implantable hearing solutions for patients with unilateral hearing loss

Keywords
Active middle ear implants, bone conduction, bone-anchored hearing aids, bone conduction implants, implantable hearing aids, percutaneous bone conduction implants, transcutaneous bone conduction implants,

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Planned Session 27

Clinical Applications of Bone Conduction Hearing Aids
PS 27-5

Comprehensive audiological outcomes of the Osia® 2 system

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Introduction:
The Osia® 2 system is a pioneering active transcutaneous bone conduction implant designed to overcome the limitations of traditional bone conduction devices. By utilizing a piezoelectric transducer (Digital Piezo Power™), the system aims to provide enhanced gain and output, particularly in the high-frequency range, while maintaining skin integrity. This study evaluates the comprehensive audiological outcomes and clinical efficacy of the Osia® 2 system in patients with conductive or mixed hearing loss (CHL/MHL).

Methods:
A prospective clinical study was conducted involving patients implanted with the Osia® 2 system. Audiological assessments included pre- and post-operative pure-tone thresholds (air conduction and bone conduction), aided sound-field thresholds, and speech recognition scores in quiet and noise (e.g, K-WRS). Subjective patient satisfaction and quality of life were measured using validated questionnaires such as the APHAB and SSQ. The fitting process followed a structured schedule, with activation typically occurring 2 to 4 weeks post-surgery.

Results:
Preliminary results demonstrate significant improvement in functional gain across all tested frequencies, with notable performance in the high-frequency bands (above 2 kHz), which are critical for speech clarity. Speech perception in noise showed substantial enhancement compared to preoperative unaided or traditional bone conduction aid conditions. Patients reported high levels of satisfaction regarding sound quality and wearing comfort, with minimal postoperative complications or skin-related issues.

Conclusion:
The Osia® 2 system provides excellent audiological benefits and high patient satisfaction for individuals with conductive and mixed hearing loss. Its active piezoelectric technology offers superior high-frequency amplification and speech understanding in challenging listening environments. These findings suggest that the Osia® 2 system is a highly effective and reliable solution for long-term hearing rehabilitation.

Planned Session 28

Vestibular Disorders and Their Impact on Quality of Life
PS 28-2

The Impact of Migraine and Vestibular Migraine on Audiometric Profiles and Quality of Life in Patients with Tinnitus

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Background
Migraine symptoms often include headaches, nausea, and sensitivity to light and sound. When vertigo occurs, it may be classified as vestibular migraine. Since the IHS-Barany criteria in 2012, our understanding of complex vertigo has improved. Notably, many migraine or vestibular migraine (VM) patients experience tinnitus, with around 10% facing fluctuating hearing loss. Terms like "Migraine-associated tinnitus" have emerged, but research on this is limited. This study explores the connection between migraines and tinnitus.

Methods
We retrospectively reviewed adult medical records for "Primary tinnitus" diagnoses by a single otologist from May 2020 to July 2021. After excluding "Secondary causes" like ISSNHL, Meniere's disease, ear infections, and vascular issues through interviews and exams, we assessed related medical histories and conducted audiometric evaluations. Tinnitus severity was measured using a culturally adapted Chinese version of the Tinnitus Handicap Inventory (THI) questionnaire.

Results
Among 298 tinnitus patients (149 women, 149 men, mean age 57.06), 125 completed the THI questionnaire. The median THI score was 32, with a mean of 34.99 ± 21.01. Migraine or vestibular migraine was the only factor significantly linked to higher THI scores ($P < 0.001$, odds ratio = 19.41). Tinnitus patients with migraine or vestibular migraine exhibited significantly lower mean pure-tone auditory thresholds($p=0.002$), speech recognition threshold($p=0.019$), and most comfortable levels values ($p=0.021$) compared to the tinnitus patients without migraine.

Conclusions
In this population-based study, patients with primary tinnitus had significantly higher THI scores and exhibited concurrent symptoms, including dizziness/vertigo, cervicalgia, and migraine or vestibular migraine. Among these factors, the diagnosis of migraine or vestibular migraine was the sole contributor to significantly higher THI scores and also correlated with better hearing.

Planned Session 28

Vestibular Disorders and Their Impact on Quality of Life
PS 28-3

Peripheral and Neural Correlates of Auditory Dysfunction in Chronic Migraine: Clinical and Preclinical Evidence

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Migraine is a common neurological disorder that is often accompanied by sound sensitivity, yet the underlying mechanisms are still not well understood. In this translational study, we combined clinical and preclinical approaches to examine how chronic migraine affects peripheral hearing, sound tolerance, speech-in-noise performance, and neural transmission along the auditory brainstem and cortical pathways.

In the clinical cohort, 20 adults with migraine (10 episodic and 10 chronic) and 10 non-migraine controls with normal baseline hearing completed pure-tone and speech audiometry, QuickSIN, uncomfortable loudness levels (ULLs), distortion-product otoacoustic emissions (DPOAEs), and acoustic reflex thresholds (ARTs). Migraine participants were tested at baseline and again during a spontaneous attack, while controls were retested within one month. At baseline, all groups showed normal thresholds, DPOAEs, and ARTs; however, migraine participants had significantly reduced ULLs compared with controls (>90 dB HL). During migraine attacks, ULLs decreased further (40–65 dB HL), DPOAE amplitudes were reduced, contralateral ARTs were elevated, and QuickSIN performance worsened, while pure-tone thresholds remained unchanged. These findings suggest cochlear and superior olivary complex dysfunction, along with abnormal central gain, during migraine in the absence of hearing loss. Analyses of brainstem and cortical auditory responses are ongoing and will be reported.

In the preclinical model, male and female Sprague Dawley rats were exposed to three migraine risk factors to induce a chronic migraine–like state. Tone-burst auditory brainstem responses were recorded at 4, 12, 22, and 32 kHz before induction and on Days 1, 7, and 22 post-induction. After migraine induction, animals showed elevated high-frequency thresholds (mean =10–20 dB SPL) and enhanced suprathreshold wave II amplitudes across frequencies, indicating altered brainstem excitability and neural gain.

Collectively, these clinical and preclinical findings demonstrate that chronic migraine is associated with alterations in both peripheral and central auditory function, reflecting abnormal cochlear–neural gain and brainstem processing rather than sound hypersensitivity alone. These changes likely contribute to reduced sound tolerance, poorer speech-in-noise performance, and altered neural transmission during migraine attacks. These findings also highlight the potential value of objective auditory measures as biomarkers to monitor disease activity and treatment response in migraine.

Planned Session 28

Vestibular Disorders and Their Impact on Quality of Life
PS 28-4

Improving Quality of Life Through Vestibular Rehabilitation

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Vestibular disorders are among the most disabling conditions in neurotology and exert a profound, multidimensional impact on patients' quality of life (QoL). Beyond vertigo itself, vestibular dysfunction disrupts balance control, visual stability, and spatial orientation, leading to dizziness, oscillopsia, postural instability, and reduced balance confidence during routine movements essential for independent daily living. As human mobility is fundamental to functional autonomy, persistent dizziness and imbalance substantially limit physical activity, occupational performance, and social participation, often restricting independent mobility and increasing reliance on caregivers. Prolonged vestibular symptoms are also frequently accompanied by secondary psychological consequences, including anxiety, depressive symptoms, and avoidance of movement or visually complex environments, which further exacerbate functional disability and contribute to deterioration of health-related quality of life (HRQoL).

The optimal strategy for improving QoL in vestibular disorders is, in principle, effective management of the underlying disease. In episodic vestibular conditions without persistent interictal dysfunction, treatment is primarily directed toward reducing the frequency and severity of vertigo attacks. However, many patients with chronic vestibular disorders exhibit sustained vestibular hypofunction or maladaptive central processing, in which restoration of normal vestibular function is rarely achievable with current medical or surgical interventions. Even after resolution of the acute disease process, residual deficits in balance, gaze stability, and motion tolerance frequently persist, highlighting the need for rehabilitation-based approaches that target functional recovery.

Vestibular rehabilitation therapy (VRT) plays a central role in improving function and quality of life in patients with chronic vestibular dysfunction through mechanisms that vary according to the underlying disorder. In patients with chronic vestibular hypofunction, VRT primarily facilitates central compensation by enhancing gaze stability, postural control, and the integration of remaining sensory inputs, including visual and somatosensory cues. Targeted gaze stabilization and balance exercises promote adaptive neuroplastic changes within central vestibular and sensorimotor networks, enabling reduction of motion-provoked dizziness and restoration of functional stability. In disorders such as persistent postural-perceptual dizziness and vestibular migraine, where maladaptive central processing, excessive visual dependence, and movement avoidance are prominent contributors to disability, VRT emphasizes carefully graded exposure and habituation strategies. These approaches recalibrate sensory weighting, improve tolerance to motion and visual stimuli, and facilitate re-engagement in daily activities with greater confidence in movement.

Objective vestibular function tests show limited correlation with patient-reported symptom burden and QoL (Jacobson & Newman, 1990). Although vestibular test results often remain unchanged, vestibular rehabilitation has consistently been shown to produce meaningful improvements in dizziness-related disability and QoL, underscoring the importance of patient-reported outcomes in treatment evaluation (Hall et al, 2016). Consequently, customized, diagnosis-driven vestibular rehabilitation represents a critical therapeutic strategy for improving QoL in patients with chronic vestibular disorders.

Planned Session 28

Vestibular Disorders and Their Impact on Quality of Life
PS 28-5

Vestibular Disorders Across the Lifespan: Impact on Quality of Life

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Vestibular disorders are among the leading causes of dizziness, imbalance, and spatial disorientation across all age groups. Although traditionally defined by physiological impairment within the peripheral or central vestibular system, their clinical significance extends far beyond measurable dysfunction. Increasing evidence from population-based studies and patient-reported outcome measures demonstrates that vestibular disorders substantially impair quality of life (QoL), participation, and psychosocial well-being. Importantly, the consequences of vestibular dysfunction are not uniform across age groups; rather, they are developmentally shaped, affecting motor and cognitive maturation in children, productivity and emotional health in adults, and independence and safety in older persons. This presentation outlines the multidimensional burden on quality of life from vestibular disorders across the lifespan and emphasises the importance of a lifespan-oriented, participation-focused model of care.

In pediatric populations, vestibular dysfunction remains under-recognised despite growing evidence of its functional consequences. Vestibular impairment has been identified in a substantial proportion of children with sensorineural hearing loss and in various neurodevelopmental conditions. Unlike adults, children rarely describe vertigo explicitly; dysfunction more commonly manifests as delayed motor milestones, impaired balance, clumsiness, difficulty with sports participation, visual-motor integration challenges, and reduced spatial orientation. Emerging research links vestibular deficits with academic difficulties, particularly in reading and spatially demanding tasks. Beyond physical instability, the impact extends to reduced confidence, peer participation, and school engagement. Parents frequently report concerns regarding safety, developmental progress, and academic performance. In this age group, the burden of vestibular dysfunction lies not only in symptoms but in constrained developmental opportunity. Disruption during critical periods of neurodevelopment may influence long-term participant trajectories. Accordingly, assessment of children must extend beyond symptom identification to include participation-based outcomes and family impact.

In adults, vestibular disorders are a common reason for healthcare consultation and are associated with significant functional limitation. Chronic dizziness and imbalance frequently interfere with work performance, driving, household responsibilities, and social activities. Patient-reported outcome measures such as the Dizziness Handicap Inventory (DHI) consistently demonstrate moderate to severe impairment across physical, functional, and emotional domains in individuals with persistent vestibular symptoms. Anxiety, depressive symptoms, and fear of movement are highly prevalent and contribute to activity avoidance and physical deconditioning. Notably, perceived handicap often does not correlate directly with objective vestibular findings, underscoring the complex interaction between sensory impairment, cognitive appraisal, and psychological adaptation. Many adults describe vestibular disorders as an "invisible disability," reflecting the substantial yet externally unrecognised impact on daily life. In working-age populations, vestibular dysfunction may disrupt occupational identity, reduce productivity, and limit community mobility. Effective management must therefore prioritise restoration of confidence, participation, and psychosocial well-being in addition to symptom control.

In older adults, vestibular dysfunction assumes heightened clinical and public health importance. Age-related decline in vestibular function contributes to instability, falls, and reduced mobility. Falls are a leading cause of injury-related morbidity in older populations, and balance impairment is a significant modifiable risk factor. Beyond injury risk, fear of falling frequently leads to activity restriction, social withdrawal, physical deconditioning, and progression toward frailty. Reduced mobility is associated with diminished social participation and increased vulnerability to depressive symptoms and cognitive decline. Health-related QoL measures in older individuals with vestibular impairment show significant reductions in physical and social functioning. In this life stage, the impact of vestibular dysfunction is defined less by episodic vertigo and more by gradual erosion of independence. Decisions regarding driving, community engagement, and living arrangements are frequently influenced by balance confidence rather than objective severity alone. Thus, vestibular dysfunction in later life is closely linked to autonomy, safety, and dignity.

Across all age groups, a consistent pattern emerges: vestibular pathology initiates a cascade from impairment to activity limitation, participation restriction, and psychosocial consequence. The International Classification of Functioning, Disability and Health (ICF) framework provides a useful structure for conceptualising this progression. However, the specific manifestations of reduced participation differ across developmental stages. In children, vestibular dysfunction constrains exploration and learning. In adults, it disrupts productivity and social roles. In older persons, it threatens independence and increases vulnerability. Recognising these stage-specific consequences is essential for tailoring assessment and intervention strategies.
A lifespan perspective reframes vestibular disorders as conditions that influence how individuals develop, work, age, and engage with society. Quality-of-life outcomes must therefore be central to clinical evaluation and management. Incorporating patient-reported measures and participation-based goals alongside symptom assessment enables a more comprehensive understanding of disease burden. Ultimately, successful vestibular care is not defined solely by reductions in dizziness or improvements in balance performance, but by the restoration of participation, preservation of autonomy, and enhancement of well-being across the lifespan.

Planned Session 29

Tele-audiology
PS 29-1

Beyond technology: Towards service equity

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This presentation will highlight how technology was used judiciously to strengthen rural community-based services. It will capture the elements of (1) development and or assessment of outcomes in using mhealth/ ehealth as tools for community-based programs to increase access to care (2) capacity building with task-shifting within community-based service delivery models (3) Use of implementation/feasibility outcomes including cost-effectiveness Collectively, these studies have laid the groundwork for developing a scalable and sustainable service delivery model for children with hearing and speech-language disorders in underserved communities.

The hope is to bring the focus on how technology in-itself is not the 'hero' but a multi-stakeholder approach including understanding contextual factors plays a crucial role in using technology where necessary to build service equity.

This work was built over 17 years and has been funded by various government and non-government organisations and several collaborators and NGOs.

Planned Session 29

Tele-audiology
PS 29-2

Telemedicine Experiences at Home Healthcare Clinic in Korea

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Telemedicine offers significant advantages in providing medical care to patients with severe mobility limitations. The Home-based Medical Care (HBMC) team at Seoul National University Hospital implemented video telemedicine services for patients with rare, incurable diseases, including people living with Amyotrophic Lateral Sclerosis (pALS).
We conducted a retrospective cross-sectional study of pALS who received video televisits through the HBMC team from July 2020 to February 2023. The study analyzed patient demographics, disease status, mobility levels, and the primary clinical issues addressed during the televisits.

During the 32-month study period, televisits were provided to over 80% of the pALS registered with the HBMC team. More than 60% of these patients were aged 60 years or older. Clinical profiles indicated high severity: over 70% were non-ambulatory, and more than 80% were dependent on tube feeding. Beyond managing disease-related symptoms, supportive care equipment, and acute health problems, the televisits facilitated critical discussions on Advance Care Planning (ACP), including the determination of goals of care.

Video televisits are an effective modality for providing direct medical services to elderly and mobility-impaired patients. This service model enables not only the management of acute medical issues but also complex and essential discussions such as Advance Care Planning.

Reference: Kim, M. S, Yoo, S. H, Kim, K. H, Cho, B, & Lee, S. Y. (2025). Telemedicine Experiences of People Living with Amyotrophic Lateral Sclerosis at Home in South Korea. Yonsei Medical Journal, 66(6), 366.

Planned Session 29

Tele-audiology
PS 29-3

Systems-based approaches to designing ear and hearing care programs - examples from Australia and Thailand

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Background: Permanent childhood hearing impairment (PCHI) affects an estimated 1–2 per 1,000 newborns globally, with substantially higher prevalence among high risk infants. Without timely identification and intervention, early hearing loss can significantly impede speech, language, cognitive, and socio emotional development. Effective Early Hearing Detection and Intervention (EHDI) systems rely on timely screening, diagnosis, and early intervention supported by sufficient workforce capacity, interprofessional coordination, and well functioning referral pathways. However, in many low and middle income countries (LMICs), shortages of trained personnel, centralised diagnostic services, and fragmented systems contribute to delays and high loss to follow up rates. While strategies such as decentralisation, task sharing, and teleaudiology are recognised as potential solutions, their implementation remains inconsistent and poorly understood at a systems level.

Thailand's national newborn hearing screening guidelines and universal health coverage create the foundation of good public policy for equitable access to care, yet implementation varies widely across health districts. Existing literature highlights referral pathway gaps, workforce shortages, and limited interprofessional coordination, all of which undermine progress toward Joint Committee on Infant Hearing (JCIH) 1–3–6 benchmarks. Systematic evidence examining how the Thai EHDI pathway operates in practice—its workforce structures, service delivery models, and contextual constraints—remains limited. Understanding these real world dynamics is essential for designing feasible, scalable improvements. Therefore, the primary objective of this study is to understand how Thailand's EHDI pathway functions across diverse contexts and to co design feasible workforce and service delivery strategies—drawing on learnings from Australian EHDI systems—to improve timeliness and continuity of care. This presentation will discuss findings from Australia.

Methods: Knowledge from the Australian Universal Newborn Hearing Screening (UNHS) Expert Working Group and five workshops with ASEAN partners was synthesised to articulate system strengths, leverage points, and feedback structures across the EHDI pathway (recruitment → screening → diagnosis → amplification/early intervention → ongoing management). In parallel, a multiphase qualitative systems study in Australia (NSW, Victoria, Queensland) applied FRAM informed interviews, document review, and cross case comparisons to map workforce roles, information flows, referral pathways, and performance variability.

Results: High performance shown in the Australian EHDI programs reflect the alignment of governance (national framework, indicators), robust data systems and quality assurance, and a skilled, networked workforce (e.g, communities of practice, collaborative reporting). Family centred practice, universal access to paediatric hearing services via Hearing Australia, and tele audiology extend reach, while feedback loops (e.g, rapid detection of false positives/ equipment faults) drive continuous improvement. These dynamics underpin sustained high coverage, early ages of device fitting, and stable referral pathways. These strengths emerged from coherent governance, performance monitoring, and feedback loops rather than isolated technical fixes. Reflections on how these learnings will be applied to Thailand will be shared.

Discussion: Using implementation science approaches to understand high-functioning programs provides a practical blueprint for designing context appropriate EHDI systems. Australian exemplars demonstrate how governance, data, workforce capability, and family centred practices interact to produce reliable, equitable outcomes; translating these mechanisms can guide reforms in Thailand that prioritise timeliness, continuity, and equity. This systems based approach supports adaptive learning cycles, enabling countries to move from "program components" to resilient, whole of pathway care.

Planned Session 29

Tele-audiology
PS 29-4

Real world integration of remote care: The role of a decision matrix in improving access to care

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This paper presents the development of a decision matrix designed to support the delivery and uptake of optimal hearing health care for recipients of cochlear implants. The initiative emerged in response to growing demand placed on a Victorian, Australian provider of cochlear implant (CI) services spanning primary, secondary, and tertiary care. In collaboration with industry partners, a comprehensive and adaptable model of care was established, offering benefits to both organisational and consumer stakeholders.

The decision matrix has been shaped through an iterative process, guided by the accessibility framework proposed by Levesque et al. (2013), ensuring services are available, approachable, acceptable, affordable, and appropriate. Key challenges addressed include:

• Availability: Strained by the rapid increase in CI recipients and the expanding eligibility criteria for implantation.
• Approachability: Influenced by limited awareness among referrers and geographical barriers to service access.
• Affordability: Impacted by inconsistent reimbursement for both direct and indirect service provision.
• Acceptability and Appropriateness: Carefully considered to preserve the professionalism and empowerment of all stakeholders during changes to care delivery.

Over a period of 2 years, the decision matrix has informed a personalised care model for over 1000 CI recipients, guiding frequency and modality of care. Options for remote, in-clinic, or hybrid service delivery have enhanced accessibility and responsiveness to individual needs.
This presentation will outline the development and evolution of the decision matrix, highlight outcomes to date, demonstrate equity in service provision and comparable care aiming to explore the broader benefits of this collaborative approach for stakeholders involved in CI service provision anywhere in the world.

Keywords: Remote care, Equity, Patient focused care

Planned Session 30

Diagnostic Protocols of SSD and Asymmetric Hearing Loss

PS 30-1

Clinical topic on the SSD management

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Single-sided deafness (SSD), including unilateral hearing loss (UHL), represents a clinically relevant condition that interferes with the normal development of binaural auditory processing, resulting in deficits in sound localization and speech perception in noise, with downstream effects on language acquisition and quality of life. Evidence from pediatric audiology research highlights that early auditory deprivation may lead to long-term neurofunctional and developmental consequences, supporting the need for timely diagnosis and intervention. However, despite growing attention to early rehabilitation, the clinical effectiveness and optimal indications of different hearing devices remain incompletely defined.

In this prospective longitudinal study, 18 children with SSD (age range: 3–17 years) were evaluated before and after auditory rehabilitation. Outcomes included aided sound field thresholds and speech perception in quiet and noise, alongside patient-reported measures collected through validated questionnaires (SSQ and CHILD). Patients were fitted with hearing aids (HA; n = 15) or cochlear implants (CI; n = 3) based on clinical criteria.

Post-rehabilitation results showed a consistent improvement in auditory performance across the cohort. Both HA and CI users achieved better aided thresholds and enhanced speech perception. Subjective measures also indicated reduced listening effort and improved spatial hearing and daily functioning. While CI users tended to show greater benefits in binaural-related tasks, both interventions provided meaningful gains.

In conclusion, rehabilitative interventions in pediatric SSD lead to significant improvements in both objective auditory performance and subjective listening experience. While CI may provide a more effective restoration of binaural processing, particularly in complex listening environments, hearing aids represent a valid option for appropriately selected patients. These findings reinforce the importance of early identification and a tailored, patient-centered approach to management, in order to maximize auditory development and long-term functional outcomes.

Planned Session 30

Diagnostic Protocols of SSD and Asymmetric Hearing Loss

PS 30-2

From screening to candidacy: Practical CI assessment in pediatric SSD

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Children with single-sided deafness (SSD) exhibit deficits in speech perception and spatial hearing, owing to absent access to interaural time and level differences. Rerouting technologies (CROS/BCHA) preserve audibility but do not restore binaural processing and therefore rarely improve localization or yield true spatial release from masking. Cochlear implants (CIs) can reintroduce bilateral input and enable binaural integration, yet pediatric candidacy determination is complex, developmentally constrained, and sensitive to neuroplastic timing.

This session formalizes an evidence-based audiologic workflow from referral to candidacy counseling. We specify criterion measures and their rationale such as four-frequency pure-tone average, the role of the aided Speech Intelligibility Index, constraints in aided speech perception testing, age-appropriate word recognition tasks, functional hearing measures, and suitable speech-in-noise testing. We will briefly review exclusion criteria (e.g, cochlear nerve deficiency) and family counseling topics in alignment with consideration for time-sensitive periods for auditory maturation.

Planned Session 30

Diagnostic Protocols of SSD and Asymmetric Hearing Loss

PS 30-3

HRTF Individualization to Optimize Spatial Perception in Virtual Environments

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Auditory spatial perception relies on binaural processing, which is often disrupted in individuals with hearing impairment, particularly in those with asymmetric hearing between the two ears. Reduced sound localization ability and impaired spatial perception are among the most common complaints of hearing-impaired patients and may also pose significant safety concerns in daily life, such as difficulty detecting approaching vehicles or environmental hazards. Despite their clinical importance, objective assessment of these functions remains limited. Conventional diagnostic approaches require large physical spaces and complex multi-speaker systems, restricting their accessibility in routine clinical settings.

Virtual reality (VR) technology offers a promising alternative by enabling the creation of spatialized auditory environments without the need for extensive physical infrastructure. However, a key technical challenge persists: spatial auditory input at the peripheral auditory system is highly individualized, depending on each person's anatomical characteristics. Therefore, head-related transfer functions (HRTFs) implemented in VR systems must be tailored to individual anatomy to achieve accurate spatial perception.

We have previously demonstrated successful VR-based training of sound localization ability in patients with single-sided deafness by applying listener-specific spatialized auditory stimuli within the virtual environment. Currently, we are investigating efficient and user-friendly approaches to HRTF individualization to support accessible, clinically feasible testing and effective rehabilitation of auditory localization ability in virtual environments.

Planned Session 30

Diagnostic Protocols of SSD and Asymmetric Hearing Loss

PS 30-4

Behavioral and Neural Markers of Speech-in-Noise Processing Assessed by the Digit-in-Noise Test

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Background: Speech-in-in noise (SiN) perception is a complex process requiring both peripheral auditory integrity and central cognitive resources. While the Digit-in-Noise (DiN) test has emerged as an efficient clinical tool, its potential to reflect underlying neural mechanisms remains to be fully elucidated. This presentation integrates behavioral outcomes from the Korean DiN test with electrophysiological markers to provide a comprehensive understanding of the auditory-cognitive interface across various clinical populations.

Methods: Across a series of studies, we evaluated K-DiN performance in individuals with normal hearing, symmetric/asymmetric hearing loss (HL), and mild cognitive impairment (MCI) with HL. Behavioral speech reception thresholds (SRTs) were correlated with pure-tone averages (PTA) and word recognition scores. To identify neural markers, we employed cortical auditory evoked potentials (CAEP) with dipole source analysis and EEG oscillatory analysis during attentive K-DiN and SiN tasks.

Results: The K-DiN demonstrated excellent discriminative ability, yielding 90% sensitivity and 98% specificity (AUD 0.98) for detecting mild hearing loss. In clinical applications for asymmetric HL, K-DiN SRTs were more closely related to the PTA of the better-hearing ear, supporting its utility as a reliable sound-field assessment tool. Beyond behavioral aspects, electrophysiological findings in individuals with single-sided deafness revealed a significant left hemispheric dominance in N1 activation during SiN tasks - a pattern not observed in quiet conditions - where N1 activity was significantly associated with both the duration of deafness and SiN perception ability. Furthermore, neural oscillation patterns in older adults indicated that while alpha rhythm enhancements served as a neural correlate of auditory attention in the HL group, the group with MCI exhibited increased frontal theta activity. This theta power was negatively correlated with both K-DiN accuracy and MoCA scores, suggesting that theta rhythm is a sensitive neural marker for cognitive decline during SiN processing.

Conclusion: The synergy between behavioral K-DiN test and objective neural markers offers a robust framework for assessing central auditory function. These findings highlight the potential of accessible diagnostic systems to detect early neurocognitive changes and inform personalized rehabilitation strategies for diverse hearing-impaired populations.

Planned Session 31

Auditory Implants: Outcomes & Future Directions I
PS 31-1

Virtual cochlear implantation: Clinical outcomes

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The microanatomy of the human cochlea is highly individual. Our team analysed the variability with a focus on predicting the microanatomy from the clinical scans of cochlear implant users. Our particular aim, in addition to understanding the formative forces in the development of cochlear morphology, is to understand the final location of the cochlear implant in the individual cochlea so that prediction becomes possible. This could guide the electrode selection process for the surgery.
Using micro-computer tomography we have analysed human cochleae with the focus on mathematically describing the exact form of the human cochlea. We subsequently have developed computer models mimicking the shape of the human cochlea that allow predicting the details of the individual cochlear anatomy from the clinical CTs. For this goal, we analysed the lateral wall as well as the modiolus, details of the 3D shape of the scala tympani and its vertical profile, to finally propose a detailed 3D model of the cochlea. The most recent 3D model not only estimates specific outcome parameters but allows for entire, three-dimensional virtual implantations of patient-specific cochlear anatomy with different types of electrode arrays. The model was trained based on imaging datasets of 186 human cochleae, which contained 171 clinical computer tomography images (CTs) of actual cochlear implant patients as well as 15 high-resolution micro-CTs of cadaver cochleae to also reconstruct the refined intracochlear structures not visible in clinical imaging. The model was validated on an independent dataset of 141 preoperative and postoperative clinical CTs of cochlear implant recipients and outperformed all currently available planning approaches, both in terms of accuracy but also regarding the amount of information that is available prior to the actual implantation. Finally, such models provide prediction of the individual place-frequency relations. In conclusion, cochlear models provide a key tool for individualized cochlear implant surgery and allow a refined programming of speech processors after implantation.
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Planned Session 31

Auditory Implants: Outcomes & Future Directions I

PS 31-2

A Retrospective Study for Binaural Speech Perception Patterns in Adult Listeners with Hearing Aids and/or Cochlear Implants

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Rationale/Purpose
A nuanced exploration into the individualized facets of binaural advantages and disadvantages remains an under-explored terrain in both research and clinical practice. That is, some individuals show little benefit or worse performance for speech perception compared to either ear alone. This indicates that a profound understanding of binaural and monaural benefits holds the potential to enhance various aspects of binaural speech perception significantly. This study aimed to explore binaural perception patterns in hearing aid (HA) and/or cochlear implant (CI) users by using retrospective data analysis of their monaural vs. binaural speech perception scores.

Methods
Retrospective records from 172 CI users and 82 HA users in two audiology clinics in Kentucky (University of Louisville Hospital and Heuser Hearing Institute) were reviewed. Participants were categorized into three groups: 1) those who used two HAs (bilateral HA), 2) those who used two CIs (bilateral CI), and 3) those who used bimodal stimulation (a CI with a contralateral hearing aid: bimodal CI). Their demographic information (age, sex, duration of hearing loss, amount of residual hearing, duration of hearing device use), pure tone audiometry, and speech perception scores (AzBio in quiet under standard clinical conditions with loudspeaker at 0° azimuth) were analyzed. In particular, the participants' monaural (each ear separately) and binaural speech perception scores were extracted, and subjects were assigned to one of four patterns using predefined rules based on differences between the binaural score (B) and the better (b) and worse (w) monaural scores: binaural benefit ($B \geq b + \delta$), better-ear dominance ($|B - b| < \delta$), binaural averaging ($w + \delta < B < b - \delta$), or binaural interference ($B \leq w - \delta$), with δ defined by clinic test–retest variability (5 percentage points used in this study). We compared pattern distributions across groups and explored clinical predictors using multinomial regression.

Results
Across groups, all four patterns were observed.

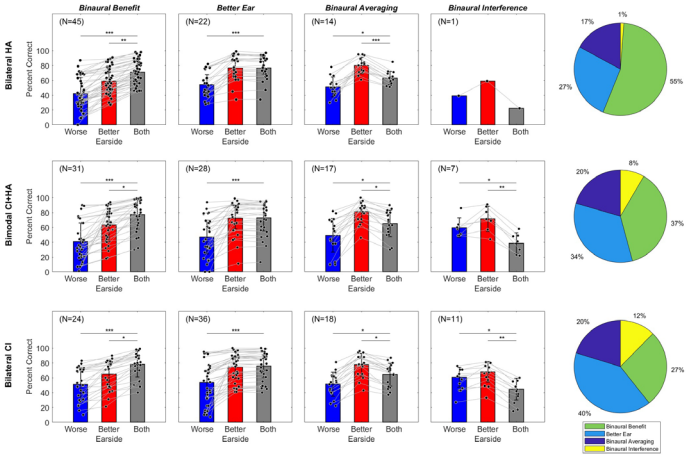


Figure Individual and average AzBio speech perception scores for four different binaural perception patterns.

Within the bilateral HA group, the binaural benefit pattern was the most common at 55%, the better-ear pattern was 27%, the binaural averaging pattern was 17%, and only 1% of subjects exhibited binaural interference patterns. Within the bimodal CI group, the binaural benefit and better-ear patterns were similar at 37% and 34%, respectively; the binaural averaging pattern was 17%, and an increased binaural interference pattern (8%) was observed. Within the bilateral CI group, the better-ear pattern was relatively dominant (40%), and 27% binaural benefit, 20% binaural averaging, and 12% binaural interference patterns were observed. Neither subject demographic data (i.e, residual hearing) nor audiometric thresholds explained those binaural speech perception patterns within or between subject groups.

Conclusions
The results from this retrospective observational study have strong clinical implications for the management of cochlear implantation, especially for transitioning from bilateral HA to bimodal CI+HA and from bimodal CI+HA to bilateral CIs. The presence of both binaural averaging and binaural interference patterns implies that listening on two devices is not always better than one. Increased understanding of how those binaural disadvantages affect speech perception for hearing-impaired listeners is clinically essential for the future design of training- and device-based rehabilitative strategies to increase the benefits of binaural processing for speech perception in both quiet and noise. In addition, delving into the intricacies of individual binaural benefits is crucial for refining treatment strategies and tailoring services to the unique needs of each recipient, consequently bolstering speech perception and spatial hearing abilities. Such insights hold promise for addressing suboptimal outcomes, notably in mitigating instances of binaural interference.

Planned Session 31

Auditory Implants: Outcomes & Future Directions I

PS 31-3

Future of auditory prostheses beyond the cochlear implant: First-in-human results for a novel auditory nerve implant

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The cochlear implant is one of the most successful neural prostheses, with more than one million devices implanted into patients worldwide. However, advancing the performance of cochlear implants by better stimulating the auditory nerve has plateaued, largely due to the difficulty in directly stimulating the auditory nerve through the bony wall of the cochlea. This limitation leads to major challenges in outcomes for real-world tasks, such as understanding speech in noise and for music appreciation. Our project has developed a novel auditory nerve implant (ANI) that combines a Blackrock Neurotech electrode array coupled to a MED-EL Synchrony 2 cochlear implant stimulator. The goal is to evaluate the benefits of more direct and focal microstimulation of the auditory nerve compared to a cochlear implant, which will be assessed through perceptual testing in an upcoming pilot clinical study. Extensive technology development, along with multiple pre-clinical and intraoperative clinical evaluations have been performed to pave the way for the pilot study of the ANI device, which is expected to initiate in April 2026. Our pre-clinical studies included over 40 human cadaver head experiments to develop the proper surgical approach and finalize the design for the ANI array and cabling. Additionally, a chronic cat ANI study was successfully performed to demonstrate safety and stability of device implantation and function over time. More recently, a first-in-human intraoperative study acutely implanting the ANI array into the auditory nerve of five patients undergoing an acoustic neuroma surgery was performed under Ethics Committee approval at the Hannover Medical School in Hannover, Germany. The electrical stimulation regimen for both the cat and intraoperative studies was evaluated through electrically evoked auditory brainstem responses and electrode impedance measurements. Overall, our team found that the ANI could be safely and successfully positioned into the auditory nerve while exhibiting low stimulation thresholds below 10 to 20 μA, which are an order of magnitude lower than those observed with cochlear implant stimulation. Evoked response measurements showed robust activation of downstream auditory brainstem structures. Based on these positive results across various preclinical and device testing, our team is now preparing for our first-in-human study where the ANI array will be implanted in deaf patients and evaluated over a one-year period in order to demonstrate low-threshold and spatially focused auditory activation while also confirming safety, stability and hearing performance over time that will guide the next generation ANI system for a larger clinical trial.

Planned Session 31

Auditory Implants: Outcomes & Future Directions I

PS 31-4

When the Sound Stops: Psychosocial and Clinical Impacts of Cochlear Implant Obsolescence – A qualitative sub-study

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Background: Cochlear implant (CI) sound processors inevitably reach technological obsolescence, yet little is known about how this impacts older adults who depend on them for communication and well-being. This qualitative sub-study aimed to explore the lived experiences of Australian adults aged 65 years and over, using obsolete CI sound processors and to examine the psychosocial impacts following an upgrade.

Methods: Twenty-two participants comprising 15 CI users and 7 communication partners took part in semi-structured interviews conducted via video or phone. Interviews were transcribed verbatim and analysed thematically using Braun and Clarke's reflexive framework. The study formed part of a larger mixed-methods project evaluating the clinical and cost-effectiveness of upgrading obsolete sound processors. Ethics approval was obtained from the Hearing Australia Human Research Ethics Committee (HAHREC/EC00109).

Results: Two overarching themes were identified. First, obsolescence produced significant psychosocial consequences for CI users and their communication partners, including communication breakdowns, social withdrawal, and anxiety linked to device failure and financial strain. Second, upgrading to new technology restored hearing access, confidence, and social participation, enabling renewed engagement with music and family life. These findings illustrate that the impacts of obsolescence extend beyond technical limitations to impact emotional well-being and social participation in later life.

Conclusion: Older adults aging with cochlear implants may experience both auditory and psychosocial challenges when their sound processors become obsolete. Upgrading older processors can restore hearing access, confidence, and participation in everyday communication. These findings emphasise the importance of recognising the real-world impacts of aging hearing technology, and of considering technology lifespan and user experience as part of long-term cochlear implant care.

Keywords: cochlear implants; obsolescence; older adults

Planned Session 32

WHO: Deafness & Hearing Loss
PS 32-1

The World report on hearing: An integrated people centered approach

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In 2021, the World Health Organization published the World report on hearing, which highlights the growing prevalence of hearing loss and proposes a public health framework to address it. Based on current population trends, it estimates that by 2050 every fourth person is likely to have a hearing loss, with over 700 million in need of rehabilitative interventions.
The report also celebrates the major advances that have been made in the field of ear and hearing care over the past decades, where solutions are available to address all hearing related needs through medical, surgical, rehabilitative and supportive interventions. It draws attention to the fact that, despite this progress, less than 20% of those in need for hearing care are able to benefit from these solutions, underlining the need for strong public health action to make ear and hearing care accessible for all.
The report then outlines the concept of integrated people-centered ear and hearing care that can help to address challenges faced in this field, including lack of trained personnel, policy and financing gaps, low capacity for service delivery at primary care level, and high cost of equipments and devices.
The report further proposes the set of H.E.A.R.I.N.G. interventions, which when integrated into and delivered through national health systems can improve access, helping countries to achieve the target of a 20% relative increase in effective coverage of hearing care services. Improving access to services will improve the lives of those in need and bring governments a return of $16 for every dollar invested in this field.
The presentation will summarize the findings of the World report on hearing and its proposed way forward for ensuring equitable access to ear and hearing care across the world.

Planned Session 32

WHO: Deafness & Hearing Loss
PS 32-2

Ear and hearing care accessible for all: WHO's role

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Hearing loss represents a major global public health challenge. WHO estimates that 1.5 billion people currently live with some degree of hearing impairment, a number projected to rise to 2.5 billion by 2050, with more than 700 million requiring rehabilitation services. Unaddressed hearing loss imposes an annual global cost of US$980 billion, equivalent to 1.34% of the world's GDP, underscoring the urgent need for accessible and integrated ear and hearing care (EHC). In 2021, WHO launched the World Report on Hearing, which provided a comprehensive public health framework and emphasized Integrated People-Centred Ear and Hearing Care (IPC-EHC) as a prioritized strategy to ensure equitable access to services across the life course. This is particularly critical in low- and middle-income countries, where nearly 80% of people with hearing loss reside and over 50% of cases are preventable through cost-effective public health interventions, including immunization, effective management of otitis media, and safe listening practices.

Building on World Health Assembly resolution WHA70.13 on prevention of deafness and hearing loss, and subsequent commitments on sensory health including resolution WHA78.7 on primary prevention and integrated care for sensory impairments, WHO has strengthened the integration of EHC across the life course and continuum of care. Within this mandate, WHO's roles in EHC include, among others:

(1) Leadership role, providing evidence-based normative, technical, and policy guidance, including defining a strategic direction for the field and ensuring a common narrative among all stakeholders. This includes generating resources and tools, such as the World Report on Hearing (2021), the Package of Ear and Hearing Care Interventions (PEHCI), the Make Listening Safe initiative, service delivery guidance, and monitoring frameworks.

(2) Health systems strengthening, promoting the integration of IPC-EHC within universal health coverage (UHC), with particular emphasis on community and primary health care levels, operationalized through the H.E.A.R.I.N.G. framework (Hearing screening and intervention; Ear disease prevention and management; Access to technologies; Rehabilitation; Improved communication; Noise reduction; and Greater community engagement).

(3) Global advocacy and monitoring, supporting Member States in conducting national situation analyses and reporting standardized EHC indicators to guide policy and investment decisions.

Among WHO regions, the Western Pacific presents one of the highest burdens of hearing loss globally, with approximately 760 million people living with the condition. This burden is framed by rapid population ageing, geographic dispersion across remote territories and islands, workforce shortages, and inequitable access to interventions and assistive technologies. Despite these challenges, Member States are advancing ear and hearing care within national health systems with WHO support.

Under its (1) leadership role, WHO has supported countries in adapting global frameworks and evidence to national contexts. For example, seven Pacific Island Countries utilized WHO support and guidance on vision and hearing screening for school-aged children to secure long-term funding for assistive technology implementation, including hearing aid provision in settings where policy frameworks and service delivery were previously very limited. In Malaysia, the government is expanding screening and early intervention services for children, supported by WHO technical guidance toward a comprehensive sensory health approach, with pilot implementation planned for 2026.

In its (2) health systems strengthening role, WHO has supported the integration of IPC-EHC into primary health care platforms. In Kiribati, ear and hearing care is planned to be incorporated into primary health care services, with WHO supporting advocacy efforts and workforce training to address limited human resources. In Indonesia, ear and hearing screening is being incorporated as part of the national annual health screening programme for different population groups, supported by WHO normative and technical guidance.

Finally, through its (3) global advocacy and monitoring role, WHO has facilitated national situation analyses and the adoption of standardized indicators across the Region. For example, the WHO Collaborating Centre at the University of Auckland is conducting an EHC regional situation analysis, with results expected in 2026. WHO also supports Member States annually in the observance of World Hearing Day on 3 March, aligning global themes with national priorities and strengthening public awareness efforts.

These experiences illustrate how WHO's roles support accessible ear and hearing care for all, translating global commitments into context-specific actions that strengthen prevention, early identification, access to technologies, and rehabilitation services across the life course. At a time when multilateral institutions face increasing scrutiny, demonstrating how global actions are translated into locally owned and sustainably financed initiatives highlights the tremendous value of international cooperation and international organizations. WHO's role in ear and hearing care goes beyond developing needed tools and issuing essential statements; it serves as a bridge connecting evidence, policy, funding/donors, and implementation to advance equitable access to hearing services worldwide. Strengthening these global-to-local linkages remains crucial to ensuring that no person with hearing loss is left behind.

Planned Session 32

WHO: Deafness & Hearing Loss
PS 32-3

World Hearing Day and Related Advocacy Initiatives

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World Hearing Day is an annual global advocacy event for raising awareness regarding hearing loss and promoting ear and hearing care and calling for action to address hearing loss and related issues. Each year, this event is celebrated on 3 March, covering a specific theme on which the World Health Organization and its partners carry out activities based on this theme. This presentation will cover the history and current programs of the World Hearing Forum related to World Hearing Day and other advocacy efforts including ways in which the attendees could become involved.

Planned Session 32

WHO: Deafness & Hearing Loss
PS 32-4

Make Listening Safe: Setting Global Standards for Safe Listening

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Hearing loss is one of the fastest growing global public health challenges, yet a large proportion of cases are preventable. Today, more than one billion young people are at risk of permanent hearing loss due to unsafe listening practices in recreational settings. Without urgent and coordinated global action, this burden will continue to increase, affecting communication, education, employability, and quality of life across generations.

The World Health Organization's Make Listening Safe initiative was established to address this critical and preventable risk. Grounded in a life-course approach to hearing health, the initiative aims to translate scientific evidence into practical solutions that empower individuals, guide policymakers, and support industry to create safer listening environments worldwide. In response, the initiative adopts a dual public health approach:

1. To raise awareness among youth through evidence-based resources, translating scientific knowledge into practical tools that promote informed listening behaviours.
2. To set and implement standards that can facilitate safe listening

This presentation will highlight the global burden of unsafe listening and present key achievements in the development and implementation of international standards, including those for personal audio devices, entertainment venues, and emerging areas such as gaming and esports. It will also describe how the Make Listening Safe Workstream of the World Hearing Forum accelerates global uptake through technical dialogue, multisectoral collaboration, sharing of good practices, and alignment across health, technology, education, and entertainment sectors.

By sharing a clear vision of the vital role global standards play in safeguarding hearing and enhancing quality of life, this presentation aims to inspire collective action toward the WHO's goal of ensuring accessible ear and hearing care for people at every stage of life.



Figure Make Listening Safe

Planned Session 32

WHO: Deafness & Hearing Loss
PS 32-5

World Hearing Forum: Uniting to advocate for hearing care

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The World Hearing Forum, initiated in 2018, is a global network of stakeholders promoting ear and hearing care worldwide. Members of this advocacy network are committed to facilitating the implementation of World Health Assembly resolution WHA70.13 on "Prevention of deafness and hearing loss" and WHA78.7 on "Primary prevention and integrated care for sensory impairments including vision impairment and hearing loss, across the life course." The World Hearing Forum fills critical gaps related to ear and hearing care by providing a collective vision to advocate for and collaborate in this field. In general, this advocacy and collaboration is achieved across five workstreams. First, the Changemakers workstream aims to raise global awareness of hearing health and drive societal change by engaging champions, sharing impactful stories, and amplifying WHO messages. Second, the External relations workstream aims to expand the reach of the World Hearing Forum to include organizations outside the traditional ear and hearing care field, thereby embracing a broader group of aligned stakeholders and interests to enhance the global advocacy for ear and hearing care. Third, the Make listening safe workstream aims to realize a world where people of all ages can enjoy recreational music without risk to their hearing. Fourth, the Member engagement workstream aims to increase membership engagement and satisfaction in the World Hearing Forum and promotes advocacy, youth involvement, accessibility, resources, and funding. Fifth, the World hearing day workstream aims to maximize awareness on hearing loss and advocacy through the annual World hearing day. In this presentation, the speaker will discuss the goals and widespread achievements of the World Hearing Forum, across each of these five workstreams, to promote ear and hearing health worldwide.

Planned Session 33

Measurement of Tinnitus
PS 33-1

Standardizing tinnitus patient assessment: A Delphi consensus approach

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Tinnitus assessment remains inconsistent across clinics and disciplines, reflecting both the heterogeneity of tinnitus and the lack of a universally adopted assessment framework. This inconsistency reduces comparability of outcomes and complicates interdisciplinary care.

This presentation reviews a Delphi consensus approach to standardizing tinnitus patient assessment, with emphasis on recent work from the Korean Tinnitus Study Group and its relationship to international efforts. Delphi methodology, combining literature-informed statement development with iterative anonymous expert rating, offers a practical strategy for defining core assessment elements where evidence and practice remain heterogeneous.

Commonly used instruments, including visual analogue/numeric rating scales, the Tinnitus Handicap Inventory (THI), the Tinnitus Functional Index (TFI), and selected psychoacoustic measures, are critically compared in terms of feasibility, clinical utility, and responsiveness. Recent evidence regarding minimal clinically important difference (MCID) is incorporated to support interpretation of meaningful change over time.

Delphi-derived consensus findings are discussed alongside major clinical guidelines (AAO-HNSF, European multidisciplinary guideline, VA/DoD guideline) and international consensus initiatives such as COMiT'ID (Core Outcome Measures in Tinnitus International Delphi) study. A pragmatic interdisciplinary framework is proposed that combines standardized core measures with flexible patient-specific extensions, with the goal of improving consistency in routine care, multicenter comparability, and international harmonization of tinnitus assessment.

Planned Session 33

Measurement of Tinnitus
PS 33-2

Comparing Modified and Standard Tinnitus Functional Indices

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Objective: To evaluate the correlation between the Tinnitus Functional Index (TFI) and a modified TFI (mTFI) as an alternative tool for tinnitus assessment.
Study Design: Prospective cohort survey study.
Setting: Tertiary care neurotology clinic.
Methods: Starting in March 2024, patients diagnosed with tinnitus completed both the TFI and mTFI questionnaires. The mTFI is an 8-question instrument that consolidates each TFI subscale into a single question. Primary outcome measures included correlation between total index scores and individual question responses. Statistical analysis was performed using Python and the scikit-learn library.
Results: A total of 127 patients were included. The Spearman's correlation coefficient (ρ) between mTFI and TFI was 0.929 ($p< 0.001$). Individual mTFI questions demonstrated strong correlations with their corresponding TFI subscales with ρ values ranging from 0.531 to 0.925 (all $p< 0.001$). Specifically, correlations were as follows: intrusive (ρ=0.783), sense of control (ρ=0.531, cognitive (ρ=0.791), sleep (ρ=0.925), relaxation (ρ=0.870), quality of life (ρ=0.878), and emotional (ρ=0.885) with all $p<0.001$.
Conclusions: The mTFI is predictive of TFI, one of the most applied surveys for the assessment of tinnitus severity and symptoms. The mTFI takes a shorter time to fill compared to the full TFI due to its brevity. Testing this concise version of TFI in studies with larger cohorts may provide insight into modifying TFI or adopting mTFI for future studies.

Planned Session 33

Measurement of Tinnitus
PS 33-3

Audiological and psychological assessment of tinnitus patients with normal hearing

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Introduction: This study was performed to assess identifiable abnormalities in tinnitus patients with normal hearing.

Methods: The medical records of subjective non-pulsatile tinnitus patients with normal hearing confirmed by conventional pure-tone audiometry who visited our tinnitus clinic between March 2020 and May 2022 were reviewed. The loudness discomfort level (LDL), extended high-frequency hearing loss (EHFHL), summating potential (SP)/action potential (AP) ratio, distortion product otoacoustic emission (DPOAE), thresholds of auditory brainstem response (ABR) wave V, somatic modulation, and psychiatric symptoms, such as anxiety, depression, and stress were evaluated by questionnaires.

Results: Decreased LDL (n = 48, 59.8%) was the most frequent finding, followed by EHFHL (n = 29, 35.4%), increased SP/AP ratio (n = 27, 32.9%), psychiatric symptoms (n = 24, 29.3%), decreased DPOAE (n = 17, 20.7%), somatic modulation (n = 8, 9.8%), and increased ABR threshold (n = 3, 3.7%); 75.6% of patients had one or more of these findings. The presence of psychiatric symptoms was independently associated with the Tinnitus Handicap Inventory (THI) score.

Conclusion: Tinnitus in patients with normal hearing may be accompanied by a combination of various subclinical abnormal audiological findings. However, the presence of psychiatric symptoms alone was independently associated with tinnitus distress.

Keywords: normal hearing; psychiatric symptom; sound intolerance; tinnitus; tinnitus distress.

Planned Session 33

Measurement of Tinnitus
PS 33-4

Tinnitus and psychological aspects (biomarker)

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Background:
Tinnitus is a prevalent auditory symptom with substantial heterogeneity in perceived intrusiveness and disability. In routine practice, severity is commonly quantified using patient-reported outcome measures, particularly the Tinnitus Handicap Inventory (THI). However, THI largely reflects tinnitus-related distress and functional impact rather than auditory percept strength alone, and it is well recognized that higher THI scores are accompanied by stronger depressive/anxious tendencies, especially in severe cases (1). Building clinically useful "biomarkers of tinnitus" therefore requires a multidomain view: (i) clinical endophenotypes that capture the distress phenotype and treatment needs, (ii) molecular state markers that may fluctuate with distress and treatment response, and (iii) genetic trait/prognostic markers that index vulnerability to severe tinnitus suffering.
Objective:
To propose a practical multidomain biomarker framework for tinnitus by integrating (i) questionnaire-based phenotyping using the Tinnitus Sample Case History Questionnaire (TSCHQ) with THI severity strata, (ii) plasma brain-derived neurotrophic factor (BDNF) as a candidate molecular marker, and (iii) a candidate single-nucleotide polymorphism (SNP) marker (BCR rs131702) associated with severe tinnitus distress.
Data Sources and Methods (three complementary domains):
(i) TSCHQ phenotype dataset: An outpatient tinnitus cohort (n=82) completed the Japanese TSCHQ. Patients were stratified by THI into mild (0–16), moderate (18–56), and severe (58–100) groups; hearing level was assessed using the four-frequency pure-tone average. TSCHQ item response proportions were compared across groups, with standard analyses for numeric variables and correlations.
(ii) Plasma BDNF dataset: A published plasma biomarker study measured plasma BDNF in tinnitus patients (n=43) and healthy controls (n=30), relating BDNF to THI and mood burden assessed by the Hospital Anxiety and Depression Scale (HADS). Patients were categorized as mildly vs severely handicapped according to THI thresholds, with additional analyses by HADS score (2).
(iii) SNP dataset (BCR rs131702): A chronic tinnitus cohort (n=138; duration >3 months) underwent genotyping of candidate SNPs related to psychological traits. Severe tinnitus distress was defined by THI. Anxiety and depression were measured using STAI (state/trait) and SDS; regression analyses examined whether rs131702 was associated with severe THI independent of psychological measures and whether state anxiety acted as a confounder/mediator (3).

Results:
(i) TSCHQ-defined clinical endophenotype linked to severe THI.
The TSCHQ cohort comprised mild (n=12), moderate (n=45), and severe (n=25) groups. Mean age was similar (~60 years). Mean hearing thresholds increased only modestly with severity (mild 37.8 dB HL; moderate 38.6 dB HL; severe 45.2 dB HL), indicating that severe tinnitus handicap cannot be explained by peripheral hearing loss alone. Fourteen TSCHQ items showed significantly higher response proportions in the severe group, while no TSCHQ items significantly differentiated mild from moderate groups. Clinically, the severe group displayed a characteristic "distress cluster," emphasized in the discussion as including: ① prominent auditory hypersensitivity features (hyperacusis-related items), ②stronger linkage between tinnitus and sleep disturbance, ③ higher rates of accompanying symptoms (multisymptom burden), and ④higher prevalence of psychiatric treatment history—suggesting that severe tinnitus presentations require comprehensive, multidisciplinary responses beyond an ear-only model. Thus, TSCHQ+THI constitutes an immediately implementable phenotype biomarker panel for endotyping and triage (e.g, identifying patients who may benefit from coordinated hyperacusis management, sleep intervention, and psychological care alongside tinnitus counseling).
(ii) Plasma BDNF as a candidate molecular "state" biomarker.
The plasma BDNF study reported that BDNF levels varied with tinnitus handicap severity: plasma BDNF was significantly higher in the mildly handicapped tinnitus group than in both the severely handicapped group and controls ($P<0.01$). (PubMed) Furthermore, mood burden tracked both handicap and BDNF: patients with lower HADS scores (≤14) exhibited significantly lower THI scores ($P<0.05$) and higher plasma BDNF levels ($P<0.01$). (PubMed) These findings support plasma BDNF as a measurable biological correlate of the distress-linked state in tinnitus, consistent with the conceptualization that THI increasingly reflects affective load in severe cases. In a biomarker framework, plasma BDNF may be most relevant for monitoring clinically meaningful change in distress-oriented interventions (e.g, multimodal counseling, sleep-focused management, and cognitive-behavioral approaches), rather than indexing tinnitus loudness per se.
(iii) BCR rs131702 as a candidate genetic "trait/prognostic" biomarker.
In the chronic tinnitus SNP study, rs131702 in the breakpoint cluster region (BCR) gene was significantly associated with severe THI scores. rs131702 was reported to be independent of depression severity (SDS) and STAI-trait anxiety, while showing a significant association with severe STAI-state anxiety. Multiple regression suggested that STAI-state partially explained the rs131702–THI association (coefficient decreased after adjustment), yet rs131702 remained significantly associated with severe THI even after controlling for state anxiety—supporting its role as a potential prognostic marker for vulnerability to severe tinnitus distress.

Integrated Interpretation and Proposed Framework:
Taken together, these datasets converge on a coherent view: severe tinnitus handicap is best understood as a distress-centric phenotype, characterized by anxiety/arousal, sleep involvement, multisymptom burden, and sensory hypersensitivity. The TSCHQ+THI signature provides a scalable clinical endophenotype marker; plasma BDNF offers a candidate molecular state marker associated with handicap and mood burden; and BCR rs131702 represents a candidate genetic trait/prognostic marker linked to severe distress and state anxiety. 1) A pragmatic "tinnitus biomarker" strategy should therefore integrate phenotyping (who is at risk and what cluster they belong to), state biology (what fluctuates with distress and treatment), and trait risk (who is vulnerable to severe outcomes).
Conclusions:
A multidomain biomarker framework that treats THI as an index of tinnitus-related distress—closely intertwined with anxiety/depression—naturally aligns with real-world severe tinnitus presentations. TSCHQ-based endotyping can guide immediate stratified care, plasma BDNF may support objective monitoring of distress-linked states, and BCR rs131702 may help identify vulnerability to severe tinnitus suffering. Future longitudinal studies should test whether combining these domains improves prediction, treatment selection, and outcome monitoring beyond THI alone.

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Planned Session 33

Measurement of Tinnitus
PS 33-5

Objective assessment of tinnitus using functional near-infrared spectroscopy and machine learning

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Background: There are currently no objective measures of tinnitus that can be used clinically. Clinical assessment of the condition uses subjective feedback from individuals, which is not enough to provide information on underlying neural changes and is prone to placebo effects. We have shown sensitivity of a non-invasive brain imaging technique called functional near-infrared spectroscopy (fNIRS) to detecting tinnitus presence, severity and, subtypes based on laterality of the perceived sound.

fNIRS is a non-invasive brain imaging technique which uses near-infrared light to monitor changes in blood oxygen levels allowing imaging and analysis of the oxygen demands of active brain regions. fNIRS measures changes in oxygenated and de-oxygenated haemoglobin concentrations using a montage of light sources and detectors placed on a cap.

Objective: our overall aim is to develop clinically translatable objective measures of tinnitus to detect the presence and severity of the condition and identify subtypes of tinnitus based on underlying neural activity.

Methods: We recorded multi-channel fNIRS signals at rest and in response to auditory or visual stimuli from 156 individuals with chronic tinnitus and 83 controls. Severity of tinnitus was rated using the Tinnitus Handicap Inventory and subjective ratings of tinnitus loudness and annoyance were measured on a visual rating scale. Features were derived from both evoked responses and resting state data, including measures of connectivity which quantify how different parts of the brain interact. These features were then compared between groups and within individuals with tinnitus at different severity levels. In a subset of participants, we recorded heart rate in addition to fNIRS as an indicator of stress experienced in individuals with tinnitus.

To investigate differentiating laterality of the perceived tinnitus sound we matched a subset of participants with unilateral and bilateral tinnitus and a group of controls, for age, gender and hearing levels. Two fNIRS features of connectivity- Module Laterality and Modified Module Laterality- were used to compare groups.

Using the same protocol, we also performed fNIRS recordings in a group of cochlear implant users who experienced tinnitus and whose perception of tinnitus changed with use of their implant. A cochlear implant is used to provide a sense of sound to a person who is deaf and, in many cases also suppresses tinnitus. We performed resting state and evoked recordings with the cochlear implant turned on and off. To assess neural synchrony, we compared functional connectivity measures with the implant turned on and off.

Results
Detection of tinnitus presence and severity: Using machine learning applied to fNIRS signals, we differentiated individuals with tinnitus from controls with 78% accuracy and individuals with mild versus severe tinnitus, with 87% accuracy using cross-validation testing. By adding measures of heart rate as an indicator of stress, a common symptom in tinnitus, we further improved classification of individuals at low versus high severity levels to 90% accuracy.

Identifying tinnitus subtypes based on sound laterality: Comparison of groups with tinnitus perceived on different sides showed significant difference in Module Laterality in individuals with uni¬lateral tinnitus compared to both bilateral tinnitus and controls. Within the unilateral tinnitus group, Modified Module Laterality showed significant difference between indi¬viduals who experienced left-sided tinnitus compared to right-sided tinnitus.

Detecting tinnitus severity within individuals: In cochlear implant users we found a significant correlation ($r = 0.79$) between changes in diversity coefficient (a measure of connectivity) and changes in loudness ratings with the implant turned on and off.

Conclusion: Objective measures of tinnitus presence, severity and subtypes would greatly benefit clinicians, researchers and patients by providing a tool to assess new treatments, monitor patients' treatment progress and aid personalised treatment interventions by identifying tinnitus subtypes based on underlying neural changes.

Planned Session 34

AI/Big Data

PS 34-1

Beyond the audiogram: Using patient-reported outcomes and speech-in-noise to uncover hearing loss

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Importance: Pure-tone audiometry and speech tests are standard tools used to characterize hearing loss in clinical practice. This nationwide study aimed to combine these measures with Patient-Reported Outcome Measures (PROMs) to explore whether they offer additional patient-centered insights.
Objective: To determine whether integrating PROMs into audiological practice can reveal specific functional and emotional needs not captured by traditional audiological tests.
Design: We conducted a population-based cross-sectional analysis on data collected between September 1, 2020, and December 31, 2022.
Setting: Multicentre study involving 700 audiology clinics across France.
Participants: A total of 91,297 adults aged 18 to 99 years with symmetrical HL were included based on the completeness of pure-tone audiometry, speech tests and PROMs.
Exposures: Hearing loss degree was assessed using hearing thresholds combined with speech understanding abilities measured both in quiet and in noise. Overall, 723,255 PROMs were collected using a validated personalized scale of improvement where patients identified up to five listening situations for improvement with hearing rehabilitation.
Main Outcomes and Measures: The primary outcomes were specific hearing loss-related needs depending on hearing loss degree, age and sex. For this, we used SMOGN (Minority Over-Sampling Technique for Regression with Gaussian Noise) regression models with hearing threshold as the response variable.
Results: The sample was gender-balanced (44,525 females; 46,762 males) with an average hearing threshold of 42.9 dB HL (SD, 11.3) and a mean age of 72.1 years (SD, 11.8). Among 273,861 PROM responses, patients with slight to moderate hearing loss revealed a wide range of functional needs – such as converse in a group in noise or follow a phone call – and emotional needs – such as avoiding embarrassment during social interactions - that varied significantly by age and gender, but independently of average hearing threshold. In contrast, for patients with severe to profound hearing loss, specific hearing needs were primarily driven by average hearing threshold.
Conclusions and Relevance: PROMs identify specific hearing needs that are not addressed by conventional audiological measure, particularly in slight to moderate hearing loss, where individual variability is high. This large-scale study strongly supports the integration of PROMs into routine audiological care in order to offer more personalized and effective rehabilitation strategies.

Planned Session 34

AI/Big Data
PS 34-2

Age-Related Changes in Hearing and Speech Perception and Their Impact on Dementia Risk: Evidence from Clinical Big Data in Japan

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Background:
Age-related hearing loss is characterized by a predominant elevation of high-frequency pure-tone thresholds accompanied by declines in cochlear tuning and central auditory processing, resulting in reduced speech perception. However, detailed age- and sex-specific changes in hearing thresholds and speech understanding, as well as their broader societal impact, remain insufficiently characterized in large populations. This study summarizes findings from hospital-based big data analyses to clarify patterns of auditory aging and their implications for public health in Japan.

Methods:
We analyzed several large clinical datasets accumulated at a tertiary medical center. First, average hearing levels were evaluated in 23,860 individuals without interaural differences or air–bone gaps to determine age-related prevalence of hearing loss. Second, after excluding outliers, 10,681 individuals were analyzed to establish standard hearing thresholds by age and frequency. Third, in 2,760 patients who underwent both pure-tone audiometry and speech audiometry during the same period, the relationship between bone-conduction thresholds and maximum speech discrimination scores was examined. Finally, the contribution of hearing loss to dementia incidence in Japan was re-estimated using national prevalence data combined with our auditory big data and published risk estimates.

Results:
Analysis of 23,860 cases showed that approximately three-quarters of both men and women in their late 70s had some degree of hearing loss, and more than half of those in their early 80s had moderate or greater hearing loss. In contrast, a national survey reported that only 33.6% of individuals aged 75 years or older were aware of having hearing impairment, indicating a substantial gap between objective findings and subjective perception.

From the 10,681-case dataset, standard age-specific hearing thresholds across frequencies were established. High-frequency thresholds increased earlier in men, whereas low-frequency thresholds showed greater age-related elevation in women at advanced ages. A screening device developed based on these data demonstrated a normal distribution centered on age-appropriate thresholds in over 1,000 users nationwide. These results suggest that not only mean hearing levels but also deviation from age-appropriate norms can be used to encourage medical consultation and promote hearing health awareness.

Analysis of 2,760 cases (5,508 ears) revealed a clear association between bone-conduction thresholds and maximum speech discrimination scores. Even at comparable levels of cochlear function, speech discrimination declined with advancing age. Furthermore, poorer-hearing ears exhibited significantly lower speech discrimination than better-hearing ears with similar thresholds and than ears without interaural differences. These findings suggest the presence of auditory disuse at the ear level and support the importance of early auditory rehabilitation, including timely hearing aid use.

Reanalysis of dementia risk factors using Japanese prevalence data demonstrated that hearing loss remains the largest contributing modifiable risk factor for dementia in Japan, consistent with global findings. Physical inactivity was identified as the second largest contributor. These results confirm the critical role of hearing loss prevention and management in national dementia strategies, tailored to Japan's demographic and disease structure.

Conclusions:
Large-scale clinical big data reveal distinct age- and sex-related patterns of hearing threshold changes and progressive declines in speech perception, even among individuals with similar cochlear function. Objective hearing impairment is far more prevalent than self-reported awareness in older adults. Furthermore, hearing loss represents the most significant modifiable contributor to dementia risk in Japan. Ongoing research aims to translate these findings into practical screening tools and public health interventions to promote early detection, timely rehabilitation, and improved auditory health management in an aging society.

Planned Session 34

AI/Big Data
PS 34-3

Hearing loss compensation using auditory models and deep neural networks

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Computational models of hearing have been used for research in normal and impaired hearing in academia and studied in industry to inspire hearing aid design. But the potential of applying them directly in hearing aid design for e.g. addressing the 'cocktail party' problem has never been fulfilled. The presented work aims at applying these auditory models directly for training a deep learning (DL) algorithm to provide individualized hearing-loss compensation (HLC) and noise reduction (NR), thus paving the way towards fully neural- and AI-based hearing devices. We propose a DL-based closed loop approach for hearing loss compensation, which is trained on the outputs of hearing-impaired and normal hearing auditory models in response to speech signals. Listening test results will be presented and future perspectives discussed. The proposed AI-based approach has great potential in improving the quality of life for people with hearing loss.

Planned Session 34

AI/Big Data
PS 34-4

Audiometrically normal, but attending an audiology clinic: What do we know about these clients? Using machine leaning to model the demographic and hearing characteristics of individuals with subjective hearing loss

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Background:
A key challenge facing audiologists is managing clients who report hearing difficulties despite having normal audiograms, for whom traditional amplification options are limited. Evidence suggests that these clients' concerns are often minimised, with clinicians noting that hearing aid fitting guidelines restrict available options. This group of clients remains poorly described in the literature.

Objectives:
To compare demographic and hearing related characteristics of clients attending audiology appointments who have audiometrically normal hearing with those who have objective hearing loss.

Methods:
Clients from a large chain of audiology clinics were categorised as having normal hearing if thresholds in both ears were ≤20 dB HL, and non normal otherwise.
XGBoost machine learning models were developed to classify the data. SHAP (Shapley Additive exPlanations) values were used to interpret model behaviour and determine the relative contribution of each variable.
Variables examined included: age at first appointment, sex, best ear three frequency average, AB word scores, QuickSIN scores, tinnitus (presence, bothersomeness, awareness), psychosocial health measures, and 0–10 self report scales for hearing ability, impact on quality of life, work related effects, and motivation to address hearing concerns.

Results:
Data from 4,449 normal hearing adults and 38,632 non normal adults were analysed. Although male and female numbers were similar overall, significantly fewer males had audiometrically normal hearing. Among those with normal audiograms, tinnitus was a more prominent factor. AB word scores were almost universally within normal limits; however, 17.3% demonstrated mild or greater difficulty on the QuickSIN, compared with 68.5% of non normal clients. Median motivation scores for addressing hearing concerns were only one point lower than in the non normal group. More than 10% of those with normal audiograms reported frustration and worry about their hearing.

Conclusion:
Approximately 10% of clients attending audiology clinics had normal hearing thresholds yet reported significant impacts on daily life. Tinnitus may be a more substantial driver of their concerns than in clients with measurable hearing loss. Clinicians should be aware of the challenges faced by this group and consider management options beyond traditional hearing aids.

Planned Session 34

AI/Big Data
PS 34-5

How AI is shaping the future of hearing care

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Actively participating in social life and here specifically in conversations in challenging listening conditions, the cocktail party, has ranked as the top problem for people with hearing loss over decades. In hearing aids many solutions have been introduced to improve speech intelligibility in a variety of challenging listening conditions. The most successful solution to date is to apply multi-microphone technology, so called beam-former, enhancing sounds from specific directions. By combining microphones in different ways, targets from different directions, either, front, side, rear, can be enhanced while interfering sounds from other directions can be reduced. These types of algorithms have shown significant improvements in clinical studies and provide significant benefit to people with hearing loss in daily life communication. However, these techniques also have some drawbacks, one of which being that in very dynamic conversation situations they might not be capable of following the target sound fast enough. In recent years techniques from machine learning or artificial intelligence have been extensively explored regarding their potential and limitations for speech enhancement in many applications, hearing aids being one of them. Many different types of DNN based algorithms have been explored and tested. Hearing aids pose specific challenges to DNN-based speech enhancement algorithms in that hearing aids are very constrained regarding computation power and memory capacity due to the small volume of the devices. Furthermore, hearing aid signal processing requires "real-time" processing, the delay through the hearing aid should be less than 15 ms. Finally, hearing aids have to work in a vast number of different conversation situations taking place in different acoustic scenes. This requires very sophisticated training procedures to assure generalization of the algorithm will still be computationally efficient.
This talk will discuss the key challenges for speech enhancement in hearing aids and explore the potential and limitations of existing and new algorithms such modern DNN-based algorithms. We will present a solution employing a well-known U-shape network architecture, discuss the approach to training and implementation in hearing aids. Finally, we will present results from various clinical studies which clearly show how DNN-based algorithms outperform existing algorithms.

Planned Session 35

Innovative Applications of Speech Audiometry
PS 35-2

Novel speech-recognition test with synthetic speech

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Speech audiometry uses speech tests for diagnosis and validation of hearing aids and cochlear implants. In Germany, speech audiometry relies on the Freiburg Monosyllabic Speech Test (FMST) and a matrix test, the Oldenburg Sentence Test (OLSA). While widely established, the FMST is limited by low test-retest reliability, and the OLSA is known to show pronounced training effects. To address these limitations, a novel phrase-based speech-recognition test consisting of meaningful four-word phrases, termed Oldenburg Phrase Test (OLPHRA), was developed. The OLPHRA was generated using synthetic speech material. Speech-recognition thresholds (SRTs), defined as the signal-to-noise ratio corresponding to 50% correct responses, were measured in listeners with normal hearing and with hearing impairment at a noise level of 65 dB SPL. In addition, the test was applied to assess hearing aid benefit at a lower noise level of 45 dB SPL and to monitor speech recognition in quiet during cochlear-implant rehabilitation. For comparison, participants also completed the FMST and the OLSA. The results indicate that the OLPHRA provides substantially higher test-retest reliability than the FMST and exhibits markedly reduced training effects compared to the OLSA. At a noise level of 65 dB SPL, SRTs obtained with the OLPHRA were comparable to those measured with the OLSA. At 45 dB SPL, however, the OLPHRA indicated a greater measured hearing-aid benefit. In cochlear-implant users, speech-recognition outcomes in OLPHRA were comparable to OLSA and better than in FMST. Overall, the OLPHRA shows favorable psychometric properties and represents a robust alternative for the validation of hearing devices and for clinical outcome assessment. The results underline the potential of synthetic speech as an effective tool for the efficient generation of new speech-recognition tests suitable for routine clinical use.

Planned Session 35

Innovative Applications of Speech Audiometry
PS 35-3

The Audible Contrast Threshold (ACT™): A clinical measure of aided hearing-in-noise ability

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The main clinical diagnostic used for assessing hearing loss, the pure-tone audiogram, provides the basis for prescribing hearing-aid amplification to restore audibility. However, hearing-in-noise deficits often remain even with hearing-aid amplification, which is primarily designed for speech in quiet. Aided hearing-aid users may thus suffer from, e.g, poor speech understanding in background noise. To counteract such hearing-in-noise deficits, advanced hearing-aid features using powerful AI-based noise reduction algorithms are typically employed. In the absence of a standard clinical measure of hearing-in-noise ability for personalized prescription of advanced hearing-aid features, the adjustment of such features has so far been based on subjective user reports.

This presentation will discuss the insights and findings resulting from multiple research studies conducted to design and validate a clinically viable and language-independent test for assessing hearing-in-noise deficits in clinical practice. Based on previous research, the spectro-temporal modulation (STM) detection test was selected and further optimized. The measured STM performance was found to predict the hearing-impaired listeners' speech-in-noise performance measured in an ecologically valid scenario with spatially distributed speech interferers and with hearing-loss specific amplification provided (Zaar et al, 2023; 2024). To accommodate clinical needs in terms of testing procedures, available equipment, and testing time, the laboratory-type test was re-modelled into a clinically viable STM detection test with built-in audibility compensation called the Audible Contrast Threshold (ACT) test (Zaar/Simonsen et al, 2024).

We evaluated ACT in a large-scale clinical study in terms of test-retest reliability, testing time, and predictive power with regard to aided speech-in-noise performance. Speech reception thresholds (SRTs) were measured with participants using Oticon More 1 hearing aids, again in a challenging setting with spatially distributed speech interferers. Four different hearing-aid settings were tested: amplification only, mild directionality and noise reduction (DIR+NR), medium DIR+NR, and strong DIR+NR, using Oticon's AI-based help-in-noise feature.

The ACT test was found to be quick (<2 minutes) and reliable. On the group level, SRTs were highest for the amplification-only setting and decreased (i.e, improved) with increasing levels of DIR+NR processing. The individual SRTs collected with amplification only were strongly correlated with ACT and – to a lesser extent – with the 4-frequency pure-tone average (PTA4). The predictive power of ACT and PTA4 was found to be complementary, as they both contributed significantly to predicting the amplification-only SRTs in a two-predictor linear regression model. The individual SRT benefit induced by different levels of DIR+NR varied substantially across participants, with poor performers benefiting most from strong DIR+NR.

Overall, the results suggest that ACT is a quick and simple, language independent, and thus clinically viable proxy measure for hearing-in-noise ability that can be used to prescribe advanced hearing-aid features, especially advanced DIR+NR hearing-aid features that improve the speech-to-noise ratio.

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Planned Session 35

Innovative Applications of Speech Audiometry
PS 35-4

Development of the Mandarin Digit-in-Noise test, the effects of the number of digits and real-life implementation

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Objectives: To create a reliable Mandarin digit-in-noise (DIN) test suitable for Chinese-speaking populations, particularly older adults with potential cognitive limitations, this research (1) developed versions using two to five digits per sequence; (2) assessed psychometric properties, reliability, validity against established sentence-based tests, and the influence of sequence length on performance and its link to working memory; and (3) examined real life implementation.
Methods: Following International Collegium of Rehabilitative Audiology standards, monosyllabic digits (0-9, excluding 3 for optimal homogeneity) were recorded by a female speaker, level-adjusted, and formed into sequences with 200-ms inter-digit gaps. Testing involved 54 young normal-hearing adults for normative psychometric functions and reliability, plus 56 older bilateral hearing aid users for validation against the Mandarin Hearing-in-Noise Test (MHINT) and Mandarin Chinese Matrix test, alongside correlations with digit span and reading span measures of working memory; and 70 adults to evaluate implementation in real-life settings.
Results: As digit count rose from two to five, psychometric slopes steepened (16.58 to 21.09 %/dB), while mean adaptive speech reception thresholds (SRTs) worsened from -11.11 to -10.02 dB SNR. Test-retest measurement errors stayed low (0.26-0.32 dB). DIN SRTs from all sequences showed strong Spearman correlations ($\rho = 0.90$) with MHINT and Matrix SRTs. In older users, only the five-digit SRT correlated meaningfully with working memory scores (digit span $\rho = -0.37$; reading span $\rho = -0.42$), unlike shorter sequences. iDIN is easy to implement and self-administered, as most patients were able to finish the test on their own in clinical settings and felt positive about the results and information on their hearing and ability to use cognitive function for listening in noise, provided by the test results.
Conclusions: The Mandarin iDIN offers high reliability and excellent agreement with sentence-in-noise benchmarks, making it a practical tool for assessing speech perception in noise among Mandarin speakers. Shorter sequences (two- or three-digit) appear ideal for screening or routine clinical use with minimal cognitive load, while the five-digit version may better reveal working memory contributions in older or cognitively vulnerable individuals, suggesting targeted applications in comprehensive audiological evaluations. iDIN is a feasible test to implement in clinics.

Keywords: Digit-in-noise test, Mandarin Chinese, Speech-in-noise perception, Working memory, Older adults

Planned Session 35

Innovative Applications of Speech Audiometry
PS 35-5

Cognitive abilities of individuals with listening difficulties in noisy environments

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Some individuals are able to perceive and understand speech adequately in quiet environments but experience substantial difficulty in noisy situations. Speech-in-noise tests are commonly used to assess listening difficulty. The Hearing-in-Noise Test and Quick Speech-in-Noise test are the most commonly used tools in Japan. Auditory processing tests under competing speech conditions, such as the dichotic listening test, have also been employed; however, one limitation of these assessments is that they do not readily clarify the fundamental mechanisms underlying the observed poor performance.

Two major factors should be considered in speech perception in noise: energetic masking caused by background noise, and informational masking, in which attention is excessively drawn to competing sounds, making it difficult to perceive the target speech itself. Speech-in-noise tests using steady-state noise are primarily considered to measure the former. In contrast, varying the type of noise, such as using attention-grabbing speech or music, enables the evaluation of the latter.

It has been suggested that informational masking involves attentional processes, whereby excessive attentional capture by competing sounds interferes with effective speech perception. It has been demonstrated that compared to controls, individuals with listening difficulties exhibit significantly poorer speech intelligibility with contralateral music stimuli than with contralateral noise stimuli (Kawase et al, 2024). These findings indicate a close association between informational masking and cognitive function, particularly attentional control, and suggest that assessing attentional processes during listening may help clarify the underlying characteristics of individuals who experience listening difficulties in noisy environments.

To investigate these issues further, several complex tasks requiring attentional control were employed. The first task examined attentional control within a single auditory modality using an auditory dual-task paradigm in a dichotic listening situation (Obuchi et al, 2023). This task involved target detection using an oddball format for one ear and sentence repetition for the other. The task was administered to adults under 30 years of age with listening difficulties who showed no apparent abnormalities in pure-tone audiometry, extended high-frequency audiometry, or speech audiometry but exhibited marked difficulty in understanding speech in noisy environments. The participants were required to listen to both task stimuli and respond accordingly. The results revealed that whereas control participants were able to perform both tasks evenly, individuals with listening difficulties demonstrated significantly reduced performance. These findings indicate difficulties in appropriately allocating the cognitive resources required for simultaneous task processing.

The second task examined selective attention during a cocktail party situation under free-field listening conditions. In a task requiring the perception of a target voice in the presence of multiple distractor voices, individuals with listening difficulties demonstrated significantly poorer performance than controls, whereas the availability of directional cues led to improved speech perception (Kawase et al, 2022). This finding highlights the poor selective attention observed in individuals with listening difficulties and underscores the importance of clearly identifying the spatial location of a target speaker in noisy environments.

The third task investigated cross-modal attentional allocation using visual and auditory stimuli. A dual-task paradigm was employed that required strong attentional allocation to visual stimuli, with the remaining attentional capacity directed toward the auditory stimuli. The task consisted of a combination of a 1-back visual task and a visual–audio matching task. Participants were instructed to read the visual digit presented one item earlier aloud and monitor whether the auditory digit matched the visual digit. They were then instructed to press a response button when the digits differed. Errors and reaction times were also analyzed. The results demonstrated that individuals with listening difficulties exhibited limited cross-modal attentional capacity under a visual load compared to controls, resulting in a disproportionate disruption of auditory monitoring.

Although these tasks did not involve the presentation of steady noise as in conventional speech-in-noise tests, they revealed significant performance decrements in tasks requiring complex auditory selective and divided attentional processing. These findings suggest that listening difficulties in noisy environments involve poor attentional capacity and allocation. Furthermore, analyzing cognitive functions, including attention, may provide deeper insights into the mechanisms underlying listening difficulties in noisy environments.

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Planned Session 36

Intra- & Post-operative Evaluation for Auditory Implants

PS 36-1

How to perform structure preservation surgery in cochlear implantation

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Structure preservation is an important goal of modern cochlear implant surgery as research over the last 2 decades has demonstrated that preservation of the inner ear structures during and after cochlear implantation has significant impact on hearing and balance outcomes as well as preserving substrate for regenerative treatments. Many factors are thought to be significant for structure preservation, the reduction in intraoperative trauma to the cochlea being one of the key elements. Initial studies investigating the causes of residual hearing loss as surrogate marker of structure preservation identified key histopathological events, such as basilar translocation, as critical events during structure preservation implantation. However, even with major advances in soft surgery techniques, complete hearing preservation remains challenging (Skarzynski et al, 2011). With speed (Rajan et al, 2013), CSF Gusher (Crohan et al, 2018), and electrode stabilisation (Bruce and Todt, 2018) all demonstrating a significant effect on hearing preservation. We will discuss how these factors interact and link up in order to get a better idea of how we can improve structure and hearing preservation in cochlear implantation.

Planned Session 36

Intra- & Post-operative Evaluation for Auditory Implants

PS 36-2

Intraoperative EABR testing predicts the strength of CI stimulation optimized after long-term use in pediatric malformation ears

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In pediatric cochlear implant (CI) users with inner ear malformations, high stimulation levels are often needed to achieve reliable auditory responses, but excessive current risks facial nerve stimulation. We evaluated whether intraoperative electrically evoked auditory brainstem response (EABR) testing can predict the optimal maximum current level (cC-level) used in long-term CI programming. We analyzed 179 implanted ears from children <18 years: 116 with malformations, including 23 common cavity (CC), 26 incomplete partition type-1 (IP-1), 26 IP-2, and 41 cochlear nerve deficiency (CND), and 63 controls without malformations. CC, IP-1, and CND ears required significantly higher cC-levels than IP-2 and controls. Of the malformation ears, 79 underwent intraoperative EABR. Wave V was elicited in >80% of CC, IP-1, and IP-2 ears and in 54.8% of CND ears (eV-positive). Myogenic responses without wave V occurred in 18.2%, 15.0%, and 35.5% of CC, IP-1, and CND ears, respectively (myogenic category), and 9.7% of CND ears showed neither wave V nor myogenic responses. In eV-positive ears, the minimum current that evoked wave V (eV-level) correlated significantly with the cC-level achieved after long-term use. In the myogenic category, the maximum current that did not elicit myogenic responses (myogenic-level) did not correlate with cC-level; however, in most ears, the eventual cC-level was similar to or lower than the myogenic-level. These findings support an EABR-guided initial CI map immediately after implantation—using eV-levels where available and myogenic-levels as a safety ceiling when wave V is absent—followed by behavioral fine-tuning. Such an approach may expedite early postoperative optimization while mitigating the risk of facial nerve stimulation in young children with severe malformations.

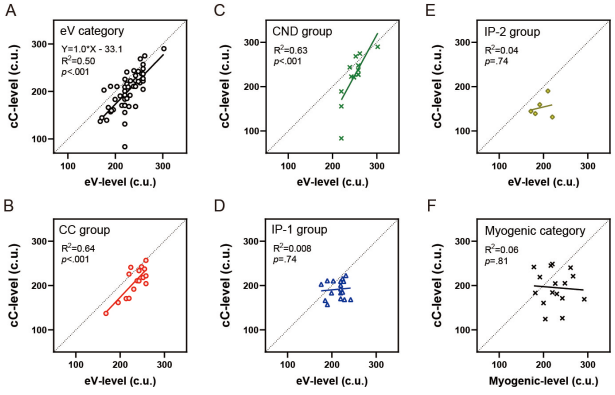


Figure Significant association between eV-levels in intra-OP EABR and cC-levels in post-OP maps

Planned Session 36

Intra- & Post-operative Evaluation for Auditory Implants

PS 36-3

Advancing hearing research using Functional Near-Infrared Spectroscopy (fNIRS)

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Functional near-infrared spectroscopy (fNIRS) is a non-invasive, baby-friendly neuroimaging technique that measures cortical hemodynamic responses via changes in oxyhemoglobin (HbO) concentration. Unlike electrophysiological methods, fNIRS is silent, portable, and relatively tolerant of movement, making it well-suited for use with sleeping infants. This presentation traces the progression of fNIRS research in audiology from measuring basic sound detection to evaluating higher-level auditory skills such as speech discrimination.

Early work by Taga et al. (2007) and Nakano et al. (2009) established that fNIRS could detect auditory responses and novelty detection effects in sleeping infants. Building on this foundation, Mao et al. (2021) demonstrated that fNIRS could measure both speech detection and discrimination at the individual infant level, marking an important step toward clinical applicability.

More recent work from our group has advanced the understanding of fNIRS response morphology in sleeping infants. Lee et al. (2024) showed that the fNIRS response to speech stimuli in sleeping infants reflects the superposition of two independent and simultaneous neural mechanisms: an obligatory auditory response and a brain arousal response mediated by the reticular activating system. The arousal response, characterised by a late-latency negative HbO component, habituates rapidly with repeated stimulus presentation, while the auditory component declines more gradually. Recognising these two concurrent mechanisms has important implications for how fNIRS data from sleeping infants should be analysed and interpreted.

Extending this two-component model to speech discrimination, Lee et al. (2025) demonstrated that fNIRS can capture aspects of speech discrimination ability in sleeping infants using a nonsilence baseline paradigm. Responses to three speech contrasts of varying acoustic difficulty, "Tea/Ba," "Bee/Ba," and "Ga/Ba", showed morphological differences consistent with the same two-component model. Notably, the most acoustically subtle contrast, "Ga/Ba," evoked a significantly smaller arousal response and a later-latency auditory response, suggesting that both components carry information about the perceived salience of a speech contrast. A high median goodness of fit ($R^2 = 0.81$) across conditions confirmed that the model generalises from detection to discrimination paradigms.

Together, these findings demonstrate that fNIRS has the potential to move beyond simple auditory detection and serve as an objective tool for evaluating higher-level auditory skills in sleeping infants, including the ability to discriminate between speech sounds. This has significant clinical implications for the early assessment of infants with hearing loss, where timely and reliable measures of speech perception are essential for guiding intervention decisions.

Planned Session 36

Intra- & Post-operative Evaluation for Auditory Implants

PS 36-4

Feasibility of speech testing using wireless connection in single-sided cochlear implant users

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Background and objectives: The speech tests used to evaluate language performance in patients with bilateral deafness (BiD) and cochlear implant (CI) are problematic if applied to patients with single-sided deafness (SSD) because normal ear hearing should be excluded. Thus, we investigated the feasibility of using wireless connection to evaluate speech intelligibility of the CI ear in patients with SSD.

Subjects and Methods: Patients with BiD and SSD were administered the word recognition scores (WRS) and speech intelligibility tests using an iPadbased wireless connection and conventional methods. To exclude normal side hearing in patients with SSD, masking noise and "plugged and muffed" method were used in the WRS and speech intelligibility tests, respectively.

Results: In patients with BiD, the WRS and speech intelligibility tests results using wireless connection and conventional methods were similar. In patients with SSD, the WRS using masking noise in the normal hearing ear was similar to that of using wireless connection. However, 3 of 11 patients with SSD showed under-masked results if using the "plugged and muffed" method.

Conclusions: Speech intelligibility testing using wireless connection is a convenient and reliable method for evaluating CI performance in patients with SSD. The "plugged and muffed" method is not recommended for evaluating CI performance in patients with SSD.

Planned Session 36

Intra- & Post-operative Evaluation for Auditory Implants

PS 36-5

The current status and future of using computational models to individually optimise cochlear implant stimulation

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Computational modeling of cochlear implant stimulation has a long history, but its development has mostly been restricted to generic models, with patient-specific modeling being relatively rare, in spite of its potential applications in both research and clinical practice.
The present state of computational cochlear implant models is discussed in relation to patient-specific modeling. From three-dimensional geometries derived from clinical imaging to full end-to end models of the electrically stimulated peripheral auditory system, computational cochlear implant models have progressed to the point where they can meaningfully simulate responses to complex (speech) stimuli.
The development of patient-specific models that could be used to study the underlying mechanisms of cochlear implant functioning and ultimately be applied to make clinical diagnoses and recommendations, is within reach. However, there are still obstacles to overcome; the most immediate of these is the issue of auditory neural health, which is currently impossible to definitively assess in a living subject, yet has profound effects on electrical stimulation.

Planned Session 37

Bringing WHO Guidance on Community-Level Ear and Hearing Care Programs into Practice

PS 37-1

Integrating ear and hearing care into primary health care: Policy to practice

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Nearly half a billion people currently are in need of ear and hearing care across the world, of which over 80% cannot access the required services. Unaddressed hearing loss poses a significant challenge for those affected, their families, and communities, posing a global cost of nearly one trillion dollars annually.

The World Health Organization estimates that over 60% of these needs (for ear and hearing care) can be addressed at the primary level of healthcare through trained health care providers, innovative models of service delivery, and an efficient referral system ensuring access to services from community to tertiary levels of care.

The integration of ear and hearing care into the primary health care system is possible through developing evidence-based policies that look beyond the traditional methods of service provision. To facilitate such policy development and its implementation, WHO has developed a number of technical resources following a robust methodlogy in consultation with leading experts in the field. This talk will outline WHO's approach which is based on the 'Integrated people-centered ear and hearing care' framework; and provide an introduction to technical resources available to support this approach. It will also share experiences from the field including challenges, limitations, and benefits.

Planned Session 37

Bringing WHO Guidance on Community-Level Ear and Hearing Care Programs into Practice

PS 37-2

WHO guidance on hearing aid fitting in low- and middle-income settings: Overview of WHO's guidance, including findings and lessons learned from South Africa and India

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Access to high-quality, affordable hearing aids and related services is an essential component of integrated ear and hearing care services. The World Health Organization (WHO) led a consultative process to develop the first evidence-based guidance on hearing aid service delivery approaches in low-resource settings. This guidance provides practical information for hearing aid service delivery for both children (aged five years and older) and adults. Key principles of this guidance for hearing aid service delivery are as follows. This guidance recommends the use of task sharing from highly trained professionals, such as audiologists, to trained non-specialist providers, such as community health workers, in order to extend hearing care capacity. This hearing aid service delivery approach was designed to be implemented in community-based settings with basic infrastructure. Ideally, hearing aid services should be part of a strategy for integrated, person-centered ear and hearing care implemented through the national health system. Hearing aids must conform to the WHO specifications, as outlined in the 'Preferred profile for hearing aids and related technical specifications,' and must be high-quality, affordable, and easy to fit (pre-programmed or similar).

In this presentation, the speaker will provide a detailed overview of this guidance focused on hearing aid service delivery approaches in low-resource settings. This will include considerations related to the required work force, hearing aids, and all steps of the hearing aid service delivery process, including entry into the program, hearing assessment, hearing aid fitting, counseling, follow-up, and referral criteria. In addition, the speaker will share the outcomes of and the lessons learned from two settings (in South Africa and India) that implemented this WHO guidance focused on hearing aid service delivery.

Planned Session 37

Bringing WHO Guidance on Community-Level Ear and Hearing Care Programs into Practice

PS 37-3

Enhancing Hearing Aid Services through Community Partnerships: A Focus on High-Income Countries

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Background: Major national and international efforts have identified hearing health as a global public health priority and call for action. Disparities in hearing health exist and access to hearing health specialists remain limited across resource settings, including within high-income countries. Access to effective communication and hearing health is increasingly recognized as fundamental to health and well-being across the life course. Although hearing loss is highly prevalent and action is prioritized, relatively little progress has been made in extending access to care through traditional clinic-based hearing care.

Methods: As outlined by the WHO's "Hearing Aid Service Delivery Approaches for Low- and Middle-Income Settings", the application of public health-driven approaches to hearing health is needed to extend access to care across diverse resource settings, including the incorporation of task sharing. Long considered a core component of addressing disparities and extending access, task sharing relies on the rational redistribution of expertise, where hearing health professionals extend their roles beyond direct care providers and also serve as supervisors of frontline healthcare workers, such as community health workers.

Results: Through a public health lens, this presentation will introduce basic concepts around task sharing and discuss experiences working in partnership with diverse communities within low- and middle-income settings in a high-income country. The presentation will cover guiding principles of community-engaged research and partnership that underlies expanding access to hearing care within community settings. This presentation will cover experiences partnering with nonprofit aging service providers as well as faith-based organizations in diverse communities in the United States and current evidence supporting the safety, feasibility, acceptability, and efficacy of these new models of care.

Conclusion: As gatekeepers to hearing healthcare, hearing health professionals play an essential role in ensuring that ear and hearing care is evidence-based and high-quality. Learning to work with, train, support, and advance care provided by a range of health workers, including partnering with communities, extends the reach of hearing health professionals and amplifies the shared vision of hearing care for all.

Planned Session 37

Bringing WHO Guidance on Community-Level Ear and Hearing Care Programs into Practice

PS 37-4

WHO-led hearing aid prequalification: An approach for improving access to services

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Over 90% of individuals with disabling hearing loss could benefit from safe and effective hearing aids; however, access remains limited, particularly in low- and middle-income countries (LMICs). From a global hearing health perspective, regulatory systems intended to ensure the safety, performance and suitability of hearing aids remain suboptimal. To address this gap, the World Health Organization (WHO) is considering the development of a prequalification programme for hearing aids. WHO prequalification programmes help appraise the quality, safety and performance of medical products, based on global standards. These programmes help optimize resource use during national procurement, with the aim to support the improvement of health outcomes.

This project aimed to identify the steps and requirements necessary to establish a WHO-led prequalification programme for hearing aids. Existing WHO prequalification models, international hearing aid standards, and regulatory frameworks were reviewed. Expert input was sought throughout, including from stakeholders involved in standards development, manufacturing, procurement and service delivery in LMICs, as well as from people with lived experience of hearing loss.

Findings were synthesised into a blueprint for a potential prequalification programme. The project resulted in a proposed multi-step process enabling manufacturers to engage with WHO in supporting access to quality hearing aids. The process includes submission of technical documentation, independent laboratory testing, and defined safety and performance criteria based on international standards. Supporting tools, including a pre-submission form and product dossier checklist, were also developed.

This work demonstrates the feasibility of adapting existing WHO prequalification models to hearing aids. A trial phase is recommended to refine processes and validate tools prior to full implementation. Ultimately, a WHO prequalification programme for hearing aids could improve global access to high-quality, affordable hearing aids while strengthening national regulatory systems and informing procurement decisions.

Planned Session 37

Bringing WHO Guidance on Community-Level Ear and Hearing Care Programs into Practice

PS 37-5

Empowering primary health workers for ear and hearing care in LMICs: A review of WHO resources and training

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From WHO, empowering primary health workers to deliver ear and hearing care (EHC) in low- and middle-income countries (LMICs) addresses a critical workforce gap. In nearly 80- 90% of LMICs, there is fewer than one ENT specialist or audiologist per million population, while approximately 80% of people with hearing loss live in these settings and an estimated 60% of cases are preventable. Globally, unaddressed hearing loss accounts for approximately 430 million disability-adjusted life years (DALYs) annually, with LMICs bearing the majority of the burden. Expanding task-sharing approaches through primary health care (PHC) is therefore essential to scaling services within the framework of universal health coverage (UHC).

In its leadership role, including normative and technical support, WHO supports Member States to integrate EHC across the life course and along the continuum of care, with particular emphasis on community and primary health care levels. WHO and partners have developed a range of tailored tools designed for varied settings, including strategic recommendations, planning and monitoring tools for EHC at the national level, human resource development, and service delivery guidance. Examples of service delivery tools include the Hearing Aid Services Delivery Approaches for Low- and Middle-Income Settings and the Primary Ear and Hearing Care Training Manual (2023). The manual comprises 10 modular, competency-based units covering ear anatomy, prevention and management of otitis media, hearing screening protocols, hearing aid maintenance, and basic rehabilitation counselling. It is tailored for nurses and community health workers operating at facility and outreach levels. Accompanied by a Trainer's Handbook, an online module for training, and community awareness materials available in six UN languages, the package has supported the training of more than 5,000 primary-level workers across multiple WHO regions.

Training platforms are also available through OpenWHO e-learning modules and the WHO Academy's Training Access Platform (TAP). More recently, the Vision and Hearing Screening for School-Aged Children: Implementation Handbook (2025) has strengthened school-based screening approaches. WHO has also developed digital innovations to support decentralized screening and referral. The hearWHO mobile application, based on digits-in-noise testing, enables field-based hearing screening and supports appropriate referral. The WHOears app, introduced in 2026, expands low-cost focused screening tools that can be used in classrooms for school-aged children. These tools align with WHO's PHC-oriented strategy by promoting decentralized service delivery and earlier intervention closer to communities.

Experiences from the Western Pacific Region, particularly in Pacific Island Countries (PICs), illustrate both the challenges and the applicability of these tools, especially those for service delivery. Countries face geographic dispersion across remote islands, workforce shortages, and inequitable access to EHC services. In the Solomon Islands, a nation of over 900 islands with a population of approximately 700,000, most living in rural communities, EHC services remain extremely limited, with only one trained ENT specialist as of 2025 and minimal audiology infrastructure. Although an ENT clinic is operative, equipment and capacities have been limited. In this context, WHO has been supported primary health care level training to strengthen local capacity to manage ear and hearing conditions. Concurrently, high-level policy engagement with the Ministry of Health has focused on integrating EHC within national noncommunicable disease (NCD) frameworks and developing long-term strategic plans.

Similarly, in Kiribati, a PIC with a population of 119,000, EHC services are highly constrained, with one ENT clinic and limited health workers overseeing diagnostic and rehabilitative services. WHO has supported a summarized situation analysis, on-site PHC training, referral pathway development for vision and hearing services, and planning processes toward a national framework integrating eye, ear, and oral health under the NCD agenda. Technical support has also included resource mobilization efforts, particularly to advance access to grants for assistive technology.

These country experiences demonstrate the practical value of WHO's resource and training packages, and digital tools, in strengthening prevention, early identification, access to technologies, and rehabilitation services across the life course. At a time when multilateral cooperation faces increasing pressures, translating global guidance into locally adapted implementation underscores the critical value of international collaboration. WHO's role in ear and hearing care extends beyond developing technical resources; it serves as a bridge connecting evidence, policy, financing, and implementation to advance equitable access to hearing services worldwide.

Planned Session 37

Bringing WHO Guidance on Community-Level Ear and Hearing Care Programs into Practice

PS 37-6

Hearing aid use in South Korea: An overview of national support policies and current trends

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Background

Hearing loss is a highly prevalent chronic condition that negatively affects communication, social participation, and quality of life. Hearing aids are an effective and widely recommended rehabilitation option; however, adoption rates remain low in many populations. Financial burden has been identified as one of the most important barriers to hearing aid use. South Korea has implemented a national hearing aid subsidy program through its universal health insurance system, providing an opportunity to evaluate how changes in financial support influence real-world hearing aid adoption. This presentation aims to examine the impact of national hearing aid support policies in South Korea on hearing aid adoption, using large-scale population data, and to describe current trends and remaining gaps in access to hearing rehabilitation.

National Policy Context

South Korea provides financial support for hearing aids to individuals registered with hearing disability through the National Health Insurance system. The hearing aid subsidy program was first introduced in 1997, providing reimbursement of approximately USD 200 per device. The subsidy level was increased in 2005 to approximately USD 300. A major policy revision occurred in 2015, when the reimbursement amount was substantially expanded to approximately USD 1,000 per hearing aid, corresponding to the cost of an entry-level device. This marked increase in financial support significantly reduced out-of-pocket expenses for eligible individuals and represented a turning point in access to hearing rehabilitation.

Evidence from Nationwide Insurance Data

Using National Health Insurance Service data from 2004 to 2018, we evaluated trends in hearing disability registration and hearing aid adoption following changes in the subsidy level. After the 2015 expansion, the number of newly registered individuals with hearing disability increased markedly, and the proportion of individuals receiving hearing aid subsidies exceeded 85%. In addition, the time interval between disability registration and hearing aid adoption shortened over time, suggesting that improved financial support facilitated earlier uptake of hearing rehabilitation. These findings indicate that a considerable burden of hearing loss had remained unregistered or untreated prior to the subsidy expansion.

Evidence from Population-Based Survey Data

To assess actual hearing aid use in the general population, we analyzed data from the Korea National Health and Nutrition Examination Survey comparing the periods 2010–2012 and 2020–2022. Among adults aged 40 years and older with objectively measured hearing loss, overall hearing aid adoption nearly doubled over the decade. Increased adoption was observed across all degrees of hearing loss severity, with the highest rates seen in individuals eligible for financial support. However, individuals with disabling but unsupported hearing loss consistently demonstrated adoption rates five to six times lower than those receiving subsidies, highlighting a persistent gap in access.

Conclusion

National hearing aid subsidy policies in South Korea have significantly improved hearing aid adoption and revealed previously unmet needs for hearing rehabilitation. Nevertheless, substantial disparities remain, particularly among individuals with disabling hearing loss who do not meet eligibility criteria for financial support. These findings suggest that further policy refinement, including expanded eligibility and complementary strategies to promote timely hearing rehabilitation, is necessary to achieve broader and more equitable access to hearing care.

Planned Session 38

Personalized Tinnitus Management
PS 38-1

Genetic contribution to tinnitus and cognitive decline

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Background: Tinnitus a common phenotype observed in individuals with hearing loss but also associated with several neuropsychiatric conditions. Bilateral and severe tinnitus has a significant heritability according to familial aggregation, twins and adoptees studies. Genome wide association studies and exome sequencing studies have identified common and rare variants associated with any tinnitus and severe tinnitus, respectively. Several studies have reported an association of hearing loss, particularly high frequency hearing loss (HFHL), severe tinnitus and mild cognitive impairment (MCI), but the molecular mechanisms have not been established.
Methods: Genomics studies published in 2016-2025 were retrieved to assess the available evidence to support a genetic contribution of common and rare variants and define a potential association with mild cognitive impairment.
Results: Several common variants have been published, but most of these studies are pending replication in an independent cohort and their pleiotropic effect cannot be ruled out. Conversely, a burden of rare missense variants in in ANK2, TCS2 and AKAP9 have been replicated in individuals with severe tinnitus in Spanish and Swedish cohorts, but their effect on cognitive impairment has not been established. Furthermore, the PRKRA gene showed an enrichment of rare loss-of-function variants in 15% of MCI patients, associated with mild-to-moderate tinnitus. Cognitive performance was linked to tinnitus, but not hyperacusis or HFHL.
Conclusions: Rare variation with a large effect size may explain the link between tinnitus and cognitive decline, but a precise definition of cognitive impairment, HFHL and sound hypersensitivity is needed to get a better understanding of the tinnitus-cognitive decline link.

Keywords: Genomics, severe tinnitus, hearing loss, hyperacusis, dementia

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Planned Session 38

Personalized Tinnitus Management
PS 38-2

Evidence and innovation: Digital therapeutics for tinnitus management

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Barriers to access, limited specialist availability, and the growing digitization of healthcare are accelerating the role of mobile solutions in the management of prevalent chronic conditions such as tinnitus. Digital therapeutics offer the opportunity to translate evidence-based interventions into scalable, data-driven, and personalized care pathways that are accessible beyond the clinic.

Preliminary analyses of real-world user data of a tinnitus management app will be discussed. The app is designed to integrate validated treatment modules like cognitive behavioral therapy (CBT) to support individuals in managing tinnitus-related distress. First outcomes indicate meaningful reductions in tinnitus distress among users who complete the CBT module, underscoring the clinical potential of app-based interventions. At the same time, real-world implementation reveals persistent challenges: high dropout rates before users begin therapeutic modules and difficulties in sustaining long-term adherence. Factors influencing engagement include user motivation, daily habits, perceived benefit, usability, and the extent of professional guidance.

Digital therapeutics can meaningfully reduce barriers to evidence-based tinnitus care and extend support to underserved populations. However, achieving optimal outcomes requires more than technology alone. This presentation will explore how interdisciplinary collaboration, thoughtful user engagement strategies, and integration with professional care pathways can enhance adherence and unlock the full potential of digital therapeutics in tinnitus management.

Planned Session 38

Personalized Tinnitus Management
PS 38-3

Adapting Personal Therapies Using a Mobile Application for Tinnitus Rehabilitation

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Objective: To evaluate the efficacy of a smartphone-based application providing tinnitus-specific cognitive behavioral therapy and customized sound therapy for tinnitus.
Methods: In a prospective randomized controlled trial, the treatment group participated in daily sound therapy and weekly interactive CBT modules, and the control group did not receive the program (waitlisted). Outcome measures after eight weeks included the Tinnitus Functional Index (TFI), Generalized Anxiety Disorder (GAD-7), Patient Health Questionnaire (PHQ-9), Perceived Stress Scale (PSS), and Pittsburgh Sleep Quality Index (PSQI).
Results: Ninety-two patients (mean age 57.2±11.9 years) were included. The treatment (n=47) and control (n=45) cohorts had similar TFI, PHQ-9, GAD-7, PSS, and PSQI scores at presentation (all $p>0.05$). Treatment-group patients had significantly higher improvements than controlled patients in their TFI (16.7±14.9 vs. 1.9±10.8, $p<0.001$), PHQ-9 (1.9±4.2 vs. -0.7±3.4, $p=0.002$), GAD-7 (1.1±3.6 vs. -0.9±3.3, $p=0.009$), and PSQI scores (2.5±3.2 vs. -1.1±2.1, $p<0.001$). Treatment-group subjects also significantly improved in seven of the eight TFI domains (all $p<0.05$). TFI improvements of ≥20 occurred in 18 (38.3%) treatment subjects. Of the 9 treatment-group patients presenting with moderate-severe depression, 4 (44.4%) improved to minimal depression. Of the 4 treatment-group patients with moderate-severe anxiety, 2 (50.0%) improved to minimal anxiety. Of the 17 treatment-group patients with moderate-severe sleep difficulties, 10 (55.6%) had considerable sleep improvement.
Conclusion: This novel smartphone application providing cognitive behavioral therapy and customized sound therapy was effective in reducing symptom severity and improving anxiety, sleep, and mood for tinnitus patients.

Planned Session 38

Personalized Tinnitus Management
PS 38-4

Bimodal neuromodulation for personalized tinnitus treatment: Clinical evidence and real-world outcomes

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Chronic subjective tinnitus is a complex condition requiring multidisciplinary management. While clinical trials have established the efficacy of bimodal neuromodulation with paired sound and body electrical stimulation, such as with stimulation of the tongue, ear or face regions, real-world evidence (RWE) is essential to support its therapeutic potential across diverse clinical settings. This presentation will first provide an overview of various previous clinical studies performed with bimodal neuromodulation demonstrating positive benefit for tinnitus patients, and then will summarize the largest RWE dataset achieved for a device tinnitus treatment (the Lenire bimodal device). The Lenire dataset was aggregated from over 10 independent United States tinnitus clinics, representing over 750 patients with moderate to severe bothersome tinnitus. Patients received bimodal neuromodulation with Lenire alongside standard clinical guidance. Effectiveness was measured by the responder rate (improvement equal to or greater than 7 points on the Tinnitus Handicap Inventory, THI) at approximately 12 weeks and 12 months from device fitting. At approximately 12 weeks post device fitting, the cohort achieved greater than 85% responder rate, with a mean THI reduction of more than 26 points. Longitudinal RWE analysis confirmed sustained benefits out to 12 months follow-up, with a responder rate of approximately 91%, with a mean THI improvement of more than 31 points. These results exceed outcomes from the previous Lenire clinical trials that led to FDA approval, supporting that the efficacy and benefits of bimodal neuromodulation can be enhanced by personalized clinical support in practice.

Planned Session 38

Personalized Tinnitus Management
PS 38-5

Multi-modal virtual reality system for tinnitus treatment methods and validation: Multicenter Study

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Background: Digital therapeutics for tinnitus are expanding, but comparative evidence for supervised immersive device-based treatment remains limited. We evaluated TD2 against an assessment-only no-treatment control to determine its effect on tinnitus-related handicap.
Methods: HVR-CTP-TD2 was a multicentre, open-label, randomised, controlled superiority trial done at six tertiary hospitals in South Korea. Adults with subjective tinnitus were randomly assigned (1:1) to six once-weekly supervised clinic-based TD2 sessions or to an assessment-only no-treatment control. The primary outcome was change in Tinnitus Handicap Inventory (THI) score from baseline to week 6 in the full analysis set.
Findings: Between Oct 20, 2025, and Jan 19, 2026, 108 participants were randomly assigned. One participant in the control group had no post-baseline efficacy assessment and was excluded from the full analysis set, leaving 107 participants in that set; all 108 randomly assigned participants were included in the safety set. At week 6, mean change in THI was -16.68 (SD 20.05) in the TD2 group and 0.23 (17.03) in the control group, giving a baseline-adjusted between-group difference of -16.91 (95% CI -24.12 to -9.70), which met the prespecified superiority criterion. No serious adverse events occurred. Device-related adverse events were dizziness in three participants and headache in one participant.
Conclusion: Compared with an assessment-only no-treatment control, TD2 was associated with a greater reduction in tinnitus-related handicap over 6 weeks, and no short-term signals of serious safety concern were observed. Sham-controlled or active-controlled trials with longer follow-up are warranted.

Planned Session 39

Hearing and Social Connection Across Aging
PS 39-1

Multidisciplinary Approaches to Managing Hearing Loss and Cognitive Decline

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Hearing loss is the most common neurologic disorder. Like most neurologic conditions, it has a prolonged pre-symptomatic phase that may extend 15 to 20 years before patients meet traditional diagnostic criteria. Subclinical synaptic degeneration, reduced neural synchrony, and early central compensatory changes often begin decades before individuals report "hearing problems" to a clinical provider. As a result of this delay, intervention often does not occur until the seventh or even eighth decade of life. By then, the brain has already maladapted to years of degraded input, increased listening effort, and chronic neural strain.

Symptoms typically begin emerging in the third to fourth decade of life as difficulty in noise, listening fatigue, and tinnitus, but these complaints are often dismissed or normalized. The delay between early neurologic change and formal treatment represents a missed opportunity for prevention. During this window, untreated auditory deprivation may contribute to social withdrawal, reduced physical engagement, emotional strain, and cognitive decline.

This presentation reframes hearing loss within a broader aging medicine model. Rather than treating hearing loss in isolation, a multidisciplinary approach is proposed that integrates audiology with evaluation of cardiovascular disease, metabolic dysfunction, thyroid disorders, autoimmune disease, traumatic brain injury, sleep disturbance, depression, smoking, vision impairment, and other established comorbidities associated with both auditory and cognitive decline. By identifying shared biological pathways such as vascular compromise, neuroinflammation, metabolic stress, and neural degeneration, clinicians can refer and intervene earlier and more strategically.

Through emerging epidemiologic data, this lecture will present that early identification of auditory decline, combined with coordinated management of comorbid conditions, offers a powerful opportunity to alter functional trajectory. Addressing hearing loss alongside its systemic risk factors may help preserve social engagement, emotional well-being, physical safety, and cognitive health.

Recognizing hearing loss as a neurologic disorder of aging necessitates a fundamental shift in clinical practice. The field must move beyond late-stage device delivery toward early-stage brain health intervention. When identified early and managed within a multidisciplinary framework, hearing loss emerges as a modifiable neurologic condition that meaningfully influences social engagement, emotional stability, physical safety, and long-term risk of cognitive decline and dementia.

Planned Session 39

Hearing and Social Connection Across Aging
PS 39-2

Depression and Hearing Loss in Older Adults: Geographies of Health in a Rapidly Ageing World

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Background and Rationale

Hearing loss is the leading cause of morbidity among older adults in England and a pressing global public health challenge, with over 1.3 billion people affected worldwide and one-third of those above 65 years experiencing disabling hearing loss. The adverse impact extends far beyond auditory impairment, profoundly affecting mental wellbeing, social participation, and quality of life. Depression- affecting 280 million people globally- represents one of the most significant consequences of untreated hearing loss, yet remains underrecognised in audiological practice.
This presentation examines hearing loss and its relationship with depression through a spatial epidemiological lens, drawing upon longitudinal data, primary care records, and advanced spatial methodologies. Understanding geographic and socioeconomic dimensions is essential for audiologists because hearing health outcomes cluster in space and time, influenced by neighbourhood characteristics and environmental exposures that create systematic disparities in both prevalence and access to audiological services.

Geographic Patterns in Hearing Loss: Beyond Age-Based Estimates

Current estimates of hearing loss prevalence in England rely on audiological data collected over 40 years ago, projected through age demographics alone. This approach is epidemiologically inadequate. Spatial analysis of 2.7 million primary care records reveals that hearing loss prevalence varies substantially across geographic areas, in ways unexplained by age structure.
Over a decade-long observation period, hearing loss prevalence increased by 59.3%, with marked spatial heterogeneity in both prevalence levels and rates of change. Certain areas demonstrate persistent high-prevalence clustering, while others show accelerating increases. Neighbourhood socioeconomic deprivation accounts for up to 35% of variance in hearing loss prevalence, though this relationship varies substantially across locations. These findings indicate that social and environmental determinants operate through locally-specific mechanisms requiring place-based audiological service planning.

The Psychosocial Burden of Hearing Loss: Socioeconomic Gradients

Analysis of 74,908 person-years from the English Longitudinal Study of Ageing, using dynamic cross-lagged structural equation models, demonstrates that hearing loss poses a substantial risk for depressive symptoms in older adults. Critically, socioeconomic position fundamentally moderates this relationship.
Quality of life emerges as a key mediator between hearing loss and depression. Hearing loss disproportionately affects different wealth groups by impacting quality-of-life domains, particularly the sense of control over one's circumstances. Our research found that individuals in the lowest wealth quintile experience approximately twice the impact on quality of life as those in the highest quintile. The total effect of hearing loss on depression shows standardised coefficients ranging from 0.72 to 0.98 for the lowest wealth quintiles, compared to 0.48 to 0.58 for the highest quintiles.
These findings carry important implications: patients presenting with hearing loss who also face socioeconomic disadvantage require heightened attention to psychosocial wellbeing and may benefit from integrated care pathways addressing both hearing rehabilitation and mental health support.

Hearing Aid Intervention: Differential Benefits Across Socioeconomic Groups

The evidence strongly supports hearing aid provision as effective for alleviating depressive symptoms, with benefits distributed unequally across socioeconomic groups in ways that should inform clinical practice.
Those in lower wealth quintiles experience proportionally greater reductions in depression risk following hearing aid adoption. For patients in the lowest wealth quintile, the standardised coefficient for depression risk decreased from 0.89 to 0.56 following hearing aid use -an improvement of 0.33- while remaining essentially stable in the highest wealth quintile. More frequent hearing aid use conferred slightly greater benefits.
This socioeconomic gradient suggests audiological intervention serves not merely as sensory rehabilitation but as a mechanism for reducing health inequalities. Hearing aids may help restore control and social engagement for vulnerable populations, findings that strengthen the case for equitable access to hearing healthcare.

Self-Reported Hearing Measures: Implications for Clinical Screening

Audiologists must recognise significant limitations in self-reported hearing measures. Validation against objective audiometry reveals that self-report measures detect only approximately 70% of objectively measured hearing loss, with nearly one-third of cases undetected.
Factors associated with underreporting include: female sex, older age, lower educational attainment, routine or manual occupations, and unhealthy lifestyle behaviours. For moderately severe to severe hearing loss, older adults aged 75–89 years had over 7 times the odds of not reporting difficulties compared with those aged 50–64 years.

These findings reinforce that reliance on patient-initiated help-seeking will systematically miss hearing loss in precisely those populations at greatest risk. Objective audiometric screening integrated into routine primary care represents an essential strategy for identifying unacknowledged hearing loss.

Environmental Exposures: From Risk to Resilience

Geographic analysis extends to environmental determinants affecting mental health. Transportation-related noise pollution indirectly affects depression prevalence, accounting for up to 18.64% of the total effect of neighbourhood deprivation on mental health in rural areas. In urban settings, older adults with higher nighttime noise exposure show increased vulnerability to mental health impacts of income deprivation.
Emerging evidence suggests that access to green-blue spaces - coastal, riverine, and park environments - may offer protective benefits for mental health, potentially buffering against harmful environmental exposures. Understanding how communities, particularly those facing disproportionate socioeconomic challenges, access and benefit from these therapeutic environments represents a critical frontier. This includes coastal populations where nature-based solutions may support mental wellbeing alongside clinical interventions. Validating spatial indices measuring green-blue space quality and accessibility could guide community-level interventions complementing audiological care.

Implications for Audiological Practice

These findings carry several implications. First, hearing loss assessment should incorporate awareness of patients' broader socioeconomic and environmental circumstances. Second, audiologists should consider routine depression screening, particularly among disadvantaged patients, with appropriate referral pathways. Third, the evidence strengthens advocacy for equitable hearing aid provision, demonstrating intervention benefits extend to mental health outcomes. Fourth, objective audiometric screening should be prioritised, particularly for populations prone to underreporting. Finally, audiologists can contribute to holistic approaches integrating clinical rehabilitation with community-based and nature-based interventions supporting mental wellbeing.

Conclusion

In a rapidly ageing world, audiologists occupy a critical position at the intersection of sensory health and mental wellbeing. Geography matters; where patients live shapes their hearing health, mental health, and the relationship between the two. By adopting spatially informed perspectives that encompass both environmental risks and protective resources, audiologists can advocate for place-based service planning and position hearing care as a public health imperative for healthy ageing.

Hearing and Social Connection Across Aging
PS 39-3

Social connectedness and well-being of adults with acquired hearing loss

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Hearing loss has a fundamental impact on an adult's ability to communicate and, in turn, socially connect with others. Hearing loss increases the risk of social isolation and loneliness, and this, in turn, is a recognised predictor of depression/anxiety, lower well-being, cognitive decline, and reduced workforce participation. However, there has been little research thus far exploring the real-world social connections of adults with hearing loss. The aim of this project was to take a multi-method approach to investigate the real-world social connections of adults with hearing loss who use or do not use hearing aids.

In this study, adults with hearing loss over the age of 50 years who attended an Australian-based audiology clinic for a hearing assessment and their familiar communication partners (e.g, family members, friends) were recruited for the study. Participants (n=195) completed an online social identity map (oSIM) - a visual map which profiles their social groups. A sub-group of participants (n=14) also video-recorded some of their real-world conversations within key social groups identified in their oSIM maps. This presentation will provide some overall findings about the quantity and quality of the social connections of adults with acquired hearing loss at the time of their first hearing assessment both self-reported in their oSIM maps and observed in their video-recorded social interactions.

It was common for participants to have a large proportion of social groups who did not know about their hearing loss. Patterns can be observed in the video-recorded social interactions of supportive and non-supportive social groups in relation to the adult's hearing loss. The findings from this study provide novel, evidence-based data on hearing loss and hearing aid experiences within the complex and multifaceted social world of adults with hearing loss. The implications will be discussed in relation to tailored messaging for clients of the potential social benefits of pursuing hearing rehabilitation.

Planned Session 39

Hearing and Social Connection Across Aging
PS 39-4

Hearing Aids to Support Cognitive Function of Older Adults at Risk of Dementia: The HearCog Trial Results

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Background: Evidence from observational studies indicates that hearing loss accounts for 8% of dementia cases; however, to date, only one clinical trial has examined the effect of hearing intervention, and the results were negative. It is unclear if the reported association between hearing loss and dementia is causal, and if the clinical remediation of hearing impairment can reduce the rate of cognitive decline among older adults at risk of dementia. The HearCog sought to address this gap in the literature.

Methods: The HearCog trial is a randomised, controlled clinical trial that investigated whether hearing aid intervention could lessen the rate of cognitive decline over 12 months. Hearing-impaired people aged 70 years or older with mild cognitive impairment (Montreal Cognitive Assessment for the Hearing Impaired (HI-MOCA) >18 and <26) were randomised to an experimental or a delayed-control group to determine whether hearing aid use reduced the rate of cognitive decline over 12 months. Secondary aims were to investigate whether correcting hearing loss had a beneficial impact on memory, executive functions, anxiety and depressive symptoms, quality of life, physical health and health-related costs over 12 months. The difference between the intervention and control groups for cognitive and psychosocial measures was estimated using generalised linear mixed modelling (GLMM), including the time-by-intervention interaction in these models.
In addition, we also used FluoroDeoxyGlucose-Positron Emission Tomography (FDG-PET) imaging in a cohort of participants to (i) characterise patterns of metabolic activity in patients with hearing loss and cognitive impairment following intervention (hearing aid), (ii) determine whether FDG PET may predict patients most likely to have a cognitive benefit from hearing aid intervention. We also conducted a health economic analysis to explore the cost-effectiveness of the intervention compared to the control arm and the impact of hearing aids on anxiety, depression, physical health and quality of life.

Results- Cognition, Mental and Psychosocial well-being: Nine hundred and eleven (n = 911) participants were screened face-to-face. 211 participants (23 %: n = 81 (38%) female, mean age 77 yr (SD 5.6)) were randomised, with 108 (51·2 %) allocated to the hearing aid intervention group. The use of hearing aids had no effect on the primary endpoint by the end of 12 months (HI-MOCA mean difference = 0.5 (95% CI -0·4 to 1·3), p = 0.3). Similarly, There were no between-group differences for any of the secondary cognitive, central auditory processing, or psychosocial outcomes. In contrast, the Consonant-Nucleus-Consonant (CNC) unaided word test and theCity University of New York (CUNY) unaided sentence test were 9·1 units (95% CI 3·4 to 14·7, p = 0·002) and 14·5 units (95% CI 6·7 to 22·4, p < 0·001) higher, respectively, in the hearing aid group compared with controls.

Results FDG-PET: Comparing the two groups, there were no significant metabolic differences detected in any brain regions between the two timepoints (Wilcoxon signed-rank test).

Results Health Economic analysis: Cost-utility analysis from a healthcare system perspective showed the hearing aid intervention cost an additional AUD $9,883 over 12 months (95% CI: $8,370 to $11,396, p<0.001) without improving quality-adjusted life years (mean difference -0.014 QALYs, 95% CI: -0.032 to +0.005, p=0.156).

Conclusion: Correcting hearing loss with hearing aids for 12 months does not improve cognitive, psychosocial, or central auditory processing outcomes among older adults with mild cognitive impairment. Long-duration interventions are required to identify the long-term impact on cognitive functions of older adults at risk of dementia.

Keywords: Hearing loss, Dementia, Hearing aids

Planned Session 40

Hearing and Other Developmental Disorders
PS 40-1

Hearing screening, assessment, and intervention programs for vulnerable populations: Persons with intellectual disability

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Background:
Individuals with intellectual disabilities (ID) are at a significantly higher risk of hearing loss than the general population, yet it frequently goes undiagnosed and untreated. To address this gap, the multicenter prospective HörGeist study examined the feasibility, outcomes, barriers, and costs of an outreach program that provided repeated hearing screenings, diagnostic assessments, interventions, and follow-up care within participants' everyday settings. The overarching goal was to determine whether such a model could be scaled up for nationwide implementation in Germany. This report presents findings on participants' ear and hearing care before and after inclusion in the outreach program, compared with standard care and a clinic-based invitation approach.

Methods:
In this population-based, age-stratified cohort study, 1,053 participants with ID (63% male; aged 1–90 years) underwent on-site hearing screening and reference audiometry conducted in kindergartens, schools, workplaces, and residential facilities. Baseline data on ear and hearing care were collected through structured interviews with participants and their caregivers. When screening suggested possible hearing loss, comprehensive audiological diagnostics and treatment were offered on-site, or participants were referred for external care (Schwarze et al, 2023; Zielonkowski et al, 2025). A comparison group of 141 individuals with ID was invited to a clinic for identical assessments, but none attended.

Results:
At baseline, hearing loss had been documented in roughly one sixth of the outreach participants. About 9% had hearing aids, yet only half of these individuals used them—and often inconsistently or ineffectively. The program newly identified hearing loss in approximately 44% of participants. Of the roughly 30% referred to external institutions for further diagnostics after the first screening, a little over one third attended. Among those prescribed hearing aids, just over one quarter used them. About half of other recommended measures (e.g, cerumen removal, medication, or use of ear ventilation balloons) were implemented. Consequently, the proportion of untreated or insufficiently treated hearing loss decreased only modestly, by about 5% (Neumann et al, in preparation). Major barriers included refusal by caregivers or participants, often linked to limited understanding of the treatability and consequences of hearing loss.

Conclusion:
A mobile outreach hearing program is feasible and effective for identifying hearing loss among people with ID. Nonetheless, a substantial gap in hearing care persists. To achieve lasting improvements, broader public awareness and tailored hearing rehabilitation strategies are needed—approaches that incorporate communication training and actively engage both individuals with intellectual disabilities and their caregivers.

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Planned Session 40

Hearing and Other Developmental Disorders
PS 40-2

Hearing Assessment and Hearing Aid Use in Children with Hearing Loss and Intellectual Disabilities

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【Background】
With the widespread implementation of newborn hearing screening, hearing loss is now diagnosed at an early stage, even in children with multiple disabilities, including intellectual disabilities. As a result, hearing aids and cochlear implants can be introduced earlier than before.
Except for cases associated with congenital malformation syndromes, intellectual and developmental disabilities often become apparent only after the initial diagnosis of hearing loss. Children with intellectual disabilities frequently present with multiple comorbid conditions, such as autism spectrum disorder, and show marked individual variability.
Because these children cannot always be assessed using standard audiometric methods, speech-language-hearing therapists (SLTs) must carefully observe each child's auditory behavior and adapt assessment techniques to the child's developmental stage. Rather than focusing solely on hearing loss, SLTs consider the child's overall developmental profile and individuality, providing consistent and long-term follow-up support.

【Challenges】
Following early diagnosis, children with multiple disabilities, including intellectual and developmental disorders, present several critical challenges:
· Reliability of behavioral testing:
In assessments such as behavioral observation audiometry (BOA) and visual reinforcement audiometry (VRA), delayed motor and intellectual development, fluctuating physical health, and variable arousal levels often make sound localization difficult. Since these are subjective assessments, the results depend heavily on the therapist's observational skills and clinical experience.
· Inconsistency between objective and behavioral data:
In children with organic brain damage, objective measures such as auditory brainstem response (ABR) or auditory steady-state response (ASSR) may show absent responses despite observable auditory reactions in daily life. Discrepancies between objective and behavioral findings complicate the clinical picture.
· Difficulty in sedation and test execution:
While objective evaluations are useful, they are often difficult to perform on older children with intellectual disabilities who cannot be easily sedated or remain still.
· Barriers to hearing aid use:
Even with a diagnosis, consistent hearing aid use is often hindered by unstable physical conditions or sensory hypersensitivity.
· Required clinical expertise:
SLTs must skillfully integrate sensory inputs to elicit reproducible responses while carefully observing each child's unique auditory behavior. They must possess high-level expertise and self-reflection to determine the appropriate timing and intensity of intervention.

【Purpose of the Study】
The purpose of this study is to demonstrate an individualized approach to hearing assessment and auditory support for children with comorbid intellectual disabilities and to optimize hearing aid settings based on each child's minimal response level.
By providing individualized instruction on hearing aid use, we aim to promote auditory utilization and support the development of communication abilities.

【Approach / Clinical Practice】
1. Audiological Evaluation
In behavioral assessments such as BOA, VRA, and Play Audiometry, the therapist's skill to observe developmental milestones and subtle behavioral changes is essential. The testing environment should be a space for building communication, where the therapist waits for the child's unique expression without preconceived expectations.
For school-aged children who find objective tests (ABR/ASSR) difficult, incorporating somatosensory inputs—such as tactile and kinesthetic cues while holding blocks—is effective for conditioning and maintaining focus. Physical guidance is gradually reduced as the child learns to respond to auditory stimuli independently.
2. Hearing Aid Fitting and Management
The results of behavioral audiometry do not represent thresholds but rather minimum response levels (MRLs) observed at the time of testing.
Accurate data are often difficult to obtain; therefore, hearing aid adjustments should be made in stages based on accumulated MRLs and daily behavioral observations. The primary goal is to promote interpersonal communication by fostering auditory awareness through hearing aid use.
If a child is resistant to wearing hearing aids, therapists should consider multiple factors, including physical factors (posture, earplug use), physiological factors (sleep, medication), and environmental factors (family support). It takes a long time to see the effectiveness of hearing aids, and hearing utilization varies greatly from person to person. Over time, auditory behavioral responses may improve, making hearing aid use unnecessary. We take a flexible, long-term approach, utilizing all communication methods and considering that hearing needs may change over time. A successful fitting often results in increased smiles, deeper engagement, and a greater willingness to engage in social interactions.

3. Support for Caregivers
While spoken language acquisition may be challenging, caregivers hope that their child can recognize caregiver's voice. Therapists can serve as role models by demonstrating how changes in vocal volume, distance, and intonation, as well as the use of tactile or vibratory cues, influence the child's responses. By listening empathetically to caregivers and highlighting positive caregiving experiences, therapists support families in finding enjoyment in everyday interactions and help prevent feelings of isolation during the habilitation process.
By listening empathetically and focusing on successful parenting experiences, therapists support families in finding joy in their daily interactions and preventing feelings of isolation during the habilitation process.

【Implications / Conclusion】
The primary goal of hearing aid use and auditory habilitation for children with intellectual disabilities is to elicit responsive interactions with caregivers. Establishing a reaction to a parent's voice or their own name through appropriate amplification is a fundamental step in supporting communication development.
Key considerations for clinical practice include:
· Multimodal communication:
When spoken language is limited, communication methods should be selected and combined according to the child's primary condition, comorbidities, and developmental stage.
· Interpersonal development:
By engaging in preferred activities and patiently waiting for the child's response, therapists and caregivers can share the joy of interaction.
· Relationship-based development:
The ultimate aim is to foster a sense of anticipation and engagement with others, enhancing overall interpersonal development through meaningful adult-child relationships.

In the oral presentation, a representative clinical case of a child with intellectual disability will be presented to illustrate this individualized approach.

Planned Session 40

Hearing and Other Developmental Disorders
PS 40-3

Improving emotion perception in autistic children with computer-based training and hearing amplification

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Background: Autistic individuals experience significant auditory processing difficulties, which hinder their perception of subtle cues in speech that govern emotion expression. Research has shown successful behavioural training of emotion perception in autistic children and adults, especially when delivered via a computer- or technology-based platform. This research aimed to investigate whether enhancing the incoming auditory signal by using remote microphone hearing systems (RMHSs) would further improve the effects of computer-based emotion training. Another focus of this research was to explore changes in neurophysiological patterns underlying verbal emotion perception given this multimodal intervention.

Methods: A three-week computer-based emotion training intervention was conducted with 24 autistic children. Twelve of those children underwent computer-based training only. The other 12 children wore RMHSs during the computer-based training sessions, and in addition trialled the RMHAs at school for the duration of the intervention period. Participants were assessed on emotion perception and production behavioural measures before and after the intervention. An additional fourteen non-autistic children made up the control group. Cortical auditory evoked potentials (CAEP) to speech stimuli with angry, happy, sad, and neutral emotional tones were acquired from the non-autistic control group, and the 12 autistic children who received the RMHSs and computer-based training intervention.

Results: Outcomes from the behavioural measures showed that autistic children benefitted from computer-based emotion training. However, it was those who completed the training with RMHSs that maintained a stable, high performance after the two-week follow up period post-intervention, suggesting better maintenance of training effects when training is combined with RMHSs (effectively increasing the 'auditory dose'). Autistic children who trialled RMHSs at school reported significantly improved listening experiences in the classroom, in particular in a noisy environment. Their teachers also reported significantly improved listening behaviours. There were significant differences in CAEP morphology between non-autistic and autistic children, and also pre- and post-intervention. Recordings from the autistic children pre-intervention did not show any significant differences in wave morphology for angry, happy and sad emotions. This suggests that, unlike their non-autistic peers, autistic children had more difficulties differentiating between speech sounds based on either their acoustic features or emotional content. Recordings from the same autistic children post-intervention revealed significant changes and increased differentiation between emotions.

Conclusion: Results suggest there are potential behavioural and neurophysiological benefits to social communication by developing interventions targeting auditory processing difficulties that may be hindering emotion perception abilities for autistic children.

Planned Session 40

Hearing and Other Developmental Disorders
PS 40-4

Holistic management of children with congenital cytomegalovirus (cCMV)

Holly Fb. TEAGLE

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Congenital Cytomegalovirus (cCMV) infection can result in complex and lasting sequelae that have multisystem impacts on the child, creating enduring challenges for families to manage. It is the leading cause of non-genetic sensorineural hearing loss and neurodevelopmental delays in children (1, 2). The insidious nature of the virus necessitates ongoing diagnosis and planning for developmental supports. Though the virus and its impacts have been long recognized, a well-accepted and organized plan for screening, diagnosis, and intervention does not exist in most countries. Acceptable screening practices are the first step in executing holistic care for children. This presentation describes a co-designed study to screen New Zealand children for cCMV when they are referred from newborn hearing screenings. Additionally, grassroots efforts in New Zealand to raise awareness about CMV have been launched, involving families, healthcare providers, and educators, and these will be described.

Planned Session 40

Hearing and Other Developmental Disorders
PS 40-5

Influence of visual deprivation on auditory performance and neuroplasticity

Hyunjoon SHIM[1,2]

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Visual deprivation is known to trigger compensatory neuroplasticity, where the auditory system often develops enhanced capabilities to navigate the environment. This presentation synthesizes five consecutive studies investigating how blindness affects auditory spectral and temporal resolution, speech perception in noise, and the underlying neural mechanisms.

• Psychoacoustic Advantages: Early Blind (EB) subjects exhibited superior spectral-ripple discrimination (SRD) and temporal modulation detection (TMD). Interestingly, late Blind (LB), subjects showed an advantage in temporal resolution exclusively, suggesting that spectral enhancement may require a critical period or longer deprivation.
• Central Auditory Processing: EB individuals demonstrated enhanced dichotic listening, particularly in the left ear, effectively eliminating the typical "right-ear advantage" found in sighted individuals. They also showed superior temporal sequencing and frequency patterning abilities.
• Speech Recognition under Degradation: When using noise-vocoders to degrade speech, EB subjects maintained higher recognition scores than sighted subjects. Notably, spectral degradation had a greater impact on speech recognition in EB subjects, while the effect of temporal degradation was similar in both groups.
• Neural Correlates: EEG data, including N2 and P3b components, revealed shorter latencies and greater amplitudes in blind subjects. These findings suggest enhanced neural processing strategies and resource allocation for auditory cues.
• Impact of Hearing Loss and Aging: The compensatory benefits observed in young, normal-hearing blind individuals diminish significantly in the presence of sensorineural hearing loss or advanced age. While some temporal processing advantages persist, group differences in spectral resolution and speech recognition tend to vanish as auditory input quality declines.

While visual deprivation fosters remarkable auditory advantages through neuroplasticity, these benefits are contingent upon the integrity of auditory input. This underscores the critical importance of early hearing screening and intervention for the visually impaired to maintain their specialized cortical reorganization.

Planned Session 40

Hearing and Other Developmental Disorders
PS 40-6

Difficult clinical cases: Multidisciplinary approach necessary

Christian Vinberg THORUP

Audiological Department, Aarhus University Hospital, Denmark

When presented with difficult diagnostic cases a multidisciplinary approach is often necessary.
In this presentation, this will be illustrated through a clinical case of ANSD in a child with multiple concurrent possible causes of his condition.
The child was born prematurely and suffered from several severe medical conditions, including septicaemia, congenital CMV and prolonged hyperbilirubinaemia.
Through the newborn hearing screening programme, severe hearing affection was identified.
The diagnostic process of this case has required cooperation of audiologists, pediatricians, geneticists, general practitioners (GP) and even dentists.
Also, the treatment of a child with ANSD gives rise to discussion as to which is the better option and requires continuous and close follow-up.

Planned Session 41

AI for the Ear and Beyond
(Computational Audiology Network)

PS 41

AI for the Ear and Beyond (CAN)

Jan-Willem WASMANN[1,2,3,4]

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[2]Counties Manukau Health NZ | Te Whatu Ora, University of Auckland, New Zealand
[3]ENT, ErasmusMC, Netherlands
[4]School of Human and Community Development, University of the Witwatersrand, South Africa

Chairs: Gloria Araiza-Illan (CAN, UMCG, RUG), Shangqiguo Wang (CAN, University of Hong Kong), Jan-Willem Wasmann (CAN, Radboudumc)

In this session, organized by the Computational Audiology Network (CAN), we will explore applications of AI in ear and healthcare globally. Through four presentations, attendees will gain insights into innovative projects. The session will conclude with a Q&A and panel discussion. This session offers a unique opportunity to explore cutting-edge AI applications in audiology.

Planned Session 41

AI for the Ear and Beyond
(Computational Audiology Network)

PS 41-1

AI-driven virtual personas for clinician communication training in audiology

Nicky CHONG-WHITE

Technology, National Acoustic Laboratories, Australia

This talk describes the development of an AI virtual patient training tool for audiology, designed to address gaps in communication and counselling skills training. It outlines a user-led, iterative approach to building diverse patient personas, supported by AI strategies that guide behaviour and enable realistic, natural conversations. The goal is to allow clinicians to practise a range of communication skills across different appointment scenarios, adapting their approach to individual patients to support more effective clinician–client interactions.

Planned Session 41

AI for the Ear and Beyond
(Computational Audiology Network)

PS 41-2

Piloting AI-assisted Otoscopy in Primary Care: A Digital Innovation to Transform Childhood Ear Disease Diagnosis in Aotearoa New Zealand

Michelle POKORNY[1], Erin KEACH[2]

[1]Counties Manukau Health, Health New Zealand | Te Whatu Ora, University Of Auckland, New Zealand
[2]Hauora a Toi Bay of Plenty, Health New Zealand | Te Whatu Ora, New Zealand

Middle ear disease is a leading cause of preventable childhood hearing loss. In Aotearoa New Zealand, general practitioners (GPs) are the primary care providers for ear disease, yet diagnosis relies on standard otoscopy, which can have accuracy as low as 45%. This contributes to diagnostic uncertainty, antibiotic overuse, inappropriate referrals, and delayed care—disproportionately affecting Māori and Pacific children.

This proof-of-concept pilot is the first real-world evaluation of drumbeat.ai, an image-based AI otoscopy tool developed by the University of Sydney. Local validation in a diverse NZ cohort showed 96% sensitivity and 84% accuracy. The project is a partnership involving GPs, AI developers, and national stakeholders, working with a large GP provider to assess feasibility, acceptability, workflow integration, and early impacts on management and referral quality.

The presentation will outline:
- Burden and equity impact of childhood ear disease in NZ
- AI tool overview and performance
- Pilot design and co-design approach
- Early clinician feedback, enablers, and barriers in busy GP settings
- Implications for scaling AI-assisted ear disease diagnostics in primary care, including workforce readiness, workflow integration, and equity-focused implementation; and exploring broader AI solutions to strengthen child ear and hearing health.

Initial insights indicate AI-assisted otoscopy can enhance diagnostic confidence, support best-practice management, and reduce unwarranted variation—strengthening primary care and improving outcomes for children and their whānau/families.

Planned Session 41

AI for the Ear and Beyond
(Computational Audiology Network)

PS 41-3

VR-based fine-tuning of hearing device settings

André GOEDEGEBURE

Otorhinolaryngology and Head & Neck Surgery, Erasmus MC, Netherlands

One of the largest challenges in clinical audiological rehabilitation is to optimally adjust hearing devices to the individual's hearing needs and listening preferences. After a first fit based on the pure-tone audiogram, this fine-tuning is typically done in a quiet consultation room. However, real-world situations that hearing-impaired individuals may encounter are much more complex and diverse. Therefore, there is a substantial risk for reaching sub-optimal hearing-aid settings, in spite of extensive trial periods. To address this issue, we developed an advanced fine-tuning procedure that uses virtual audiovisual environments. This method utilizes virtual reality (VR) technology to allow hearing care professionals to test different settings with hearing device users in various situations. Thus, professionals can ensure that the settings are adequate for individuals in various real-world scenarios, and users can more easily and quickly compare different settings.

Two experimental studies have been performed to evaluate feasibility and potential benefits of VR-based fitting. Adult hearing-impaired participants with hearing aids or cochlear implants were fitted according our VR-based procedure. After that this VR fit was compared with a well-validated standard fit, using both listening tests and a take-home period of about two weeks. We showed that VR-based fine-tuning is feasible in a clinical setting. Participants reacted very enthusiastic as the used audiovisual scenes adequately reflected everyday listening conditions. We also managed to improve hearing device settings for some individual cochlear implant and hearing aid users, although we did not find an overall benefit. In the second study, we updated the VR-based fine-tuning protocol for hearing aid users with a more generalized and structured version. The results of this study are currently collected and will also be shared in the current presentation.

In conclusion, Virtual Reality is a promising tool for audiological clinical rehabilitation that may lead to more personalized care that is optimally tailored to the needs and preferences of the individual hearing-device user.

Planned Session 41

AI for the Ear and Beyond
(Computational Audiology Network)

PS 41-4

Art of Hearing: A Digital Dialogue Between Audiology and Creativity

Selvarani MOODLEY

School of Human and Community Development, University Of The Witwatersrand, South Africa

South Africa is the only African country with long-standing, consistent audiology services, positioning it uniquely to influence hearing health access and disability inclusion across the continent. To advance progress toward the SDGs, there is a pressing need for Afrocentric, culturally relevant, and accessible audiology resources that reflect the realities of African communities.

This presentation highlights an interdisciplinary collaboration between Digital Arts and Audiology aimed at creating innovative digital tools that enhance hearing health awareness and accessibility. The projects include:

1. a youth focused hearing health awareness website;
2. an interactive story based game introducing users to audiology testing and hearing health information
3. an Afrocentric digital avatar ;
4. a mobile game supporting early hearing screening for children; and
5. a culturally appropriate VR system for vestibular assessment.

Together, these initiatives illustrate how digital creativity can transform audiology practice, address African specific challenges, and support the development of inclusive, Afrocentric healthcare resources.

Planned Session 42-43

Public Health Planning for Hearing Impairment (PHPHI)

PS 42-1, 42-2, 42-4, 42-7, 42-10

Public Health Planning for Hearing Impairment

Andrew SMITH[1,2]

[1]International Centre For Evidence in Disability (until Dec 2024) / Honorary Consultant (public Health Hearing Programmes) Prasho Foundation (from March 2025), London School of Hygiene and Tropical Medicine (until Dec 2024), United Kingdom
[2]Public Hearing Health, PRASHO Foundation, Hyderabad, India

Abstracts by Andrew Smith for planned session 42-43 Public Health Planning for Hearing Impairment

ABSTRACT for 1st presentation – Introduction
Figures released by the World Health Organization (WHO) in March 2021 state that 430 million people in the world are estimated to have moderate or worse levels of hearing loss, and 1.6 billion to have any level of hearing loss . These numbers are projected to increase to over 700 million and 2.5 billion respectively by 2050 if nothing further is done. Over 80% live in low- and middle-income countries (LMICs). Hearing loss is the third largest cause of Years Lived with Disability (YLD) in the 2019 assessment for the Global Burden of Disease Study. The global cost of hearing loss is currently estimated to be $976 billion .

Hearing loss is largely avoidable through appropriate prevention strategies but is generally neglected due to lack of awareness amongst health professionals and policy makers, as well as the general public. It can only be addressed on a large scale by adopting a public health approach within the existing health system. However, most health professionals in this field are not familiar with public health methods and programme planning.

Professor Andrew Smith and Dr Daksha Patel in 2009 developed specific content for a 5-day course, now called a Training Workshop, on public health planning for hearing Impairment (PHPHI) for implementation in LMICs around the world.
The main purpose of the PHPHI training workshop is to introduce health professionals working in ear and hearing health to the principles and practice of the public health approach to hearing health.

They will also learn to use public health methods to plan a public health project in ear and hearing health.

The overall aim of the PHPHI Training Workshop programme is to develop a cadre of health professionals throughout LMI countries who will use public health methods to plan projects and programmes that will lead to a reduction in the huge burden of hearing loss.

The Training Workshops are very popular, and the numbers of participants and course locations have increased annually since inception. From 2009 to the end of 2025, 2328 health workers from seventy countries have been trained in PHPHI. Eighty-two training workshops have been held in twenty-two centres. Seventeen centres are in LMI countries.

The workshops have attracted academics and professionals in Otology and Audiology and allied fields, and health planners from Ministries of Health and Education, and Non-Governmental Organizations.

Key outputs from the training workshops include:
• training health professionals and local faculty in public health approaches to hearing health,
• raising awareness and advocacy for hearing loss at a local level,
• local assessment of needs and gaps within district health programmes,
• initiating the development of national and local programmes and projects for hearing health.

The main elements of the Public Health Approach for Ear and Hearing Health and also the main components of the PHPHI Training Workshop comprise:
• Epidemiology of hearing loss globally regionally nationally
• Principles and practice of the public health approach to ear and hearing health
• Prevention of hearing impairment through the public health approach
• Primary ear and hearing care principles and training
• Burden of hearing loss and solution costs
• Raising awareness and health promotion for ear and hearing health
• Community based research about ear and hearing care
• Planning projects for hearing health in a country or district

The Training Workshop itself lasts 3 to 5 days and incudes group sessions where participants learn to plan projects in public hearing health.

This session of ten presentations will introduce participants to the Public Health Approach for Ear and Hearing Health from a global, regional and national perspective and provide a taster for the full PHPHI Training Workshop.

The first presentation will provide an overview of public health planning for hearing impairment and the Training Workshop.

It is recommended that participants attend the whole set of presentations in order to get a comprehensive understanding of the Public Health Approach for Ear and Hearing Health.

References
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ABSTRACT for 2nd presentation. Principles and practice of public health applied to hearing impairment
This presentation defines public health and shows why it is needed to address the burden of hearing loss.
It shows ways to measure hearing loss in a population especially the prevalence, incidence and burden. It mentions the WHO-recommended method of conducting a population-based hearing prevalence survey.
The key criteria for selecting a public health intervention are discussed and the public health Interventions most likely to be effective for integrated ear and hearing care (EHC) provision across the Life Course are introduced.

ABSTRACT for 4th presentation: Prevention of hearing loss
This presentation describes the four levels of prevention in the chain of causation. how these levels can be linked to different causes of hearing impairment through the life course.and how this information is useful in programme planning for ear and hearing care.

ABSTRACT for 7th presentation: Primary Ear and Hearing Care(PEHC), and role of Community-Based Rehabilitation(CBR)
Primary ear and hearing care (PEHC) is an essential component of the Public Health Approach for Ear and Hearing Health.
In this presentation the history and philosophy of PEHC and its relation to Primary Health Care are discussed.
Teaching tools for PEHC developed by WHO are described and the links to Community-based Rehabilitation (CBR) and other community-based programmes are highlighted.

ABSTRACT for 10th presentation: National program for control of hearing loss & deafness
This presentation adopts a generic approach to describing the practical aspects of developing and monitoring a national strategy and programme for Ear and Hearing Care. It uses the planning and implementation cycle as a framework to demonstrate the steps that need to be taken to develop the strategy and programme. The examples are taken from various WHO tools especially those on Situation Analysis, Planning and Monitoring of National Strategies and Indicators for Monitoring Provision of Services.

Planned Session 42-43

Public Health Planning for Hearing Impairment (PHPHI)

PS 42-3

National policy for prevention and treatment of hearing loss: South Korea

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Hearing loss is an increasing public health concern in South Korea, affecting individuals across the lifespan and imposing substantial medical, social, and economic burdens. While South Korea has successfully established a nationwide newborn hearing screening program with high coverage and effective early intervention, significant gaps persist in hearing healthcare beyond infancy. In particular, school-age hearing screening, prevention of noise-induced hearing loss in adolescents, and adequate support for age-related hearing loss in older adults require further policy development.

Adolescents are increasingly exposed to recreational and environmental noise through personal listening devices and urban lifestyles, placing them at high risk for noise-induced hearing loss. Preventive strategies, including public education, school-based hearing conservation programs, and noise exposure regulation, are therefore essential. In older adults, early detection of presbycusis remains limited, and the use of hearing aids is often delayed due to social stigma, lack of awareness, and financial barriers. These unmet needs contribute to adverse outcomes such as social isolation, reduced quality of life, cognitive decline, and increased dementia risk.

This policy proposal presents a comprehensive national strategy encompassing life-course–based hearing health management. Key priorities include sustaining and advancing newborn hearing screening, establishing standardized and periodic school hearing screening, implementing preventive programs for adolescent noise-induced hearing loss, and strengthening early detection of age-related hearing loss. In addition, ongoing policy initiatives aim to reduce stigma associated with hearing aid use and to expand reimbursement and public financial support for hearing aids and auditory rehabilitation services.

Through integration of hearing care into primary healthcare, reduction of regional and socioeconomic disparities, and promotion of research and innovation, a coordinated national policy for hearing loss will improve population health, support healthy aging, and reduce long-term societal costs in South Korea's rapidly aging society.

Planned Session 42-43

Public Health Planning for Hearing Impairment (PHPHI)

PS 42-5

Hearing Loss in South Korea : A Global Perspective

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South Korea is currently experiencing a demographic transition unlike any other in the world, rapidly approaching a "hyper-aged" society. In this context, hearing health has transitioned from an individual medical concern to a critical national public health priority. This lecture provides a comprehensive analysis of the epidemiological trends of hearing loss (HL) in South Korea and proposes a visionary roadmap for integrated hearing management that could serve as a model for the global community.

The Epidemiological Turning Point According to recent national statistics, the prevalence of severe-to-profound hearing loss in South Korea reached a significant "turning point" in 2011, peaking at 0.5% (253,008 registered cases). Since then, the total prevalence has shown a steady decline, settling at 0.46% by 2015. While the annual prevalence rate is gradually decreasing across all age groups due to improved early intervention and public health awareness, a paradoxical challenge remains: the absolute number of HL cases is surging among the population aged 80 and over. This surge is directly linked to the rapid aging of the Korean population, with notable disparities persisting in male populations (1.19 times higher than females) and rural areas (1.4 times higher than urban centers).

Strategic Shift: Integrated Life-Cycle Management To combat these challenges, South Korea is advocating for an "Integrated Hearing Management System" that spans the entire life cycle. This proactive framework moves beyond simple treatment to a continuous care model consisting of six key stages: Neonatal hearing screening, Infant and pre-school check-ups, School-age screening, Occupational and workplace hearing conservation, Life-transition health exams, Geriatric hearing management.

Policy Proposals for Enhanced Accessibility The core of this lecture focuses on two transformative policy recommendations designed to lower the barrier to hearing rehabilitation.

Expansion of Cochlear Implant (CI) Coverage: We propose a critical shift in insurance policy, including mandated speech processor upgrades every 10 years and the expansion of bilateral CI coverage for adults. This ensures that the benefits of high-technology intervention are maintained throughout a patient's life, supported by robust mapping and speech therapy infrastructure.

Reform of Hearing Aid (HA) Standards: A landmark proposal involves redefining the criteria for hearing disability registration. By lowering the threshold from 60 dB to 55 dB, the government can significantly expand the population eligible for subsidized hearing aids. Furthermore, we advocate for tiered financial support for seniors (over 65) with bilateral hearing thresholds of 40 dB or higher, ensuring that "hidden hearing loss" in the elderly is addressed before it leads to cognitive decline or social isolation.

In conclusion, the South Korean experience demonstrates that while clinical prevalence may be managed, the social burden of hearing loss in an aging society requires aggressive policy intervention and a lifelong management perspective. This session invites global stakeholders to discuss how these strategies can be adapted to diverse international healthcare systems.

Planned Session 42-43

Public Health Planning for Hearing Impairment (PHPHI)

PS 42-6

Inside and Beyond WHO: Personal Reflections on Its Role and Use in Global Hearing Care

Young Ah KU

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Based on my previous experience working on the prevention of hearing impairment and deafness at the World Health Organization, this presentation offers a reflective perspective on the role of WHO in advancing global ear and hearing care.

Having left WHO long time ago, I aim to provide an independent, practitioner-oriented view rather than a description of current WHO activities. While acknowledging WHO's important contributions in setting global agendas, developing technical guidance, and supporting Member States, I will share personal observations on the practical challenges, limitations, and areas where expectations from the field may not fully align with global frameworks.

The presentation will also briefly introduce selected international efforts in hearing health as part of the broader global health landscape, with a focus on how these initiatives are experienced and interpreted at the implementation level.

Finally, drawing on my experience as a clinician and public health professional, I will discuss how experts in the field—beyond WHO—can more effectively engage with and make use of WHO's resources, platforms, and normative functions to strengthen ear and hearing care in diverse settings.

Planned Session 42-43

Public Health Planning for Hearing Impairment (PHPHI)

PS 42-8

Public hearing health in South Korea

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Hearing loss is a global health challenge affecting 1.5 billion people, a figure projected to rise to 2.5 billion by 2050. In South Korea, the increasing risk of hearing loss among the youth due to unsafe listening habits and the rapid aging of the population necessitate a robust public health approach. Despite its impact, hearing loss is often stigmatized and overlooked by policy-makers as an "invisible disability".

This presentation aims to evaluate the current status of ear and hearing care (EHC) in South Korea and propose a strategic transition from the current fragmented system to a "person-centered life-long care" model, aligned with the WHO's World Report on Hearing.

The WHO's H.E.A.R.I.N.G. intervention framework includes hearing screening, disease prevention, access to technology, and rehabilitation. South Korea's existing legal and institutional landscape, such as the Act on Guarantee of Health Rights and Access to Medical Services for Persons with Disabilities and the role of various government bodies (Ministry of Health and Welfare, etc.) across the life course will be discussed.

Life-Course Impact: Hearing loss is a major modifiable risk factor for dementia, accounting for a significant portion of preventable cognitive decline. Current management in Korea is split across multiple ministries (Health, Education, Labor), leading to a lack of continuity in informational, management, and relational care. While 80.3% of individuals with hearing disabilities rely on spoken language, policy focus often leans heavily toward sign language, highlighting a need for more diverse rehabilitation support (hearing aids, CI, etc.).

To achieve universal health coverage, South Korea must integrate Integrated People-Centered Ear and Hearing Care (IPC-EHC) into its national health plans. This requires a collaborative effort beyond medical professionals to include social and governmental support, ensuring timely diagnosis, noise reduction, and improved social awareness to foster an inclusive environment for all individuals with hearing loss.

Planned Session 42-43

Public Health Planning for Hearing Impairment (PHPHI)

PS 42-9

Early Detection for Early Intervention in South Korea: Moving Beyond Screening Toward Timely and Equitable Rehabilitation

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Early detection and timely intervention for childhood hearing loss are essential for optimal speech, language, cognitive, and social development. Before universal newborn hearing screening (UNHS), many children with hearing impairment in South Korea were not identified until two to three years of age, resulting in delayed diagnosis and missed opportunities for early auditory rehabilitation. To address this gap, nationwide UNHS was fully implemented under the National Health Insurance system in October 2018, establishing a national Early Hearing Detection and Intervention (EHDI) framework aligned with the international 1-3-6 principle.

Since national insurance coverage was introduced, screening coverage has increased substantially, from 79.1% in 2010 to over 95% in recent years, reflecting improved accessibility and public awareness. South Korea has therefore made significant progress in achieving the "1" component of the 1-3-6 principle. However, in 2026, the major public health challenge is no longer screening itself, but ensuring that every child identified with hearing loss successfully reaches the "6" milestone—timely, effective, and equitable rehabilitation.

Children who meet disability registration criteria may receive hearing-device reimbursement through the national welfare system, while infants with bilateral moderate hearing loss are supported through the government-funded Infant Hearing Aid Support Program introduced in 2019, with eligibility expanded since 2024 to include selected cases of unilateral hearing loss. These policies have improved access to amplification, but early intervention should not be defined solely by hearing-aid provision or cochlear implantation. The ultimate goal is consistent device use, appropriate fitting and verification, auditory-based speech and language rehabilitation, and continuous family-centered support that enables children to achieve age-appropriate language development and successful social participation.

To strengthen the Korean EHDI system, national support should move beyond hearing-device reimbursement toward structured auditory-verbal habilitation support. Eligibility for rehabilitation services should be based not only on disability registration, but also on functional hearing needs, particularly for children with mild-to-moderate bilateral hearing loss or unilateral hearing loss who often fall outside current support systems. Speech-language therapy vouchers and structured auditory-verbal rehabilitation programs should be expanded to ensure equitable access regardless of region or socioeconomic status. In addition, screening, diagnosis, amplification, cochlear implantation, and rehabilitation services must be connected through an integrated national tracking system to prevent loss to follow-up across the 1-3-6 continuum.

South Korea has successfully established universal screening; the next step is to achieve universal habilitation so that early detection truly leads to early intervention.

Planned Session 44

Rethinking Tinnitus: Moving Beyond Neural Correlates

PS 44-1

Understanding tinnitus in humans: What is holding us back?

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This presentation serves as an introduction to the session entitled _"Rethinking Tinnitus: Moving Beyond Neural Correlates."_ Despite more than two decades of intensive research imvolving leading scientists in the field, tinnitus research has yet to converge on robust and reproducible neural activity patterns that reliably indicate the presence of tinnitus in humans. Focusing on human electrophysiology, I will critically examine potential factors contributing to this impasse, including methodological heterogeneity, resolution limitations by standard approaches, and the lack of longitudinal data to obtain within-subject data. Rather than reiterating established correlational findings and the focus on "biomarkers", I will argue that progress may require a shift in perspective regarding what constitutes meaningful neural evidence. Finally, I will outline some emerging research directions that may help move the field forward.

Planned Session 44

Rethinking Tinnitus: Moving Beyond Neural Correlates

PS 44-2

Maladaptive threat and safety learning in tinnitus: Neural mechanisms of aversive generalization and threat regulation

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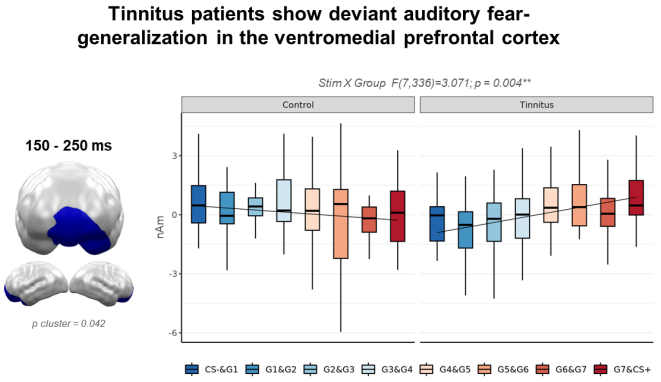


Figure Deviant Fear Generalization in Tinnitus

Classical conditioning has been proposed as a key neurophysiological model to understand the psychological distress associated with tinnitus, where the tinnitus sound becomes linked to an aversive emotional state through repeated pairing. This model assumes implicit learning mechanisms as more relevant than conscious ones and stands as the theoretical framework for the "Tinnitus Retraining Therapy", focusing on passive extinction of the conditioned response. Building on conditioning models, we hypothesized that tinnitus patients would exhibit deviant aversive and safety learning, as well as an overgeneralization of the aversive response. Additionally, we expected reduced threat inhibition in prefrontal cortex regions, identified as a hub of dysfunctional connectivity in tinnitus by our previous work.

Tinnitus patients and healthy controls underwent an auditory conditioning paradigm in which a low frequency or a high frequency tone (CS+) was paired with an aversive sound (US) while the other tone remained unpaired acting as safety signal (CS-). Before and after the conditioning phase, CS+, CS- as well as seven generalization stimuli (GS) with frequencies logarithmically distributed between CS- and CS+ were presented while neural responses were recorded by magnetoencephalography. In addition, explicit subjective ratings of all stimuli were assessed.

Patients and balanced healthy controls showed comparable generalization effects in their ratings of the GS stimuli: the more similar GS were to the aversively conditioned stimulus (CS+), the higher the ratings were in terms of threat response and the likelihood of the aversive stimulus occurring. Preliminary MEG data showed that, consistent with our hypotheses, neural activity reflecting threat inhibition was found in ventromedial prefrontal cortex (vmPFC) regions with tinnitus patients showing inverted generalization gradients compared to balanced controls, suggesting dysfunctional prefrontal fear generalization in tinnitus.

These findings suggest that tinnitus patients experience maladaptive aversive generalization learning associated with deviant prefrontal activation, which may contribute to the heightened affective distress observed in tinnitus.

Planned Session 44

Rethinking Tinnitus: Moving Beyond Neural Correlates

PS 44-3

Neural aging as a tinnitus risk factor

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Tinnitus, the perception of sound without an external source, affects 10–15% of individuals, yet its neural mechanisms remain poorly understood. Building on evidence that chronological age predicts tinnitus risk beyond hearing loss, we tested the hypothesis that accelerated neural aging increases susceptibility to tinnitus by integrating cross-sectional resting-state MEG with longitudinal structural imaging data. In a large MEG dataset, spectral parametrization revealed that age–neural relationships were amplified in the tinnitus group compared to age-, sex- & hearing-matched controls. Complementing these findings, prospective analyses showed that among participants without tinnitus at baseline, stronger age-related declines in white-matter density predicted later tinnitus onset. Collectively, these converging functional and structural findings support accelerated brain aging as a key risk factor for tinnitus.

Planned Session 44

Rethinking Tinnitus: Moving Beyond Neural Correlates

PS 44-4

The Bayesian brain and the free-energy principle in tinnitus, phantom pain, Mal de Débarquement syndrome, and visual snow syndrome

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Background and Purpose: Tinnitus, phantom pain, Mal de Débarquement Syndrome (MdDS), and Visual Snow Syndrome (VSS) are classified as phantom percepts — sensory experiences generated by the brain in the absence of corresponding external stimuli. All four conditions are understood to arise from maladaptive neuroplasticity following sensory deafferentation. This review examines these disorders through the unified lens of the Bayesian brain model and the free-energy principle.

Methods: Existing literature on tinnitus, phantom pain, MdDS, and VSS was systematically reviewed within the framework of predictive coding theory. The clinical features, neurophysiological mechanisms, and brain network alterations of each condition were comparatively analyzed and integrated into a unifying theoretical model grounded in the free-energy principle.

Results: When sensory input is reduced or abnormal, the brain — driven by its fundamental imperative to minimize prediction error — activates its internal generative model, which can give rise to phantom percepts. All four disorders share common neural mechanisms, including thalamocortical dysrhythmia, salience network (SN) dysfunction, and involvement of the (para) hippocampal memory system. Co-activation of the insula and dorsal anterior cingulate cortex (dACC) within the SN leads the brain to treat the absence of sensory input as behaviorally salient, thereby reinforcing maladaptive plasticity. Over time, persistent phantom percepts become integrated into the self-referential default mode network (DMN), further entrenching the pathological predictive model.

Conclusion: The predictive coding framework offers a powerful and parsimonious explanation for the generation of phantom percepts across sensory modalities. Tinnitus, phantom pain, MdDS, and VSS represent extreme manifestations of the brain's core operating principle — the drive to minimize free energy. Although clinically maladaptive, these phenomena are energetically adaptive responses to sensory uncertainty. This integrated perspective deepens our understanding of these disorders and provides a rational basis for developing therapeutic strategies aimed not merely at suppressing symptoms, but at recalibrating the underlying maladaptive predictive model through neuromodulation, pharmacotherapy, and psychological interventions.

Planned Session 45

Global Outreach & Epidemiology
PS 45-1

Health management of workers exposed to ototoxic chemicals

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Exposure neurotoxic and ototoxic chemicals can pose significant threats to auditory and vestibular health (Zarus et al, 2024), with occupational settings representing the primary source of high-level exposures (Masterson, Morata and Themann, 2025). These substances —including solvents, heavy metals, nitriles, pharmaceuticals, and asphyxiants commonly found in industrial cleaners, paints, lacquers, glues, and pesticides— can independently damage the auditory system and potentiate the harmful effects of occupational noise exposure.

Prevention efforts face two major obstacles worldwide: insufficient technical and administrative frameworks for controlling ototoxic chemical exposures, and a lack of evidence-based protocols for systematic risk management. Through the International Ototoxicity Management Group (IOMG), this collaborative effort identifies evidence-based strategies for managing ototoxic risks in occupational settings (Morata et al. 2025).

Proposed actions include identification of exposed workers, screening for auditory and vestibular problems, referral practices for clinical evaluation, and management of occupational exposures to prevent further cases. The proposed strategies and the body of evidence that was drawn from are found at https://en.wikiversity.org/wiki/International_Ototoxicity_Management_Group_(IOMG)/Protocols.

Action steps of a multi-tiered prevention strategy were influenced by the public health model of interventions as well as international guidance on risk management. The progression through these steps informs the selection of actions to prevent health effects from ototoxic exposures. Example activities and their corresponding level of prevention from the public health model of intervention are provided. Primary prevention emphasizes worker education and exposure reduction through engineering and administrative controls. Secondary prevention encompasses systematic audiometric monitoring conducted at baseline, during exposure periods, and post-exposure to enable early detection of auditory and vestibular changes. When auditory deterioration is identified, prompt reporting and referral facilitate timely risk management decisions and guide appropriate rehabilitation interventions.

Longitudinal monitoring programs provide essential support for at-risk workers and their healthcare providers in developing individualized exposure reduction strategies and determining optimal timing for rehabilitative interventions. Through integrated prevention, surveillance, and intervention approaches, occupational health programs can effectively minimize ototoxic damage and preserve workers' auditory and vestibular functions across their careers.

The adopted public health model framework allows for flexibility in meeting workplace needs to prevent the effects of exposure to ototoxicants among workers. The proposed approaches for ototoxicity management of workers exposed to ototoxicants were developed as practical steps to address a critical need for the expansion of hearing loss prevention activities in the workplace. This framework is intended to be customized to meet specific needs. It identifies novel technologies and metrics that can guide ototoxicity prevention into the future. It may serve as a basis for updating occupational health processes, informing future research, and advancing clinical audiology practices.

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Planned Session 45

Global Outreach & Epidemiology
PS 45-2

Enhancing remote audiology care through person- and context-centred practices

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Equitable access to hearing healthcare remains a global challenge, particularly for families facing geographic, systemic, and resource-related barriers that limit timely intervention and continuity of care for individuals who are deaf or hard of hearing. Virtual and hybrid models of hearing healthcare delivery have the potential to reduce inequities in access and participation. Achieving effective scale-up and sustained integration across diverse health systems requires implementation-ready approaches that account for contextual variation, family engagement, and system-level readiness. Drawing on global partnerships, participatory research, and implementation science, this session will present ongoing work to advance remote audiology care through readiness assessment, co-design, and contextual adaptation. The session aims to support shared learning around the clinical integration of evidence-informed, collaborative, and family-centred virtual audiology care that is globally relevant and locally actionable.

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Planned Session 45

Global Outreach & Epidemiology
PS 45-3

Addressing the global gap: Mapping audiology workforce and training disparities towards pathways of equitable access

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Hearing loss remains a major global health challenge, yet access to ear and hearing care continues to be constrained by profound and uneven workforce shortages, particularly in low- and middle-income countries (LMICs). Drawing on national-level data from a cross-sectional electronic survey conducted between June 2022 and March 2024 by the Global Otolaryngology–Head and Neck Surgery Initiative, this study examined the global distribution, availability, and training of hearing healthcare providers across 93 countries, representing 77% of the world's population. The global density of audiologists was 1.48 per 100,000 population, with more than 70% of countries reporting fewer than one audiologist per 100,000, and an overall hearing healthcare workforce density of 4.1 per 100,000. Shortages were most pronounced in the African, Eastern Mediterranean, and South-East Asian regions, where training pathways were limited and reliance on overseas education was common, particularly in low-income settings where 83% of audiologists were trained outside their country of practice. These findings reflect and extend existing evidence from global studies of barriers to ear and hearing care, which consistently identify workforce shortages, limited infrastructure, and constrained resources as dominant supply-side barriers, alongside demand-side challenges such as affordability and low ear and hearing care literacy. Together, this body of work highlights that workforce scarcity is not an isolated problem but a central determinant of access, shaping where services exist, who delivers them, and who ultimately receives care. Addressing global hearing health inequities will therefore require coordinated workforce planning, expansion of sustainable and locally accessible training models, integration of ear and hearing care into primary health systems, and policy investment tailored to the realities of LMICs.

Planned Session 45

Global Outreach & Epidemiology
PS 45-4

Hearing care for all: An opportunity to globally unite and address inequities in hearing health

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Hearing loss is one of the most prevalent chronic health conditions worldwide, yet there remains profound inequity in access to timely, affordable, and quality hearing care globally but also within regions and countries. The World Report on Hearing (World Health Organization, 2021) estimates that over 1.5 billion people live with hearing loss globally, with nearly 80% residing in low- and middle-income countries. Despite the availability of effective interventions, persistent inequities driven by workforce shortages, limited-service infrastructure, financial barriers, and low awareness continue to impede access to care across the life course.

This presentation frames Hearing care for all as both a global call to action and a unifying agenda for the audiology community. Drawing on the World Report on Hearing and aligned global policy frameworks, this presentation explores how coordinated, multisectoral action can accelerate progress towards equitable hearing health.

Key strategies include prevention and early identification, integration of hearing care into primary health care and universal health coverage, innovative workforce and task-sharing models, culturally responsive service delivery, and the responsible application of digital and assistive technologies.

Practical examples of scalable and contextually adaptable models of care are presented to demonstrate how evidence-based solutions can bridge gaps between high- and low-resource settings. The role of advocacy, global partnerships, and co-design with people with lived experience is highlighted as essential to translating evidence into sustainable policy and practice.

By positioning hearing health as a shared global responsibility, this presentation calls on the audiology community to lead collaboratively in addressing inequities. A united global approach, grounded in the vision of the World Report on Hearing, offers a powerful opportunity to improve access, advance equity, and ensure that hearing care is available to all, everywhere.

Planned Session 45

Global Outreach & Epidemiology
PS 45-5

Patient-reported outcome measures (PROMs) in audiology: A case study from South Korea

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Introduction: The Paradox of South Korea's Big Data Infrastructure
South Korea boasts one of the most sophisticated medical big data infrastructures in the world. With approximately 97–98% of the population enrolled in the National Health Insurance Service (NHIS), the Health Insurance Review and Assessment Service (HIRA) manages a colossal database that tracks the diagnosis, prescription, and surgical history of millions. In the field of audiology, this provides an unparalleled vantage point to monitor macro-indicators such as hearing aid prescription rates, the annual volume of cochlear implant (CI) surgeries, and total healthcare expenditures related to hearing loss.
However, behind this "quantitative supremacy" lies a critical "qualitative void." The current big data ecosystem is fundamentally designed for "billing" rather than "healing." While ICD-10 codes and treatment records are meticulously documented, the "patient's voice"—subjective symptoms such as the severity of tinnitus, the debilitating effects of dizziness, or the improvement in social engagement after rehabilitation—is conspicuously absent. Consequently, we are operating in an era of "half-data," where we know a patient received treatment but remain blind to whether that treatment genuinely improved their quality of life (QoL).

The Structural Bottleneck: Obstacles in Cost-Effectiveness Analysis
The absence of Patient-Reported Outcome Measures (PROMs) is not merely an academic concern; it poses a significant hurdle to national policy-making. To justify government subsidies or the expansion of insurance coverage, a Cost-Effectiveness Analysis (CEA) is essential. This typically requires calculating Quality-Adjusted Life Years (QALY).
Due to the lack of indigenous Korean utility weights reflecting subjective QoL improvements, Korean researchers have frequently been forced to borrow QALY values from Western literature (e.g, UK or US studies). This "one-size-fits-all" approach fails to account for Korea's unique social fabric, family structures, and linguistic characteristics. Without localized PROMs, developing a truly tailored Korean clinical practice guideline remains an uphill battle.

Creative Breakthroughs: Utilizing Proxy Indicators
In this data-restricted environment, South Korean researchers have pioneered creative "bypass strategies," using claims data as "proxy indicators" to infer the subjective suffering and functional recovery of patients.

1. Cognitive Health as a Proxy for Well-being Instead of directly asking patients about their social isolation, researchers tracked the incidence of dementia. Hearing loss is a major modifiable risk factor for cognitive decline. By analyzing NHIS data, it was proven that the CI group had a significantly lower dementia incidence rate (11.2%) compared to the non-rehabilitated hearing loss group (17.5%). This objective numerical gap serves as a powerful proxy, proving that auditory rehabilitation preserves cognitive function and, by extension, psychosocial QoL.

2. The Prevalence-Incidence Gap: Quantifying Chronic Suffering
To estimate the scale of patients who remain unrecovered despite treatment, researchers introduced the "Gap" concept. By subtracting the incidence rate (new cases) from the prevalence rate (total cases) within a specific timeframe, one can isolate the "chronic patient pool." These individuals continue to utilize medical services for the same condition, indicating unresolved subjective discomfort. This allowed for an estimation of the economic burden and the scale of "unrecovered" patients without traditional survey methods.

3. Integration with National Surveys (KNHANES) The Korea National Health and Nutrition Examination Survey (KNHANES) provides a rare bridge between clinical data and subjective lifestyle habits. By linking pure-tone audiometry (PTA) results with self-reported data on nutrition (e.g, carbohydrate and vitamin intake), noise exposure history, and smoking, researchers identified how subjective environments influence the onset of noise-induced hearing loss.

Conclusion: Completing the Puzzle with PROMs
While these proxy strategies have been innovative, they remain temporary solutions. To realize the vision of "Precision Audiology" and "Patient-Centered Care," PROMs must be formally integrated into the national big data framework.
Currently, the Korean audiological community is at a crossroads. Efforts are underway to link clinical data which stores precise PTA results from major university hospitals—with the macro-level claims data of the NHIS. The final, crucial step is the formal incorporation of PROMs. By combining Clinical Test Results, Medical Utilization History and Subjective Patient Feedback, South Korea can establish a world-first, "complete" audiological database. The introduction of PROMs is the final piece of the puzzle. It will enable the development of "Korean-specific QALYs" and usher in an era where policy is driven not just by administrative efficiency, but by the genuine well-being of the patient.

Planned Session 46

Treatment for Objective Tinnitus
PS 46-1

Etiology-based surgical treatment for managing pulsatile tinnitus

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Pulsatile tinnitus (PT) is a distinct form of tinnitus characterized by an auditory perception of pulse-synchronous sound, affecting approximately 4% of the general population. PT is largely attributable to identifiable structural or vascular pathologies in 50–85% of cases, making accurate etiologic diagnosis the cornerstone of effective management.

Three principal mechanisms underlie PT generation: turbulent hemodynamics causing abnormal sound transmission, vibration of a dehiscent vascular wall, and abnormal auditory perception secondary to third-window lesions. Among the diverse etiologies, sigmoid sinus (SS) wall anomalies — encompassing diverticulum and dehiscence — have emerged as the leading cause of venous-type PT, followed by high-riding jugular bulb, dural arteriovenous fistula (AVF), and idiopathic intracranial hypertension (IIH).

This lecture presents a systematic, etiology-based framework for the surgical management of PT, with particular focus on SS wall anomalies. The diagnostic workup integrates audiometric findings — including characteristic pseudo-low-frequency hearing loss and its resolution with ipsilateral jugular compression — with high-resolution temporal bone computed tomography, MR venography, and cerebral angiography. Bedside physical examination maneuvers, such as ipsilateral jugular vein compression, head rotation, and the water occlusion test, provide essential clinical corroboration before surgical planning.

Surgical decision-making is stratified according to the precise anatomical substrate. For an isolated SS diverticulum, transmastoid diverticulectomy with multilayer reconstruction using fibrinogen/thrombin-based hemostatic materials followed by polymethylmethacrylate (PMMA) or hydroxyapatite cement provides durable acoustic barrier reconstruction. For SS dehiscence — particularly when accompanied by an adjacent broad-based diverticulum — complete circumferential exposure via cortical mastoidectomy, diverticulum reduction, and comprehensive bony reconstruction has proven superior to conventional resurfacing alone in preventing symptomatic recurrence. Tailored re-roofing (TRR) with autologous bone represents an emerging alternative that preserves luminal patency and avoids synthetic materials. Endovascular approaches, including venous sinus stenting, are prioritized in patients with significant transverse–sigmoid sinus stenosis, uncontrolled IIH, or anatomical contraindications to transmastoid surgery.

When applied to carefully selected patients through meticulous clinicoradiologic correlation, etiology-directed surgical treatment of PT offers high rates of symptom resolution and meaningful improvements in quality of life, underscoring that PT is frequently curable.

Planned Session 46

Treatment for Objective Tinnitus
PS 46-2

Novel surgical interventions for pulsatile tinnitus of venous origin

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The aim of this speech is to provide a comprehensive introduction to the various categories of vascular pulsatile tinnitus diagnosis and clinical management, catering to both novice and experienced ENT doctors. A structured algorithm for diagnosing and treating pulsatile tinnitus will be presented. The session will place particular emphasis on the differential diagnosis between vascular and other types of pulsatile tinnitus, with a detailed focus on distinguishing venous pulsatile tinnitus from other vascular types such as dural arteriovenous fistula, among others. Leading diagnostic tools and methodologies for pulsatile tinnitus will be introduced, along with an explanation of the underlying mechanisms that govern the differentiation of various types of pulsatile tinnitus. Surgical approaches and the fundamental principles guiding the surgical management of pulsatile tinnitus will also be outlined. Lastly, the session aims to impart a deeper understanding of the pathophysiological aspects of pulsatile tinnitus among the audience, transcending mere clinical considerations, and offering a glimpse into future avenues of study.

Planned Session 46

Treatment for Objective Tinnitus
PS 46-3

Middle Ear Myoclonic Tinnitus: A Step-by-Step Diagnostic and Therapeutic Approach Toward Cure

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Middle ear myoclonic tinnitus is a rare symptom but can be curable form objective tinnitus when properly diagnosed and managed. It typically presents with characteristic symptoms of intermittent crackling or non-continuous buzzing sounds, which can be differentiated from other types of tinnitus. External sound, somatic stimulation or modulation, and brain lesions may induce this specific symptom, although the etiologic factors are not always clearly identified.
The diagnostic approach to this rare condition of MEMT includes thorough history taking, otoendoscopic evaluation, and various audiological tests to assess the presence of abnormal hyperactivity or tonic tension of the middle ear muscles. Enlargement of the tensor tympani or stapedius muscles demonstrated on temporal bone computed tomography also provides supportive evidence for MEMT.
A step-by-step therapeutic approach to MEMT will be introduced to achieve a curative outcome. Medical treatment combined with tinnitus retraining therapy, our novel intra-tympanic botulinum toxin injection, and, finally, middle ear tendon resection surgery will be demonstrated, along with the therapeutic strategies and clinical outcomes during the lecture.

Planned Session 46

Treatment for Objective Tinnitus
PS 46-4

Biphasic Eustachian Tube Dysfunction After Head and Neck Radiotherapy

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Introduction:
Radiotherapy (RT) is a cornerstone treatment for head and neck cancer but frequently causes middle ear and Eustachian tube dysfunction (ETD), significantly affecting quality of life. However, the long-term evolution and phenotypes of post-RT ETD remain poorly defined.

Methods:
This single-institution cross-sectional study enrolled 100 head and neck cancer patients after RT. Patients were stratified by time since RT (<3 months, 3–12 months, 1–3 years, and >3 years). ETD type was assessed using subjective questionnaires (ETDQ-7, PHI-10), objective tests (sonotubometry, TTAG, tympanometry), and clinical evaluations including otoscopy, positional changes, and the Valsalva maneuver.

Results:
Within 3 months after RT, obstructive ETD was predominant (38.9%), whereas patulous ETD was less common (11.1%). Beyond 3 years post-RT, obstructive ETD decreased to 13.3%, while patulous ETD increased to 24.4%. The crossover between obstructive and patulous ETD occurred approximately 1–3 years after RT.

Conclusions:
Post-radiotherapy ETD exhibits a biphasic evolution, shifting from an early obstructive phase caused by mucosal edema and impaired mucociliary clearance to a late patulous phase associated with Ostmann fat atrophy, muscular fibrosis, and weight loss. Conservative treatment is recommended in the early phase, while caution is advised regarding grommet insertion and balloon Eustachian tuboplasty. In late-stage disease, targeted management of patulous ETD—including tragal cartilage insertion or Eustachian tube fat injection—may be considered, highlighting the importance of time-specific and individualized treatment strategies.

Planned Session 47

Diagnostic Protocols of Hidden Hearing Loss
PS 47-1

Hidden Hearing Loss: Insights from Animal Models vs. Human Evidence—A Case of Failed Translation?

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Purpose
In recent years, cochlear synaptopathy in humans has been the topic of controversy with replication challenges. While animal studies show synaptic loss can persist after outer hair cell recovery, translating these findings to humans is difficult. Despite over a decade of research, reliably identifying synaptopathy using auditory evoked potentials remains challenging, highlighting the need for systematic evaluation.This presentation summarizes four key efforts: 1) Meta-analysis of 22 studies (~850 participants) assessing EFR reliability for detecting cochlear synaptopathy;2) investigations of middle ear muscle reflex (MEMR) in relation to extended high-frequency (EHF) thresholds; 3) an experiment examining EHF-sensitivity and EFRs; and 4) analysis of cochlear compression effects on EFR metrics.

Methods
A multi-modal, cross-sectional study with integrated meta-analysis was conducted. Experiment 1 measured MEMR growth functions in adults with normal audiograms and varied EHF thresholds (n= 83). Experiment 2 measured suprathreshold EFRs at 40% and 100% depths with varied EHF thresholds(n=30). Experiment 3 measured EFRs and distortion-product otoacoustic emission(DPOAE) growth functions at 4kHz(n=35). Experiment 4 (meta-analysis) used random-effects models to estimate pooled effect sizes, with subgroup analyses for etiology-specific effects (e.g,noise, aging).

Results
Experiment 1 showed that higher EHF thresholds were associated with shallower MEMR growth functions(p=0.025), adjusting for age, and standard-frequency thresholds. Experiment 2 revealed negative correlation between EHF thresholds and EFRs at 40% depth (r=−0.395,p=0.015). Experiment 3 found that compression slope was positively associated with EFR strength at 40% depth (r=0.4,p=0.009), indicating stronger compression corresponded to lower EFRs. Meta-analysis results were not statistically significant regardless of modulation type, depth, and etiology.

Conclusions
Experimental results and the meta-analytic synthesis converge to indicate that evidence for cochlear synaptopathy in humans remains tenuous. This casts doubt on whether synaptopathy seen in animal models translates to humans, which is unsurprising since over 90% of behavioral neuroscience findings fail to generalize to human populations.

Planned Session 47

Diagnostic Protocols of Hidden Hearing Loss
PS 47-2

Rethinking Diagnostic Protocols for Subclinical Hearing Difficulties: Lived Experience and Data-Driven Candidacy

Rebecca BENNETT

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Title: Rethinking Diagnostic Protocols for Subclinical Hearing Difficulties: Lived Experience and Data-Driven Candidacy

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A growing number of adults report significant listening effort, fatigue, and communication breakdown in background noise despite having audiometric thresholds within clinically "normal" limits, often described as "Sub-Clinical Hearing Difficulties (SCHD)".
Drawing on findings from a multi-site research program, this presentation addresses two critical gaps in current diagnostic pathways: (1) how we characterise the lived experience of SCHD, and (2) how we determine hearing aid candidacy and measure benefit in this population.
Using ecological momentary assessment (EMA) alongside validated self-report measures, we examine the day-to-day, listening-environment context-dependent realities of adults with SCHD, both unaided and following hearing-aid fitting. Findings indicate that SCHD is not a stable, threshold-based deficit, but a dynamic condition, and that self-reported listening difficulties and wellbeing varied across listening environments, highlighting the context-dependent nature of the SCHD experience.
We further present predictive analyses identifying which baseline audiological and psychosocial measures best forecast hearing-aid success in adults with SCHD. All measures were selected from tests commonly available in routine clinical practice, with the aim of developing a pragmatic, clinic-ready assessment battery to support candidacy decisions. Post-fitting EMA and outcome data show that benefit in this group is often reflected in reduced listening effort, enhanced social participation, and improved wellbeing, rather than large or easily measurable changes in audibility.

Together, these findings support a multidimensional diagnostic protocol that integrates functional listening measures, psychosocial profiling, and real-world data capture. Shifting from a threshold-based to a function-based framework will enable audiologists to more accurately identify, support, and monitor adults whose difficulties fall outside traditional diagnostic definitions.

Planned Session 47

Diagnostic Protocols of Hidden Hearing Loss
PS 47-3

The Hidden Intersection of Hearing Loss, Multimorbidity, and Reduced Hearing-Related Quality of Life in Adults with Intellectual Disability: Evidence from 1,053 On-Site Assessments

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Background:
People with intellectual disabilities (ID) experience higher prevalence of hearing loss (HL) and medical comorbidities than the general population, yet their combined impact on hearing-related quality of life (HRQoL) remains poorly understood. This study examined (1) the accuracy of self- and caregiver-judged hearing status, (2) differences in comorbidity profiles between those with and without HL, and (3) the association between HL and HRQoL.

Methods:
In a prospective cohort, 1053 individuals with ID (37% female, 1–90 years) underwent on-site hearing screening, diagnostic testing, and standardized medical history assessment. Diseases were coded according to ICD-11. HRQoL was assessed via a 4-point Likert scale. Logistic regression identified factors associated with HL, while linear regression explored its relationship with HRQoL.

Results:
Manifest HL was detected in 40% of participants, of whom 72.5% were previously undiagnosed. Multimorbidity (≥2 diseases) occurred in 63% with HL versus 42% without ($p < 0.001$). Participants with HL had more comorbidities (2.75 vs 1.65) and medications (2.73 vs 0.84). Eight disease categories were significantly more frequent with HL: vision impairment, hypertension, trisomy 21, obesity, mental-behavioural and neurodevelopmental disorders, spinal disorders, diabetes, and hypothyroidism. Regression confirmed independent associations of HL with vision impairment (OR 1.58, 95 % CI 1.06–2.34), trisomy 21 (OR 4.73, 2.78–8.25), spinal conditions (OR 1.83, 1.02–3.34), and hypothyroidism (OR 2.95, 1.35–6.86). Increasing HL severity predicted lower HRQoL ($\beta = -0.069$, $p < 0.001$; adjusted $R^2 = 0.081$).

Conclusions:
Undetected HL and multimorbidity substantially diminish HRQoL in adults with ID. Given the strong bidirectional associations between HL and systemic diseases, hearing status may serve as an accessible indicator for broader health risks—and vice versa. Systematic, low-threshold screening and interdisciplinary follow-up in familiar environments are vital to uncover hidden disease burdens, enhance HRQoL, and advance health equity for people with intellectual disabilities and hearing loss.

Planned Session 47

Diagnostic Protocols of Hidden Hearing Loss
PS 47-4

Feasibility of developing a clinical protocol to diagnose hidden hearing loss in normal hearing young adults with excessive noise exposure

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Purpose
Individuals with a history of noise exposure frequently report speech perception difficulties in noisy environments despite maintaining normal pure tone thresholds. Consequently, this population - potentially affected by hidden hearing loss (HHL) - is often overlooked in routine clinical settings. This study aimed to identify feasible clinical biomarkers for HHL by evaluating a comprehensive battery of widely used audiological tests and evoked potentials.
Methods
Forty-eight young adults in their 20s were enrolled and categorized into two groups based on their noise exposure history: a noise-exposure group (n = 25; e.g, military or loud music/band noise) and a control group (n = 23). A comprehensive assessment was performed, including pure tone audiometry (with ultra-high frequencies), speech-in-noise (SIN) testing, distortion product otoacoustic emissions (DPOAEs), electrocochleography (ECochG), auditory brainstem response (ABR), and cortical auditory evoked potentials (CAEP). All measured parameters were statistically compared between the noise-exposure and control groups.
Results
While both groups maintained thresholds within the normal range, the noise-exposure group exhibited significantly lower SIN scores at 0 dB signal-to-noise ratio (SNR). DPOAE amplitudes were significantly reduced in the noise-exposure group across both low-to-mid (1 - 4 kHz) and high (5 - 10 kHz) frequency ranges. Furthermore, the noise-exposure group exhibited increased ECochG SP/AP ratios, whereas ABR wave I and CAEP N1-P2 amplitudes were significantly reduced compared to the control group.
Conclusion
The distinct differences observed in SIN scores, DPOAEs, SP/AP ratios, and evoked potential amplitudes (ABR wave I, CAEP N1-P2) suggest that these measures can serve as effective clinical biomarkers for identifying HHL. Implementing this test battery could facilitate a proactive clinical approach, enabling early intervention and education to prevent further auditory degradation in at-risk populations.

Planned Session 47

Diagnostic Protocols of Hidden Hearing Loss
PS 47-5

Scaling the likelihood of noise-induced cochlear synaptopathy in humans

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BACKGROUND: Noise-induced cochlear synaptopathy can be reliably induced in various animal models following precisely designed, laboratory-generated temporary threshold shifts. The human translational effects of a real-world noise exposure that could leave cochlear function fully intact while selectively severing synaptic connections between the inner hair cells and afferent neurons remain unclear. Significant research and clinical attention have been paid toward developing a tool that could reliably detect synapse lesions in vivo, while far less attention has been paid to whether or not the occurrence of a noise-induced selective central lesion in the absence of a peripheral lesion qualifies as a relevant threat to humans.

METHODS: This presentation synthesizes evidence from animal and human studies investigating cochlear synaptopathy in the presence of normal audiometric thresholds. Emphasis is placed on histologically confirmed synaptic loss in animal models following severe and precise noise exposures and attempts at noninvasive proxy measures in humans. This presentation evaluates the translational plausibility of such a selective central lesion in real-world noise exposures, including safety constraints imposed by occupational safety standards (e.g., OSHA and NIOSH exposure limits/recommendations). This presentation also evaluates theoretical changes to audiologic management in the event of overlapping peripheral (overt) and central (hidden, presumably) lesions.

RESULTS: From a wide-lens perspective, the noise exposures used to induce synaptopathy in animal models frequently exceed what would be permissible under current occupational safety standards and guidelines, limiting translational relevance. In humans, evidence of a noise-induced cochlear synaptopathy remains indirect and inconsistent, which has frustrated the scientific and clinical communities for two decades. Despite this uncertainty, the concept of "hidden hearing loss" has been leveraged by audiologists and hearing aid manufacturers to promote diagnostic tests and interventions targeting a deficit that has not been confirmed or cannot be confirmed due to a concurrent peripheral lesion.

CONCLUSIONS: Current in vivo evidence of a cochlear synaptopathy is limited by indirect measurement approaches, studies with uncontrolled peripheral hearing status, and the impracticality of replicating causative noise exposures within ethical and regulatory constraints. Clinically, this suggests that suspected "hidden hearing loss" should be interpreted cautiously and only after rigorous exclusion of peripheral deficit, as any evidence of peripheral deficit could - by itself - explain any presumed symptom of cochlear synaptopathy.

Planned Session 48

Tinnitus Treatment with Implantable Hearing Device

PS 48-1

Cochlear Implantation for Tinnitus: Clinical Effects and Mechanisms

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[Introduction]
Cochlear implantation (CI) has revolutionized the treatment of severe-to-profound sensorineural hearing loss (SNHL). Beyond merely restoring speech perception, a wealth of clinical evidence and advanced neuroimaging now establishes CI as a highly effective intervention for managing chronic tinnitus. By clinical outcomes with the latest neurobiological models and neuroimaging data, a clear paradigm emerges: CI acts as a powerful neuromodulator that reverses maladaptive brain plasticity.

[Clinical Efficacy]
Meta-analyses demonstrate that CI significantly mitigates tinnitus severity. Post-implantation, a vast majority of patients report substantial reductions in tinnitus loudness and distress, reflected in significantly lowered Tinnitus Handicap Inventory (THI), Tinnitus Questionnaire (TQ), and Visual Analog Scale (VAS) scores. Interestingly, patients with single-sided deafness (SSD) exhibit a much more dramatic reduction in THI scores compared to those with bilateral deafness. Nonetheless, patients with bilateral hearing loss also experience profound benefits: bilateral tinnitus suppression is achieved even with unilateral implantation due to cross-hemispheric neural reorganization.
This tinnitus suppression leads to secondary benefits, including significant improvements in speech-in-noise perception, spatial hearing, and a marked reduction in associated depression and anxiety. Notably, the efficacy of tinnitus suppression and the enhancement of quality of life are highly dependent on sufficient daily wear time. Furthermore, because tinnitus often rebounds upon deactivating the CI at night and leads to sleep disturbances, the development of low-power, sleep-compatible, and always-on devices represents a critical future direction for CI design.

[Mechanisms]
Current evidence suggests a complex network spanning peripheral and central pathways, involving both auditory and non-auditory regions. Peripheral auditory deafferentation disrupts lateral inhibition, triggering aberrant auditory-somatosensory integration and hyperactivity across the thalamocortical system. Central to this process is Thalamocortical Dysrhythmia (TCD), a leading theory positing that tinnitus arises from a pathological shift in brainwave patterns. Given the thalamus's role as a primary relay, these dysrhythmias extend to a broader network—including the default mode, dorsal attention, and limbic systems—suggesting that tinnitus is maintained by a failure in top-down inhibition, attention control, and noise-canceling mechanisms.
Noting the tinnitus is rare in congenital deafness but common in acquired deafness, Knipper et al. have develop a model explaining tinnitus and why CI suppresses tinnitus. The root of acquired tinnitus lies in the damage to high-spontaneous-rate (high-SR) auditory nerve fibers which are responsible for driving the maturation of parvalbumin-positive (PV+) inhibitory interneuron networks in the auditory cortex. When high-SR fibers are damaged, these PV+ inhibitory microcircuits lose their driving force and lead to central hyperexcitability. On contrary, congenitally deaf individuals rarely experience tinnitus because these mature PV+ inhibitory networks never developed in the absence of auditory experience. CI successfully treats tinnitus because direct electrical stimulation re-engages the dormant high-SR pathways. This powerful input reawakens the PV+ inhibitory networks and restores frontostriatal top-down control, effectively silencing the tinnitus percept.

[Some evidence from electrophysiological and neuroimaging data]
EEG (Electroencephalography): Intraoperative electrically stimulated auditory brainstem response (EABR) and electrically evoked middle latency responses (EMLR) serve as a potent objective predictor of CI efficacy. Tinnitus patients exhibit a unique "larger wave III, smaller wave V and delayed wave V" in EABR and a "large Na-Pa amplitude and delayed Pa latency" in EMLR compared to non-tinnitus patients. Crucially, the size of intraoperative wave III and Na-Pa amplitude is strongly correlated with the degree of THI improvement.
MEG (Magnetoencephalography): Steady-State Auditory Evoked Fields (SSAEFs) measured via MEG objectively capture central inhibitory deficits. Tinnitus patients display abnormally high neural current strengths. When treated with neuromodulatory interventions like repetitive transcranial magnetic stimulation (rTMS), these elevated SSAEFs remain significantly decreased, confirming SSAEFs as a viable biomarker for tinnitus and auditory plasticity.
MRI (Magnetic Resonance Imaging): Structural and functional MRI reveal that CI actively reverses brain atrophy. After CI, patients exhibit a significant volume increase in the contralateral superior temporal gyrus (STG) and superior frontal gyrus (SFG). This structural recovery directly correlates with improvements in postoperative speech recognition, proving that CI induces substantive anatomical restoration.
PET (Positron Emission Tomography): Functional metabolic imaging via [15O]H2O-PET demonstrates an abnormal, overly symmetrical regional cerebral blood flow (rCBF) in the bilateral auditory cortices in single-sided deafness individuals. Following CI implantation and consistent device usage, the rCBF reverts to a healthy, asymmetrical (contralateral-dominant) activation pattern.

Planned Session 48

[Conclusion]
Moving beyond its role as a peripheral acoustic prosthesis, CI provides robust tinnitus suppression and improves psychosocial outcomes. CI functions through both a fast mechanism of electrical disruption of phantom sound and a slow mechanism of long-term neural plasticity. Incorporating CI into chronic tinnitus management protocols represents a major clinical milestone for the post-lingually deafened population.

Planned Session 48

Tinnitus Treatment with Implantable Hearing Device

PS 48-2

The Signal Processing and Numerical Analysis to Assess Auditory Conduction Based on Biomechanics

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The diagnostic assessment of auditory conduction requires a sophisticated understanding of both structural integrity and signal complexity. We introduce an advanced framework combining biomechanical modeling with advanced complexity measures in biomedical engineering. While biomechanical modeling provides a spatial map of stress-strain distributions across the outer, middle, and inner ear, advanced complexity measures offer a spectral-domain analysis of signal regularity. Unlike traditional scientific measures, we decompose hair cell transduction signals into discrete frequency bands to quantify the information loss specific to each octave. By correlating simulated mechanical damping with frequency-specific complexity measures, we can pinpoint pathologies ranging from ossicles to hair cell tonotopic degradation. This dual-layered approach allows for dynamic digital twins, optimizing the surgical and rehabilitative strategy for complex auditory disorders.

Planned Session 48

Tinnitus Treatment with Implantable Hearing Device

PS 48-3

Prognostic factors of tinnitus improvement after stapes surgery

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Tinnitus is a frequent and often bothersome symptom in patients with otosclerosis. Although the primary goal of stapes surgery is to improve conductive hearing loss, many patients also hope that the procedure will reduce or eliminate their tinnitus. While a majority of patients report improvement after surgery, a significant portion experiences minimal change, and a few even report worsening symptoms. Currently, there are no well-defined clinical indicators that reliably predict who will benefit in terms of tinnitus relief. In this study, we conducted a retrospective review of patients who underwent primary stapes surgery to investigate the relationship between preoperative factors and postoperative changes in tinnitus. We evaluated variables such as age, comorbidity, tinnitus type, and hearing outcomes to identify potential predictors of improvement. Understanding these factors could help surgeons provide more accurate preoperative counseling and manage patient expectations more effectively. Our goal is to offer practical insights that can assist in patient selection and guide discussions around tinnitus prognosis in the context of stapes surgery.

Planned Session 48

Tinnitus Treatment with Implantable Hearing Device

PS 48-4

The Impact of Cochlear Implantation on Tinnitus: Insights from Data-Logging Analysis

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Binaural hearing has been shown to have numerous benefits. In Japan, the 2017 revision of the criteria for adult cochlear implantation (CI) states that CI on both sides should not be denied if it is beneficial. In our clinic, we have seen an increase in the number of patients requesting simultaneous or sequential CI surgery. Regarding bilateral tinnitus, hearing loss is the most significant risk factor, and using hearing aids in both ears is recommended. CI can enhance hearing performance in people with hearing loss, and it is also considered effective for tinnitus. This is because it can introduce external sound stimulation, which is similar to acoustic therapy and can help avoid silence, causing an improvement in tinnitus. However, the evidence for the effectiveness of cochlear implants in treating tinnitus is not yet established, and there have been reports of tinnitus worsening after the surgery. In this report, we evaluate tinnitus symptoms before and after cochlear implant surgery in our hospital. The study included both bilateral and unilateral cochlear implant groups, who underwent preoperative tinnitus evaluation. Tinnitus was assessed using the Tinnitus Handicap Inventory (THI), and the loudness and distress of tinnitus were measured using the Visual Analogue Scale (VAS). Retrospective analysis of data obtained from the automatic scene classifier data logging system. Speech discrimination scores were evaluated after 6 months. THI improved in 29 of 35 (82.9%) patients, remained unchanged in 3 (8.6%), worsened in 2 (5.7%), and in 1 (2.9%) patient, tinnitus was first noticed postoperatively. Bilateral cochlear implant users experienced more significant improvement in their THI score, loudness, and distress related to tinnitus. Tinnitus is believed to occur when the central auditory pathway's inhibitory system becomes less active due to a decrease in acoustic input, leading to overexcitation. In this study, patients who received bilateral cochlear implants experienced a reduction in tinnitus, which is attributed to the restoration of bilateral acoustic stimulation. It was found that bilateral implantation was more effective in suppressing tinnitus than unilateral implantation.

Planned Session 49

Innovative Therapies
PS 49-1

Recent progress of inner ear organoid

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The development of auditory organoids represents a groundbreaking advancement in auditory research and regenerative medicine. These three-dimensional tissue structures, derived from pluripotent stem cells, replicate the architecture and function of the human inner ear, including the key sensory and neural cell types such as hair cells, supporting cells, and neurons. Auditory organoids enable researchers to study inner ear development, model genetic hearing disorders, and evaluate the effects of ototoxic drugs. Recent breakthroughs include the successful differentiation and functional validation of hair cell-like structures responsive to sound signals, as well as the integration of LGR5+ hair cell progenitor cells to enhance regenerative capacity. Despite significant progress, there remain many challenges of achieving full functional maturation, improving reproducibility, and scaling production for clinical applications. This emerging technology holds immense potential for understanding the inner ear biology, advancing personalized medicine, and developing novel therapies for hearing loss and balance disorders.

Planned Session 49

Innovative Therapies
PS 49-2

Developing a pluripotent stem cell-based therapy for hearing loss: Paving the way towards clinical trials

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Disabling hearing loss is a growing global concern, with significant social, personal, and economic consequences. While sensory hair cells are essential for hearing, mounting evidence suggests that the loss of neural connections between hair cells and the brainstem often precedes and exceeds hair cell damage, as seen for instance in presbycusis. Auditory neuropathy is another example of the importance of neural health, characterized by neuronal loss despite preserved hair cell function. Currently, there are no disease-modifying therapies; hearing aids and cochlear implants are the only interventions available. Cochlear implants can partially compensate for hair cell loss, but no regenerative treatment to target cochlear neuron degeneration exists to date.

To address this, we are developing human pluripotent stem cell-based therapies to repair the auditory nerve. Pluripotent stem cells can differentiate into any cell type in the body when guided by appropriate developmental signals. We have established robust methods to generate otic neuroprogenitors (ONPs) by mimicking normal development. Following successful proof-of-concept studies in animal models, we transitioned our cell generation processes to industrial standards, implemented purification strategies, and developed precise analytical methods for the characterization of the cell product. Preclinical animal studies have demonstrated the safety and functional integration of ONPs with experimental cochlear implants. Rinri is now preparing to initiate a first-in-human trial using Rincell-1, a population of ONPs derived from human embryonic stem cells. A novel surgical approach for injecting Rincell-1 into the cochlear neural spaces via the round window has also been developed. The initial trial will focus on assessing the safety of Rincell-1 as an adjunct to a cochlear implant. The presentation will summarize our current efforts and progress advancing stem cell-based therapies for hearing loss.

Planned Session 49

Innovative Therapies
PS 49-3

Towards a cure for hearing loss: The pharmacologic frontier

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Since 2011, our research has focused on the development of pharmacologic and gene-based therapies for hearing loss, with the goal of translating mechanistic insights into clinically applicable interventions. Building upon earlier work initiated in 2007, we have published a series of 14 studies addressing diverse etiologies of sensorineural hearing loss, including ototoxic drug exposure, noise-induced injury, genetic defects, and idiopathic sudden hearing loss.
Our pharmacotherapy research has primarily targeted mitochondrial dysfunction and oxidative stress, which are key pathogenic mechanisms in cochlear injury. We demonstrated protective effects of multiple candidate compounds—such as antioxidants, mitochondrial-targeted agents, and novel synthetic derivatives—against cisplatin- and aminoglycoside-induced ototoxicity, as well as noise-induced hearing loss. Notably, recent work has identified inhibition of the mitochondrial permeability transition pore as a promising therapeutic target, further supporting the central role of mitochondrial homeostasis in auditory protection. In parallel, drug delivery strategies, including intracochlear delivery of growth factors, have been explored to enhance therapeutic efficacy.
In the field of gene therapy, we have investigated targeted approaches for hereditary hearing loss using murine models. Our studies demonstrated successful restoration of auditory function through gene replacement and in utero gene therapy, highlighting the potential for early intervention in congenital deafness.
Most recently, we have focused on the discovery and development of novel synthetic compounds targeting previously unrecognized molecular pathways, with the ultimate aim of developing the world's first disease-modifying synthetic drug for hearing loss.
In this presentation, we will provide an overview of our accumulated research achievements and introduce our ongoing studies, emphasizing emerging therapeutic targets and translational strategies for the treatment of hearing loss.

Planned Session 49

Innovative Therapies
PS 49-4

A novel intratympanic injection: Dexamethasone nanocrystals embedded in hydroxypropyl methylcellulose hydrogel

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Herein, dexamethasone (DEX) nanocrystalline suspension (NS)-embedded hydrogel (NS-G) was constructed using a hydroxypropyl methylcellulose (HPMC) polymer to enhance cochlear delivery and attenuate hearing loss following intratympanic (IT) injection. Hydrophobic steroidal nanocrystals were prepared using a bead milling technique and incorporated into a polysaccharide hydrogel. The NS-G system with HPMC (average molecular weight, 86,000 g/mol; 15 mg/mL) was characterized as follows: rod-shaped drug crystalline; particle size <300 nm; and constant complex viscosity ≤1.17 Pa·s. Pulverization of the drug particles into submicron diameters enhanced drug dissolution, while the HPMC matrix increased the residence time in the middle ear cavity, exhibiting a controlled release profile. The IT NS-G system elicited markedly enhanced and prolonged drug delivery (> 9 h) to the cochlear tissue compared with that of DEX sodium phosphate (DEX-SP), a water-soluble prodrug. In mice with kanamycin- and furosemide-induced ototoxicity, NS-G markedly enhanced hearing preservation across all frequencies (8–32 kHz), as revealed by an auditory brainstem response test, compared with both saline and DEX-SP. Moreover, treatment with NS-G showed enhanced anti-inflammatory effects, as evidenced by decreased levels of inflammation-related cytokines. Therefore, the IT administration of DEX NS loaded HPMC hydrogels is a promising strategy for treating hearing loss.

Planned Session 50

Speech, Language and Cognition I
PS 50-1

Theory of Mind and Children with Cochlear Implants

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1. Background and Purpose
Theory of Mind (ToM) is the essential ability to understand others' mental states, such as beliefs and intentions. While children with CIs who receive early intervention often reach language levels comparable to hearing peers, their ToM development is frequently reported as delayed or inconsistent. This study investigated whether ToM performance in children with CIs could be improved through an intervention focused on mental state terms.

2. Methodology
The study involved 10 participants with cochlear implants (CIs) who possessed spoken language skills equivalent to those of 4–5-year-old children. These subjects demonstrated high speech perception abilities, scoring over 90% on related tests, and were pre-screened to ensure they had the necessary attention spans for telepractice. The intervention was conducted via telepractice, a method known to provide effects comparable to face-to-face sessions while offering greater flexibility in time and space. Over a total of 12 sessions, each lasting 25 minutes, participants were introduced to five new mental state terms per session using pictures and sentential complementation. Pre- and post-tests focusing on false belief understanding and mental state term recognition were administered to measure progress.

3. Results
The post-assessment results revealed a statistically significant improvement in the participants' performance across all evaluated areas. To analyze the changes, a Wilcoxon signed-rank test was employed to compare pre- and post-intervention scores. Regarding the false belief task, the analysis showed that post-test scores were significantly higher than pre-test scores ($Z = -2.816$, $p < .01$), with the mean score rising from 2.60 ($SD = 1.84$) to 6.50 ($SD = 2.32$). Similarly, in the mental state term test, participants demonstrated a statistically significant gain ($Z = -2.848$, $p < .01$), as the mean score increased from 9.30 ($SD = 2.41$) to 12.60 ($SD = 2.07$). Notably, all 10 participants showed improved performance following the 12-session intervention. While individual differences in the rate of progress were observed, the overall consistent upward trend across the group highlights the positive impact of the program.

4. Conclusion and Implications
This study suggests that Theory of Mind (ToM) in children with cochlear implants can be effectively enhanced through targeted interventions focusing on mental state terms. The findings are particularly significant as they indicate that ToM performance can be improved even in children who already possess age-appropriate language skills but previously exhibited delays in ToM development. These results provide a meaningful basis for incorporating mental state term training into clinical and educational support for the CI population. However, a conservative interpretation remains appropriate regarding the generalization of these findings. Due to the small sample size of 10 participants, further research with a larger and more diverse group of children with CIs would be beneficial to confirm these preliminary indicators of ToM improvement.

Planned Session 50

Speech, Language and Cognition I
PS 50-2

Cognitive and mental health outcomes in early-implanted cochlear implant users: Results from the TAYACI-study

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Background: Cochlear implantation (CI) is an established intervention for children with congenital or prelingual severe-to-profound sensorineural hearing loss, with early implantation linked to improved speech, language, and educational outcomes. However, long-term outcomes into adolescence and young adulthood remain insufficiently understood, particularly regarding higher-level cognition, mental health, and everyday functioning. Outcome variability among early-implanted individuals also remains an important research question.

Objective: The TAYACI (Teenagers and Young Adults with Cochlear Implants) study investigated long-term outcomes following early cochlear implantation (<30 months), focusing on cognitive and linguistic abilities, mental health, self-efficacy, and everyday life experiences. A further aim was to explore factors contributing to variability in outcomes, including age at implantation and etiology.

Methods: This multidisciplinary study included adolescents and young adults aged 12–22 years with early CI (n=50; mean implantation age 15.6 months) and age-matched peers with typical hearing (TH; n≈60–70). Participants completed standardized assessments of executive functions, phonological working memory, word fluency, and metaphor comprehension. Self- and parent-reported measures assessed mental health (Strengths and Difficulties Questionnaire, SDQ), General self-efficacy, and health-related quality of life. Everyday experiences were captured using the Young People's Survey (YPS).

Results: Participants with CI performed similarly to TH peers across most cognitive and linguistic domains, with the exception of poorer phonological working memory. Earlier age at implantation was associated with better phonological working memory and higher-level language abilities, including metaphor comprehension. Later-implanted individuals showed greater reliance on compensatory strategies, for instance semantic clustering during word retrieval tasks, indicating heterogeneous developmental pathways.

Mental health outcomes were broadly comparable between groups, although reported difficulties tended to be more persistent over time in the CI group. No group differences were found in general self-efficacy; however, individuals with additional diagnoses (e.g., Usher syndrome, or ADHD combined with hearing loss) reported lower self-efficacy, indicating increased vulnerability in this subgroup.

Participants with CI reported lifestyles similar to their TH peers, including engagement in leisure activities, digital media use, and high levels of music engagement. Many described frequent music listening, strong appreciation of music, and perceived positive emotional effects. A high proportion had attended mainstream education, and 47% of young adults with CI were enrolled in university studies. Despite these positive outcomes, participants with CI reported greater difficulties in adverse listening environments, particularly in noise and group conversations, and highlighted the value of compensatory strategies such as lipreading and access to subtitles.

Conclusions: Early cochlear implantation supports favorable long-term cognitive, linguistic, and psychosocial outcomes into adolescence and young adulthood. However, variability in outcomes persists, particularly in relation to comorbid conditions and complex listening environments. These findings indicate that support needs extend beyond early family-centered intervention (FCEI), and that continued monitoring and targeted interventions are required throughout school age and into adolescence to optimize participation and functioning.

Planned Session 50

Speech, Language and Cognition I
PS 50-3

Social-Emotional development of Children with Cochlear Implants in Japan

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Introduction
Social–emotional skills are psychological abilities that enable individuals to regulate their emotions and behaviors in group settings such as schools. These skills emerge in early childhood, develop during the school years, and are considered to be associated with later social participation and quality of life. Previous studies conducted in other countries have reported that children with hearing impairment tend to show lower levels of social–emotional skills than their hearing peers and may exhibit uneven development across different domains. However, in Japan, the challenges related to psychological adjustment among school-aged children with hearing impairment have not been sufficiently clarified. The present study aimed to evaluate social–emotional skills in children with hearing impairment in order to contribute to improvements in educational approaches and support strategies appropriate for the current educational environment in Japan.
Participants and Methods
Participants were elementary, junior high, and high school students with prelingual hearing loss who underwent cochlear implantation before entering elementary school. Parents completed the Strengths and Difficulties Questionnaire (SDQ; 25 items), which assesses children's emotional and behavioral functioning. The SDQ includes four domains of difficulties: emotional symptoms (ES), conduct problems (CP), hyperactivity/inattention (HI), and peer problems (PP). In addition, the total difficulties score (TDS), calculated as the sum of these four domains, and prosocial behavior (PB), which represents positive social behavior, were analyzed. Standardized scores were calculated using Japanese normative data stratified by age and sex. For high school students, normative data from full-time high school students were used. Differences between participants' scores and normative values were examined using t-tests. Age-related differences were estimated using regression analyses, and additional regression analyses were conducted to explore factors associated with higher difficulty scores.
Results
A total of 78 valid responses were obtained. Significant differences from normative scores were observed for all six indices. Participants showed significantly lower conduct problem scores and significantly higher prosocial behavior scores than the normative values. Despite these strengths, greater difficulties were observed in emotional symptoms, hyperactivity/inattention, and peer problems, suggesting that overall difficulties may be largely related to challenges in interpersonal functioning. Age-stratified analyses indicated that peer problems became more pronounced with increasing age. Furthermore, regression analyses revealed that a later age at the initiation of hearing aid use was associated with higher emotional symptom scores.

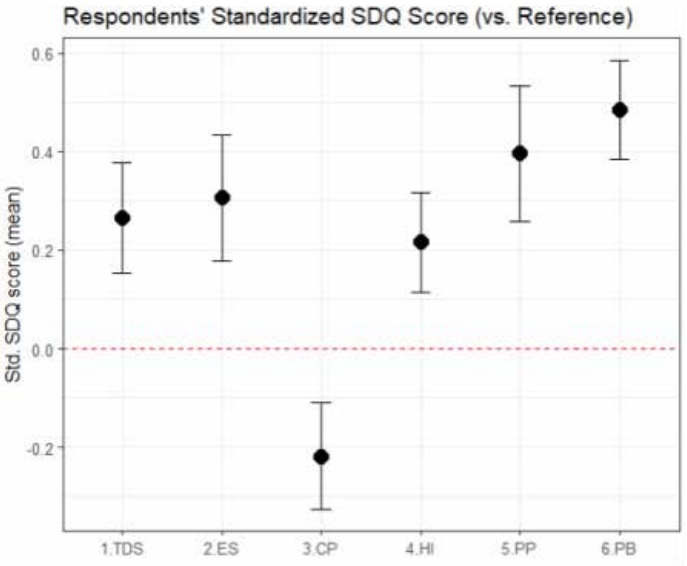


Figure Legend: TDS, Total Difficulties Score; ES, Emotional Symptoms; CP, Conduct Problems; HI, Hyperactivity/Inattention; PP, Peer Problems; PB, Prosocial Behavior. Note: Dots indicate the mean values of participants, and error bars represent the standard error

Planned Session 50

Speech, Language and Cognition I
PS 50-4

Cochlear Implant Outcomes in Children with Additional Disabilities

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Background & Objective: Children with additional disabilities present unique challenges in cochlear implant (CI) candidacy, often facing uncertain prognoses regarding open-set speech recognition. While traditional metrics focus on audiological gain, this study aimed to evaluate the broader impact of CI on this population, specifically emphasizing Quality of Life (QoL) and family dynamics.

Method: A cross-sectional study was conducted on 31 children (mean implant age: 2.8 years) with profound hearing loss and co-occurring Global Developmental Delay (GDD); 35% presented with additional comorbidities. Auditory and speech skills were assessed using the Categories of Auditory Performance version II (CAP-II) and Speech Intelligibility Rating (SIR). QoL was rigorously evaluated using the Parents' Evaluation of Aural/Oral Performance of Children (PEACH) and the Perceived Benefit Questionnaire (PBQ) to assess parental satisfaction and family stress.

Results: Significant improvements were observed in auditory and speech skills, with 64.5% of children achieving verbal communication. However, QoL results were the most profound. 100% of parents perceived the CI as beneficial. Notably, 67.8% of families reported a direct reduction in family stress following implantation. Furthermore, over 70% of parents observed distinct improvements in their child's social interaction, vocal skills, and environmental awareness.

Discussion & Conclusion: While children with additional disabilities may follow a slower trajectory for speech acquisition compared to neurotypical peers, the QoL benefits are substantial. The reduction in family stress and the improvement in social engagement justify the CI intervention. Outcome measures for this population must evolve to prioritize these holistic gains, ensuring families are counselled on realistic, yet positive, quality-of-life expectations.

Planned Session 50

Speech, Language and Cognition I
PS 50-5

Distinct and Overlapping Language and Listening Profiles in Children with Mild Bilateral Sensorineural Hearing Loss and Dyslexia: A Comparative Study

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Background:
Children with mild bilateral sensorineural hearing loss (MBHL) and those with dyslexia exhibit unique yet intersecting challenges in language and literacy development. While MBHL primarily affects auditory input, dyslexia is rooted in deficits in linguistic processing. Both conditions can compromise phonological skills and performance in noisy environments, but comparative evidence remains limited.

Objective:
To compare listening-in-noise performance, oral language abilities, articulation, reading skills, and phonological processing in Cantonese-speaking children with MBHL and dyslexia.

Methods:
A total of 126 children aged 7–9 years (43 with MBHL, 41 with dyslexia, and 42 controls) participated. MBHL was defined by pure-tone thresholds of 26–40 dB HL; dyslexia was clinically diagnosed. Measures included the Cantonese Hearing in Noise Test (CHINT), Hong Kong Cantonese Oral Language Assessment Scale (HKCOLAS), Hong Kong Cantonese Articulation Test (HKCAT), reading fluency tasks, and phonological processing/awareness tests.

Results:
Both clinical groups performed significantly worse than controls across all domains. The dyslexia group scored significantly lower than the MBHL group in language abilities, reading skills, phonological processing, and phonological awareness ($p < .05$). Conversely, the MBHL group showed poorer articulation than the dyslexia group ($p < .05$). No significant difference was found between MBHL and dyslexia in listening-in-noise performance.

Conclusions:
Findings reveal distinct and overlapping profiles: dyslexia is associated with severe linguistic and phonological deficits, whereas MBHL primarily affects auditory access and articulation. Both groups struggle in noisy environments. Results highlight the need for comprehensive, domain-specific assessment and tailored interventions for each population.

Keywords: Mild bilateral sensorineural hearing loss, Dyslexia, Listening-in-noise

Planned Session 50

Speech, Language and Cognition I
PS 50-6

Why Early Intervention Matters: Linking Listening Skill Development and Language Outcomes in DHH Children

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Background:
Children who are Deaf or Hard of Hearing (DHH) develop spoken language through distinct pathways due to limited sound access. With timely diagnosis, appropriate technology, and early intervention (EI), many achieve age-appropriate outcomes. However, early standardised language assessments may not fully capture variability in auditory access and progress. Tracking the development of listening skills may therefore provide a more sensitive and dynamic measure of access to sound and progress toward linguistic potential.

Objectives:
To explore the relationship between listening ability and spoken language outcomes, to understand how early auditory experience and listening proficiency influence development, and to examine the effects of intervention timing and duration using listening scores as a measure of progress.

Methods:
This longitudinal study included 322 DHH children enrolled in a multidisciplinary EI program between 2011–2022. Listening skill acquisition was measured using the Functional Listening Index – Paediatric (FLI-P; 3911 assessments) from 0–6 years and compared with standardised language measures (1015 assessments) from the Preschool Language Scales-4/5 and Clinical Evaluation of Language Fundamentals – Preschool-2/3. Listening scores were compared to normative data from typically hearing children, and both outcomes were normalised using z-scores.

Results:
Earlier commencement and longer duration of EI were associated with stronger listening and language outcomes. Listening skill acquisition was more sensitive to developmental progress in the early years than standardised language scores, providing a clearer indicator of change over time. Key influencing factors included duration in EI, additional needs, linguistic background, and age at intervention.

Conclusions:
Regular assessment of listening skills alongside language testing enhances monitoring of early communication progress. Commencing EI before 5 months optimises listening and spoken language outcomes. The strong relationship between EI duration and listening development underscores the importance of early, sustained intervention and ongoing tracking of listening skills to optimise spoken communication in DHH children.

Keywords: Listening skill acquisition, Early Intervention, Language and communication development

Planned Session 51

Epidemiology & Biology of Healthy Aging
PS 51-1

Aging and hearing health: The life-course approach

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In this presentation, examples of how laboratory- and community-based science has informed public and population approaches to preventing, preserving, and managing hearing health care across the lifespan will be discussed. A particular focus will be on age-related effects such as the central effects of biological aging and peripheral pathology on the brain, and how they can be addressed using a lifespan perspective. Some examples of research and community initiatives, such as the WHO's Integrated Care for Older People (ICOPE), the Make Listening Safe Campaign, and the Population Hearing Health Care Consortium, will be discussed. Furthermore, strategies for empowering individuals and communities to actively participate in their hearing health will be explored, emphasizing collaboration between healthcare professionals, researchers, and policymakers to achieve better outcomes for all age groups.

Planned Session 51

Epidemiology & Biology of Healthy Aging
PS 51-2

Early signs of auditory aging

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Hearing loss affects over 1.5 billion people worldwide and is a leading cause of years lived with disability. Yet, age-related hearing loss is still largely viewed as a condition of mid-to-late adulthood—detected only after measurable deficits appear on the audiogram. But what if auditory aging begins much earlier than we think? In this talk, I will present data from a study that longitudinally followed young adults with clinically normal audiograms and found that age-related changes are already underway in early adulthood. These changes first emerge in the extended high frequencies (>8 kHz), well before any measurable decline occurs within the standard audiometric range (0.25 to 8 kHz). More importantly, these early high-frequency changes are not isolated. Individuals with poorer extended high-frequency sensitivity showed a faster rate of decline over time, even at frequencies considered clinically normal. This suggests that early cochlear aging follows a systematic trajectory, beginning at the basal end and progressively influencing the rest of the cochlea. These findings challenge the conventional timeline of age-related hearing loss. Rather than a late-onset condition, auditory aging appears to be a gradual, continuous process that begins in young adulthood, well before it is captured by standard clinical measures. The implication is clear: by the time hearing loss is clinically diagnosed, the underlying aging process is already established. This work shifts the focus from detecting hearing loss to identifying its earliest trajectory. Extended high-frequency hearing provides a window into early cochlear aging and offers a path toward earlier monitoring, risk stratification, and ultimately, prevention.

Planned Session 51

Epidemiology & Biology of Healthy Aging
PS 51-3

Aging and its Effects on the Auditory and Cognitive Systems: Anatomical and Physiological Insights

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Hearing loss is the most prevalent neurologic disorder globally, affecting approximately 1.6 billion individuals. Increasing evidence demonstrates that it reflects a progressive neurodegenerative process rather than an isolated peripheral sensory deficit. The pathologic cascade often begins with cochlear synaptopathy, characterized by loss of afferent synapses between inner hair cells and auditory nerve fibers. This is followed by degeneration of spiral ganglion neurons, reduced neural synchrony, impaired temporal coding, and diminished signal transmission along the auditory nerve. Importantly, these neural changes may precede clinically detectable threshold elevations by years or decades.

As afferent input degrades, neurobiological consequences extend throughout central auditory pathways. Altered brainstem encoding, disrupted thalamocortical signaling, and reduced integrity of auditory association networks contribute to measurable structural and functional brain changes. Neurological studies reveal accelerated whole-brain atrophy, substantial changes within auditory and limbic regions, and remodeling across frontal and parietal networks implicated in executive function and memory. At the physiologic level, cross-modal reorganization and compensatory hyperactivation emerge, reflecting maladaptive plasticity in response to chronic sensory deprivation. These central adaptations are associated with increased listening effort and greater cognitive resource allocation to auditory processing.

Functional consequences are also substantial. Individuals with hearing loss and tinnitus demonstrate significantly poorer performance across domains of processing speed, working memory, attention, and executive control. Longitudinal studies increasingly identify untreated auditory decline as a major modifiable risk factor for accelerated cognitive decline and incident dementia.

This presentation will delineate the anatomical and physiologic progression from cochlear synaptopathy to cortical reorganization and cognitive impairment. By integrating cellular pathology, systems neuroscience, and epidemiologic evidence, the presentation positions age-related auditory neuropathy as a brain-based disorder with far-reaching consequences. Early identification and intervention should therefore be understood not solely as rehabilitative measures, but as strategies aimed at preserving neural integrity and mitigating long-term cognitive risk.

Planned Session 51

Epidemiology & Biology of Healthy Aging
PS 51-4

The association between hearing loss and degeneration of the brain in older adults

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Hearing loss is considered a potentially modifiable risk factor for cognitive decline and dementia. The sensory deprivation theory postulates that hearing loss adversely affects cognition in older adults through structural brain changes. Within the population-based Rotterdam study we have collected longitudinal data on hearing and brain imaging using MRI in almost two thousand older adults. Within this longitudinal cohort, we studied the relation between reduced hearing abilities and degenerative processes within the brain, that may support the sensory deprivation theory.

In a first study we examined the association between pure-tone audiometry and longitudinal diffusion tensor imaging (DTI) within 1877 participants with a median age of 56.4 years (IQR: [52.2-60.0]). A second study focused on the ability to understand speech in noise in relation to a decrease in DTI outcomes over time, including 1669 adults with a median age of 63.1 years (IQR [58.1–67.2])
Poorer hearing acuity was associated with faster microstructural deterioration over time in the left superior longitudinal fasciculus. Remarkably, the strongest effects were observed for low-frequency hearing thresholds. In addition, poor speech understanding in noise related to degraded white matter microstructure in the left inferior fronto-occipital fasciculus and inferior longitudinal fasciculus. Both tracts play a crucial role in speech perception.

These results suggest that hearing loss may contribute to the age-related degeneration of brain structures, consistent with the sensory deprivation theory.

Planned Session 51

Epidemiology & Biology of Healthy Aging
PS 51-5

Transforming the narrative on adult-onset hearing loss and dementia

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Associations between sensory function and cognitive decline/dementia have been reported for around 150 years. Also, greater sensory loss is associated with poorer cognition. Although sensory and cognitive function decline with age, it has been known for more than 30 years that people at any age who have better sensory function tend to also have better cognition.

There has been an explosion of interest in the association between adult-onset hearing loss and dementia. The topic regularly appears in academic journals, professional magazines, charity and public-facing websites, hearing industry marketing, and the media/social media. At times, this vigorous arm-waving is at the expense of high-quality scholarship.

The nature of the association between adult-onset hearing loss and dementia is not clear-cut. One interpretation is that adult-onset hearing loss causes cognitive decline, either direct biological changes or indirectly due to changes in lifestyle. The causal direction of the association between hearing loss and cognitive decline may be the other way around (i.e, cognitive impairment impacts hearing). Alternatively, there may be no direct causal link, but they may be associated due to common cause(s) that affect both hearing and cognitive health.

Hearing aids are the most common technology used to help people with mild to moderate hearing loss and these have been suggested as an intervention to slow cognitive decline and reduce the risk of dementia. While these are effective at improving hearing-specific quality-of-life (QoL) and listening ability, there is currently no good quality evidence to support (or refute) the claims that adult-onset hearing loss causes dementia or that hearing aids will reduce the risk.

Most current studies use observational data i.e, observe people who have chosen, or not chosen, to use hearing aids. A challenge with these studies is the inability to definitively attribute any positive cognitive outcomes to the use of hearing aids. This is because hearing aid users differ from nonusers in terms of typically being better educated, more affluent, and more likely to be from a majority ethnic background. These factors are related to a wide range of health outcomes, including cognitive ones. Although there are nine principles (e.g, strength, consistency, temporality and dose-response) that can be useful in evaluating observational data, none of these provide indisputable evidence for or against the cause-and-effect hypothesis.

The highest level of evidence for establishing causality comes from randomised controlled trials (RCTs) where participants with hearing loss are randomly assigned to the experimental group that receives hearing aids or not. This is because random allocation is less susceptible to confounding and reverse causation.

Few high quality RCTs have investigated if hearing aids reduce cognitive decline in participants with adult-onset hearing loss. Of those that have, the findings show no difference in cognitive decline between participants randomly allocated to receive hearing aids from those who do not receive hearing aid. Secondary analyses suggest potential cognitive benefits in some people fitted with hearing aids. Although caution is warranted in their interpretation (e.g, the finding may be spurious or of no material benefit), it is important see if the findings can be replicated. Replication is important because history has shown that RCTs are not perfect.

RCTs are relatively expensive and time consuming. As a result, they are often of short duration, and an unintended consequence is there may be insufficient time for the benefits to become apparent. It can also be unethical to conduct RCTs if providing (or withholding) the intervention causes harm. For example, there is an association between tobacco smoking and lung cancer but there are no trials randomly allocating participants to cigarette smoking or not; however, whereas it is plausible that cigarette smoking causing cancer, it is a stretch to believe that lung cancer causes people to take up cigarette smoking in the first place (or that there is a common cause responsible for both lung cancer and taking up smoking). Support also comes from animal studies that demonstrate the toxins in cigarette smoke cause cancer.

The challenges of conducting RCTs has led to a proliferation of alternative research designs including Target Trial Emulations (TTE) and Mendelian Randomization (MR). TTE is a framework for designing and analysing observational data to estimate the causal effect of interventions. The ability to prevent avoidable biases has contributed to the popularity of TTE; however, unmeasured or residual confounding may still exist. MR uses random genetic variants directly linked to hearing loss to establish causality for dementia (or vice versa). Unfortunately, there are mixed findings supporting different causative pathways from studies using each of these designs. If evidence converges across multiple study designs, and is consistently replicated, this will strengthen conclusions around pathways linking hearing loss and dementia.

In the meantime, the language we use when interpreting and reporting evidence from research studies is important because the topic of dementia raises considerable fear and alarm. Also,

negative health messaging can increase anxiety without changing people's behaviour. Evidence should be reported in a clear and trustworthy manner. This includes conveying the uncertainties that exist in our current understanding of the topic. Five principles when communicating information that contains uncertainty include: inform rather than persuade, be balanced, be upfront about uncertainty, acknowledge limitations in the evidence, and pre-empt misunderstandings. The British Society of Audiology, in partnership with other professional organisations, published a joint position statement and practice guidance to address misinformation on the link between adult-onset hearing loss and dementia (https://www.thebsa.org.uk/wp-content/uploads/2024/11/Position-statement-HL-and-dementia-a-guide-for-hearing-professionals-Nov-2024.pdf).

At the present time, we do not know if hearing loss is a modifiable risk factor for dementia. Until uncertainties are resolved:

1. Reinforce the benefits of healthy hearing and the proven benefits of hearing interventions in facilitating an active, independent, engaged, and healthy older age;

2. Support hearing needs of people with dementia because hearing loss exacerbates the impact of dementia on QoL, mental well-being, social participation, communication, independence, and carer burden; and

3. Avoid spreading unsupported claims and false hopes.

Planned Session 52

Genetics of Hearing Disorders

PS 52-1

Use of whole genome sequencing for genetic hearing loss diagnosis

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The vast majority of early-onset hearing loss (EOHL) cases have a genetic origin. Until recently, the diagnosis of the genetic etiology of EOHL relied mainly on targeted gene panel analyses, with a diagnostic yield of approximately 40–50%. Whole-genome sequencing (WGS) enables the detection of single nucleotide variants (SNVs) in both coding and non-coding regions, as well as small insertions and deletions. In this presentation, we will discuss the advantages and limitations of using WGS for the genetic diagnosis of EOHL.

Planned Session 52

Genetics of Hearing Disorders
PS 52-2

Genetic landscape of prelingual hearing loss: Diagnosis and implications

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Upon confirmation of sensorineural hearing loss (SNHL) in a newborn or child, a search for an underlying etiology is required. At present, it is estimated that up to 80% of bilateral prelingual hearing loss (HL) cases have an underlying genetic cause (Schearer E. et al. 2025). About 70% of prelingual HL is non-syndromic and 156 genes involved in non-syndromic HL have been described. https://hereditaryhearingloss.org

Syndromic causes account for 30% of prelingual HL. A subset of children who initially present with isolated hearing loss will develop syndromic features later in life and finally be diagnosed as syndromic HL.

More than 90% of hearing-impaired children are born to normal hearing parents. Genetic counseling plays a crucial role in the guidance and support for parents whose child is diagnosed with HL. An accurate molecular diagnosis may allow for individualized and patient-specific treatment selection and enhance genetic counselling. At present, comprehensive genetic testing is considered the cornerstone of the etiological work-up for bilateral sensorineural HL. The diagnostic yield usually lies between 40-65% varying with HL severity, symmetry, and ethnicity.

This talk will focus on the genetic causes of prelingual HL. Variability in causative variants and the diagnostic yield of genetic testing according to the population studied will be discussed.

References:
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Planned Session 52

Genetics of Hearing Disorders
PS 52-3

Genetic landscape of postlingual sensorineural hearing loss: Diagnose and implications

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Postlingual sensorineural hearing loss, as in congenital cases, is frequently associated with a genetic etiology. Our previous study demonstrated that the prevalence is approximately 30% among patients with onset between 6 and 40 years of age in Japan. The most frequently identified causative gene is KCNQ4, followed by the mitochondrial 3243A>G variant, GJB2, and CDH23, regardless of the degree of hearing loss (Usami et al, 2021). Among patients undergoing cochlear implantation (CI) or electric-acoustic stimulation (EAS), CDH23 is the most prevalent causative gene (Miyagawa et al, 2016; Yoshimura et al, 2020). Genetic testing enables an accurate diagnosis and provides meaningful genetic counseling for patients and their family members. In most patients with postlingual sensorineural hearing loss, residual hearing gradually deteriorates over time. Identification of the causative gene allows prediction of the future course of hearing, supporting earlier intervention. Furthermore, in candidates for CI and/or EAS, knowledge of the causative gene is useful for selecting an appropriate electrode array length based on the expected progression of hearing loss (Yoshimura et al, 2024).

Planned Session 52

Genetics of Hearing Disorders

PS 52-4

Genetic predisposition for adult-onset hearing loss

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Hearing loss is a major global health concern, with genetic factors accounting for a significant portion of both congenital and adult-onset sensorineural hearing loss (SNHL). Recent advances in genomic technologies have enabled the identification of over 130 deafness-related genes, paving the way for precision medicine approaches. This presentation highlights genetic predisposition to adult-onset hearing loss and introduces translational strategies targeting specific genetic causes of adult-onset hearing loss. Precision medicine for adult-onset hearing loss offers new hope for curative interventions, shifting the focus from amplification devices to molecularly guided therapies tailored to the underlying genetic etiology.

Planned Session 52

Genetics of Hearing Disorders

PS 52-5

Genetic testing for auditory neuropathy spectrum disorder

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Auditory Neuropathy Spectrum Disorder (ANSD) can arguably be identified as the clinical entity that derives the most profound benefit from genetic diagnosis. In recent years, gene therapy for DFNB9 hearing loss—driven by OTOF mutations—has successfully entered clinical trials and is widely anticipated to reach final commercialization in the foreseeable future. However, the etiology of prelingual ANSD extends far beyond DFNB9; it encompasses a diverse range of underlying causes, including prematurity-induced ANSD and ANSD resulting from bilateral cochlear nerve deficiency. Because the optimal modalities for auditory rehabilitation and therapeutic intervention vary significantly depending on the specific subtype of ANSD, genetic diagnosis assumes a fundamentally critical role in clinical decision-making.

Furthermore, the significance of genetic testing is equally paramount in the management of postlingual ANSD. For patients with postlingual ANSD, conventional hearing aids typically offer limited clinical benefit. Consequently, if a cochlear implant (CI) also proves ineffective, these patients are left with virtually no viable options for adequate auditory rehabilitation. Historically, past literature has indeed reported suboptimal outcomes following cochlear implantation in patients with postsynaptic ANSD, a specific subtype of postlingual ANSD.

Nevertheless, a recent series of clinical studies has shifted this paradigm. Evidence now demonstrates that—in addition to presynaptic postlingual ANSD (associated with genes such as TMEM43)—patients with postsynaptic ANSD (driven by causative genes including ATP1A3, FDXR, BCAP31, and CMT1) can also achieve enhanced speech discrimination, at least during the early-to-mid postoperative phase. The critical prerequisite for this success is early surgical intervention, performed before the onset of severe cochlear nerve atrophy. Naturally, in these complex cases, meticulous adjustment of parameters during the CI mapping process remains absolutely essential.

In summary, genetic testing provides a dual, indispensable function. In prelingual ANSD, it enables the early identification of DFNB9 patients who are prime candidates for emerging gene therapies. Conversely, in postlingual ANSD, it provides the vital theoretical rationale for proceeding with early cochlear implantation, even in patients whose pure-tone thresholds may not yet appear profoundly deteriorated. In this presentation, I will delve deeply into these crucial paradigms and share comprehensive clinical insights on this subject.

Planned Session 53

New Technologies for Diagnosis and Treatment of Vestibular Disorders

PS 53-1

Advancing Vestibular Neuroprosthetics: Key Contributions of the Geneva-Maastricht Team to Human Vestibular Implant Development

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Bilateral vestibulopathy results in severe imbalance, oscillopsia, gait instability, and significant reductions in quality of life. While sensory-substitution and rehabilitation-based strategies can offer partial compensation, there remains a critical need for restorative therapies for vestibular function. Over the past two decades, the Geneva–Maastricht group has been a leading driver of translational efforts toward such a therapy through the development of vestibular implants designed to deliver targeted electrical stimulation to the ampullary nerve branches—the first-order vestibular afferents innervating the ampullae of the semicircular canals and conveying angular head-motion information to the brain.

In close collaboration with our industrial partner MED-EL (Innsbruck, Austria), the group developed a modified cochlear implant incorporating extracochlear electrodes positioned near these ampullary nerve branches, enabling delivery of physiologically relevant motion-modulated stimulation at the primary entry point of rotational-motion signaling. Since the first implantation in 2007, this investigational device has been placed in human participants with severe bilateral vestibulopathy using specialized surgical techniques that have demonstrated consistent safety, with no surgical or medical complications observed across implantations.

To date, twenty-four patients have undergone implantation. Comprehensive clinical assessments—including evaluations of the vestibulo-ocular reflex, vestibulo-collic responses, postural performance, and dynamic visual acuity during walking—have demonstrated robust functional benefits. Participants exhibit restoration of mid- to high-frequency vestibulo-ocular reflex responses, activation of vestibulo-collic reflexes, and enhanced visual stability during walking. These findings highlight not only the functional efficacy of ampullary-nerve stimulation but also the remarkable adaptability of the human vestibular system in integrating artificial sensory input.

Building on this experience, we are now preparing to launch a new clinical trial in 2026 designed to assess the impact of vestibular implant use on everyday-life function, marking a crucial step toward evaluating real-world benefits and advancing the technology toward eventual clinical adoption.

Collectively, past and ongoing work from the Geneva–Maastricht team provides foundational evidence for the feasibility, safety, and therapeutic potential of vestibular implants as a future restorative treatment for bilateral vestibulopathy. The accumulated clinical experience has yielded essential insights into device design, surgical technique, stimulation strategies, and patient selection criteria. As research advances, these principles will inform the next generation of vestibular implant systems and support the translation of this technology toward routine clinical application for individuals living with severe bilateral vestibulopathy.

Planned Session 53

New Technologies for Diagnosis and Treatment of Vestibular Disorders

PS 53-2

The Vestibular Implant: Updates by the Geneva-Maastricht team

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Introduction: Bilateral vestibulopathy leads to severe balance impairments and reduced quality of life. Vestibular implants offer a promising therapeutic avenue by restoring vestibular function through electrical stimulation. The Geneva-Maastricht team is at the forefront of developing and refining vestibular implant technology and protocols.

Methods: A cohort of 10 patients with bilateral vestibular loss received a second-generation vestibular implant. We conducted a series of studies involving optimization of implant design, surgery, stimulation paradigms, and rehabilitation. Furthermore, a range of outcome measures was evaluated to assess implant performance.

Results: The updated implant design demonstrated improved vestibulo-ocular reflex and motion perception. No major adverse events were reported, and device tolerability was high. Furthermore, experimental results facilitated device fitting optimization and evaluation of outcome assessment modalities.

Conclusions: The Geneva-Maastricht vestibular implant program is continuously making substantial progress in implant technology and clinical application, validating vestibular implants as a viable therapeutic option for bilateral vestibulopathy. Ongoing research aims to further refine stimulation strategies and expand patient eligibility, ultimately improving functional recovery and quality of life.

Planned Session 53

New Technologies for Diagnosis and Treatment of Vestibular Disorders

PS 53-3

Effectiveness of a vibrotactile feedback device for improving balance in older adults with hearing loss: A randomized controlled trial

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Background: Poor balance is a frequent concern in older adults, partly due to associated vestibular changes. Individualized, waist-worn vibrotactile feedback (VTF) has shown promise for stabilizing posture in adults with vestibular dysfunction, but its effects on older adults with hearing loss are unclear. This study aimed to determine whether older adults with imbalance/dizziness and hearing impairment show greater improvements in balance after receiving an individualised VTF intervention compared with those who received random or no VTF.
Methods: A double-blind, three-arm randomized trial was conducted with 44 older, community-dwelling adults (≥60 years) with self-reported dizziness or unsteadiness, demonstrable postural instability (geriatric Standard Balance Deficit Test [gSBDT] > 39), and mild to profound hearing impairment (4FAHL 20–90 dB HL). All participants had no significant visual impairment, Benign Paroxysmal Positional Vertigo, formally diagnosed vestibular pathology, mobility- or safety-limiting medical conditions, cognitive impairment, recent substance abuse, or daytime sedative use. The sample was divided into three training groups: an experimental group (n = 14) receiving individualised VTF, a control group (n = 15) receiving randomised VTF, and a sham group (n = 15) receiving no VTF during standing balance and walking training tasks. All participants completed 10 training sessions over two weeks. Assessments were performed at baseline (week 0), post training (week 3), and follow up (6 months) using a primary outcome measure of postural stability (geriatric Standard Balance Deficit Test) and secondary measures evaluating postural stability, dizziness, physical activity, balance confidence, and dual task gait capacity.
Results: Linear mixed models revealed no fixed effects (3 groups, 3 time points) and no interactions for the primary outcome measure and all secondary outcome measures.
Conclusions: A 10-week VTF intervention program was not different to sham or control intervention for improving balance in older, community-dwelling adults with self-reported dizziness or unsteadiness, demonstrable postural instability, and mild to profound hearing impairment.

Keywords: Balance, vibrotactile feedback, hearing loss.

Planned Session 53

New Technologies for Diagnosis and Treatment of Vestibular Disorders

PS 53-4

Tackling the spin: Impact of telenystagmography for vertigo or dizziness

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Rationale
Episodic dizziness and vertigo present a significant diagnostic challenge in patients due to the transient and frequently unpredictable nature of vestibular symptoms. Patients are frequently asymptomatic during clinical consultations, forcing specialists to rely on retrospective, subjective histories that are prone to recall bias. This diagnostic gap contributes to extensive waitlists and inefficient resource allocation, as many patients undergo months of "watchful waiting" before an objective event can be captured. We investigated the effects of a portable research TNG (telenystagmography) device which was developed to bridge this gap by providing a portable, high-fidelity video-oculography solution for home use, allowing patients to capture diagnostic-quality eye movements (nystagmus) at the exact moment of an acute attack.

Methods
The pilot trial utilized a randomized controlled design to evaluate the feasibility and predictive value of the TNG-device within a tertiary ENT waitlist. Participants were randomized to either a standard care control group or an intervention group equipped with the TNG-device. Intervention participants were instructed to record ocular data during spontaneous dizzy episodes over a three-month period. These recordings were then reviewed by a centralized clinical team to provide a preliminary triage recommendation.

Results
Preliminary results from the pilot-trial demonstrate exceptional technical feasibility and patient compliance, with a 100% successful recording rate during acute episodes. The TNG-device achieved a diagnostic capture rate of 84%, providing objective evidence of vestibular dysfunction that was otherwise unobservable in a standard clinic setting. Critically, the use of the device facilitated a 53% reduction of diagnostic costs and a 43% reduction of OPD visits. Furthermore, ENT specialists reported a marked increase in diagnostic confidence, citing the availability of objective "attack-phase" data as a transformative factor in clinical decision-making.

Conclusion
The TNG-device pilot-trial confirms that remote, patient-led TNG is a viable and effective strategy for managing episodic dizziness or vertigo. By shifting the diagnostic window from the clinic to the home, the TNG-device optimizes the triage pathway, reduces the diagnostic and OPD burden for patients and thus earlier access to targeted treatment.

Planned Session 54

Psychoacoustics

PS 54-1

Integration of electric and acoustic inputs in bimodal hearing: How it happens and why it matters

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The combination of electric stimulation from a cochlear implant (CI) with preserved low-frequency acoustic hearing -- commonly referred to as bimodal or electro-acoustic stimulation (EAS) hearing -- offers significant clinical advantages over electric-only stimulation. While the benefits of this combined mode for speech perception in noise and music appreciation are well-documented, the underlying neural mechanisms that facilitate the binding of these disparate sensory inputs remain complex. This presentation synthesizes findings from our laboratory to elucidate how the brain integrates electric and acoustic cues, spanning from perceptual binding to cortical oscillations, and demonstrates why effective integration is the critical predictor of patient outcomes.

We first examine the nature of the "binding problem" in bimodal hearing. While it is understood that acoustic hearing provides fundamental frequency (F0) information often missing in electric stimulation, the mere presence of these cues does not guarantee benefit. Building on Bonnard et al. (2018), we demonstrate that the auditory system must actively fuse the acoustic F0 with the upper harmonics provided by electric stimulation. Our data indicates that the strength of this "harmonic integration" is not uniform across patients; rather, the ability to perceptually bind these spectral components significantly predicts speech-in-noise performance. This suggests that the bimodal benefit is driven by a specific central integration process rather than a simple summation of peripheral cues.

Moving from perceptual mechanics to neural representation, we explore how this integration manifests in the encoding of complex signals. In Shim et al. (2023), we compared neural encoding of speech-in-noise between bimodal/EAS users and those with standard CI configurations. We provide evidence that preserved acoustic hearing does more than add low-frequency information; it fundamentally alters the neural robustness of the speech envelope representation. The addition of acoustic input protects the neural encoding of speech features against degradation from background noise, creating a stabilized neural representation that electric stimulation alone cannot achieve. This "neural anchoring" effect highlights the neurophysiological basis for the superior performance observed in bimodal users.

Finally, we address the high-level cortical mechanisms that govern this auditory grouping. The integration of electric and acoustic streams requires the brain to organize these inputs into coherent auditory objects, a process central to Auditory Scene Analysis. Drawing on our recent work in Alsabbagh et al. (2025), we identify specific cortical oscillations that predict auditory grouping success across listeners with varying hearing configurations. We argue that these oscillatory dynamics serve as the temporal framework that binds fragmented electric and acoustic inputs into a unified percept. This finding provides a window into the cognitive resources required for bimodal hearing and suggests that variations in cortical oscillatory activity may explain why some patients struggle to integrate bimodal inputs despite preserved peripheral function.

By connecting the perceptual phenomenon of harmonic integration, the robust neural encoding of speech, and the governing role of cortical oscillations, this talk provides a comprehensive framework for understanding bimodal hearing. These findings underscore that "integration" is an active, multi-stage neural process, offering new targets for diagnostic biomarkers and potential auditory training strategies to maximize outcomes for CI users.

Planned Session 54

Psychoacoustics
PS 54-2

The Impact of Temporally Coherent Visual and Vibrotactile Cues on Speech Recognition in Noise

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Rationale/Purpose
Understanding speech in noise is improved when the brain can track temporally structured information that complements the auditory signal, and recent experiments show that abstract visual displays of the target's amplitude envelope and wrist-mounted vibrotactile stimulation each provide measurable gains for normal-hearing (NH) listeners. The amount of the benefit depends critically on temporal coherence between the added cue(s) and the auditory target; when the visual/tactile envelopes are desynchronized from the target, benefits are reduced. Building on this insight, we synthesized evidence across two complementary studies to determine (i) whether visual and vibrotactile cues additively stack when they are jointly time-locked to speech and (ii) how strongly temporal synchrony gates these multisensory advantages under adverse listening.

Methods
Two laboratory studies with young NH adults (N=20 per study; normal audiometric thresholds, normal/corrected vision) were conducted in a sound-attenuating booth using loudspeaker presentation at 0° azimuth. Auditory targets were (a) Harvard sentences fixed at 65 dB SPL, tested at SNRs –7, –5, –3, –1, and +1 dB, and (b) CRM sentences fixed at 40 dB SL with a speech-shaped noise masker adaptively varied to estimate the target-to-masker ratio (TMR) for 50% correct (color + number) identification. For multisensory cueing, the amplitude envelope of each target sentence was extracted via Hilbert transform, low-pass filtered at 10 Hz with 75% modulation depth, and mapped either to the radius of a colored on-screen sphere (visual cue) or to the intensity of a wrist vibrotactile actuator via PWM; the same envelope could be delivered to both channels simultaneously. Conditions were Auditory-Only (AO), Auditory-Visual (AV), Auditory-Tactile (AT), and Auditory-Visual-Tactile (AVT); male and female talkers were tested in all conditions. In the CRM study, temporal coherence was manipulated directly by comparing matched (synchronous) vs. mismatched (randomly time-varying modulation rate and depth) envelopes for the visual/tactile cues. Primary outcomes were word-recognition accuracy (Harvard set) and TMR thresholds with derived masking release (AO minus AV/AT/AVT; CRM). Linear mixed-effects models assessed effects of stimulation condition, SNR or synchrony, and talker gender (random intercept for subject).

Results
With Harvard sentences, adding either a visual or a vibrotactile envelope cue significantly improved word recognition at low SNRs (–7 to –3 dB), yielding ~8–20% mean gains for male talkers and ~5–25% for female talkers relative to AO; AVT (both cues) produced the largest improvements (~15–19% male; ~14–25% female), while effects tapered at higher SNRs due to ceiling performance (significant main effects of stimulation and SNR and their interaction). In the CRM paradigm, temporal synchrony was decisive: when visual/tactile envelopes were matched to the target, TMR thresholds shifted favorably and masking release averaged ~1.3–1.6 dB for AO→AV/AT and ~2.5–2.6 dB for AO→AVT; when envelopes were mismatched, benefits were negligible (~0–0.6 dB). Across both datasets, the AVT advantage approximated the arithmetic sum of the AV and AT gains, indicating that visual and vibrotactile channels contribute complementary envelope information when temporally aligned. Talker gender produced small mean differences in some measures, but multisensory benefit patterns were consistent across genders in mixed-effects analyses.

Conclusions
Temporally coherent visual and vibrotactile cues reliably improve speech-in-noise recognition, and their benefits stack additively when delivered together, whereas temporal asynchrony abolishes these advantages. Because the cues are abstract (no lip-reading required) and the tactile signal can be delivered via a wearable wrist actuator, these results motivate assistive designs that extract target speech envelopes in real time and render them as synchronized visual/tactile streams; temporal alignment emerges as a non-negotiable design constraint. The present evidence, drawn from controlled studies in NH young adults, warrants translation to older adults and people with hearing loss, optimization of tactile modulation parameters, and validation in more ecologically realistic scenes (e.g, with target-enhancing source-separation front ends).

Planned Session 54

Psychoacoustics

PS 54-3

The effect of interaural level differences on binaural fusion in the presence of interaural frequency dissimilarity in normal hearing listeners

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Binaural fusion is the ability to perceive sounds simultaneously presented to both ears as a single auditory precept. Two characteristics of a signal degrade binaural fusion: interaural coherence which is the statistical similarity between signals in both ears and interaural frequency similarity which is the similarity in frequency presented to each ear. Reducing either characteristic disrupts the ability to combine signals into a unified percept.

In normal hearing listeners, we have found that adding large interaural level differences (ILDs) to signals with reduced interaural coherence was found to improve binaural fusion. While bilateral cochlear implant (CI) users can struggle with binaural fusion, this likely mainly reflects deficits related to interaural frequency similarity rather than interaural coherence. As such, this study aims to extend previous results by examining the effect of large ILDs, as well as the resulting perceived lateralization, on binaural fusion in the presence of interaural frequency dissimilarity.

For Experiment 1, twenty-eight normal-hearing participants were tested using a single-channel vocoder with varying magnitudes of interaural frequency dissimilarity with either a 0 or 16 dB added ILD. In Experiment 2, two normal-hearing participants were tested with similar stimuli but with a range of added ILDs. Participants indicated the number, size, and location of perceived auditory images.

In both experiments, participants indicated that interaural frequency dissimilarities lead to worse binaural fusion. In Experiment 1, adding an ILD improved binaural fusion only when it led to a strongly lateralized percept. In Experiment 2, preliminary data indicated that perceived lateralization was correlated with binaural fusion, such that stimuli with more lateralized percepts were perceived as more binaurally fused.

The results suggest that ILDs could help bilateral CI users to binaurally fuse sounds, although the effect appears to be mediated by how lateralized the resulting percept is.

Keywords: Binaural fusion, Interaural level differences, Interaural frequency dissimilarities

Planned Session 54

Psychoacoustics

PS 54-4

Investigation of an effective noise masker for narrowband chirps

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Cross hearing is an important aspect to remember when investigating patients with asymmetrical hearing loss. In audiological tests, a masker has to be presented contralaterally to prevent such a cross hearing. A commonly used masker is a broadband noise. However, to reduce the noise exposure of the patients noise maskers with a lower overall noise energy are desirable. The present study investigated the effectiveness of different noise maskers on the masking of narrowband chirps. The primary objective was to identify which type of noise serves as an effective masker for these stimuli. To this end, a psychoacoustic experiment was conducted using narrowband chirps centered at 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz as targets. Based on clinically used parameters, the narrowband chirps were presented as a stimuli train of 40 Hz repetition rate. The noise level necessary to mask a narrowband chirp of a specific center frequency was determined for a broadband noise and narrowband noises of different bandwidths. Narrowband chirps and the noise masker were presented monaurally via insert earphones. The noise masker with the lowest sound pressure level needed to mask the narrowband chirp was defined as the most effective masker.
The results suggest that effective masking is primarily dependent on the power density of the noise masker covering the frequency range of the narrowband chirp. However, this effect is stronger for narrowband chirps with a center frequency of 500 Hz than of 4000 Hz.

Keywords: Narrowband chiprs, Relative masking level, Psychoacoustics

Planned Session 54

Psychoacoustics
PS 54-5

Music training mitigates age-related changes in auditory perception

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Background: Music plays a central role in emotional, social, and cognitive well-being across the lifespan. Growing evidence suggests that cognitive reserve accrued through long-term musical training may help older adults maintain perceptual and neural functions; however, the mechanisms by which musicianship supports auditory processing in aging remain unclear.

Objective: This work examined how aging and hearing-related sensory decline affect auditory perception and investigated whether long-term musical training contributes to functional preservation or compensation in challenging listening conditions.

Methods: Across complementary behavioural and neuroimaging studies, older musicians, older nonmusicians, and young nonmusicians completed speech-in-noise tasks. Functional magnetic resonance imaging (fMRI) was used to assess task-induced activation patterns, functional connectivity, neural specificity, and neural alignment across groups. Musicianship history was assessed to estimate cognitive reserve associated with long-term musical training.

Results: Aging was associated with increased frontoparietal neural activity and connectivity during speech perception, consistent with compensatory recruitment. However, older musicians showed reduced age-related upregulation of functional connectivity in auditory dorsal regions compared with older nonmusicians, and this was accompanied by superior behavioural performance. Older musicians also demonstrated more youth-like spatial patterns of functional connectivity, preserved neural specificity of speech representations in sensorimotor regions, and greater neural alignment with young adults. Musicianship-related benefits increased with training intensity and were supported by the coordinated engagement of frontal-parietal, speech motor, and visual motion regions, along with the deactivation of the angular gyrus.

Conclusions: Long-term musical training appears to confer cognitive reserve that supports the preservation of auditory and audiovisual speech processing in aging, rather than reliance on compensatory over-recruitment. These findings underscore the importance of engaging with music across the lifespan and have implications for developing music-based interventions to support perceptual, cognitive, and emotional health in older adults, particularly in the context of age-related hearing loss.

Planned Session 55

Engineering and Device Challenges in Tinnitus Therapy

PS 55-2

Clinical Experience with Tinnitus Treatment Devices

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Tinnitus therapy increasingly relies on devices, ranging from hearing aids and sound generators to app-based digital therapeutics, cochlear implants, and emerging neuromodulation systems. Yet clinical effectiveness remains variable because tinnitus is heterogeneous, treatment goals differ across patients, and outcomes are shaped not only by device parameters but also by counseling, adherence, and comorbid psychological symptoms. This presentation will review the clinical use of tinnitus treatment devices from a multidisciplinary perspective relevant to otolaryngologists and audiologists, while highlighting the gap between engineering promise and real-world implementation.

Current guideline- and consensus-based positions on device interventions will be summarized, including amplification for patients with hearing loss, therapeutic sound use, cochlear implantation in appropriate candidates, and the evolving but still selective role of neuromodulation.

As a representative example of device-integrated tinnitus care, findings from our prospective multicenter study of a mobile digital therapeutic (SoriClear) will be presented. This 6-week program combines CBT video modules, cognitive journaling, and personalized notch-filtered sound therapy for chronic subjective tinnitus. Among 197 enrolled participants, 167 (84.8%) completed the intervention, with high adherence among completers (97.8%). Significant improvements were observed in tinnitus-related distress and functional impact (THI, TFI), depressive and anxiety symptoms (BDI, BAI), and negative emotion/thought ratings, with greater THI improvement in participants with higher baseline tinnitus loudness and mild depressive symptoms. These findings support the feasibility and acceptability of structured digital therapeutics and underscore the importance of phenotype-informed selection, standardized outcomes, and integrated follow-up in tinnitus device care.

Planned Session 55

Engineering and Device Challenges in Tinnitus Therapy

PS 55-3

Personalized Strategies for Tinnitus Masking

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Conventional masking-based approaches using white or colored noise have been reported as simple and immediate methods for tinnitus relief. However, such methods may stimulate frequency regions unrelated to the perceived tinnitus, potentially leading to auditory fatigue or discomfort. This study proposes a personalized tinnitus masking sound generation protocol based on frequency-selective masking strategies, incorporating individual masking thresholds and auditory filter characteristics.
Four normal-hearing participants were enrolled in this study. Narrowband noise, presented at 20 dB SL (Sensation Level) above each participant's hearing threshold, served as a standardized artificial tinnitus stimulus. By employing a predefined tinnitus-like stimulus instead of actual tinnitus, the protocol was conducted under controlled conditions with clearly defined characteristics. Pure-tone audiometry and simultaneous masking tests were performed to evaluate individual auditory profiles. Tinnitus spectra were then quantified by measuring detection thresholds across various notched-noise bandwidth conditions, followed by curve fitting using the Roex(p,r) function. Based on the estimated tinnitus spectrum, a personalized masking sound was generated and evaluated through subjective preference assessments.
Participants demonstrated a higher preference for the personalized masking sound compared to white or colored noise. Preference was assessed based on discomfort ratings at the sound level required for complete masking. Furthermore, the personalized masking sound required the lowest total energy to achieve full masking. These results suggest that the proposed protocol enables energy-efficient masking strategies by reducing unnecessary spectral stimulation. This protocol is expected to be highly effective for tinnitus patients in future clinical applications.

Keywords: Personalized Strategies, masking effect, tinnitus spectrum, auditory characteristics

Figure

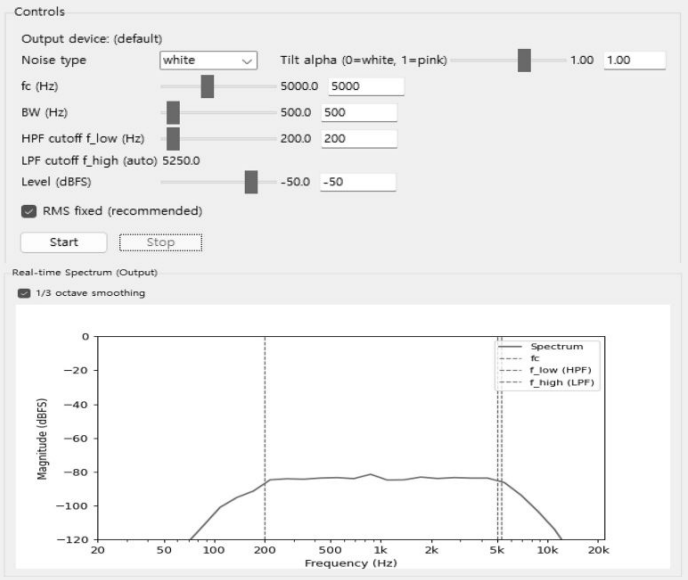


Figure1. personalized tinnitus masking sound source generation program

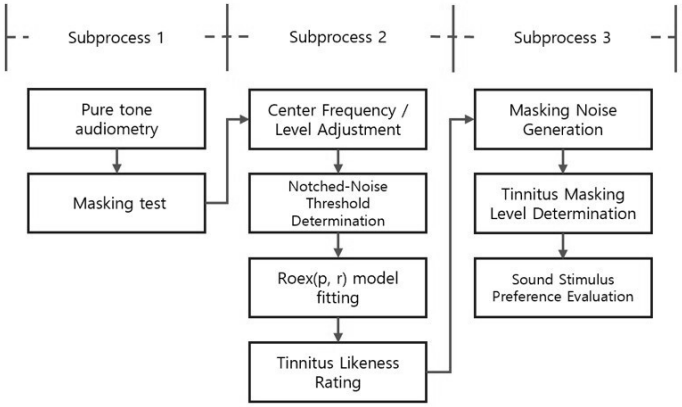


Figure 2. Block diagram of the personalized tinnitus masking sound source generation system.

Planned Session 55

Engineering and Device Challenges in Tinnitus Therapy

PS 55-4

Neuromodulation for Tinnitus: Development and Clinical Efficacy of an Integrated Non-invasive Vagus Nerve Stimulation (taVNS) and Sound Therapy System

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The management of chronic tinnitus is undergoing a significant paradigm shift from traditional acoustic sound therapy toward neuroplasticity-based interventions that address the conditions underlying neurological maladaptation within the central auditory pathways. Central to this evolution is transcutaneous auricular vagus nerve stimulation (taVNS), a non-invasive technology that targets the auricular branch of the vagus nerve to modulate the brain plasticity. By triggering the release of essential neurotransmitters like acetylcholine and norepinephrine, taVNS facilitates an enhanced state of neural plasticity, effectively opening a temporal "window" during which the brain is more susceptible to corrective sensory input.

When systematically paired with sound stimulation, this synergistic approach allows for the targeted "rewiring" of the central auditory system, enabling the suppression of phantom auditory perceptions and the restoration of normalized neural representation. Recent multi-center clinical evaluations of this integrated platform have yielded compelling evidence of efficacy, with participants exhibiting a mean reduction in Tinnitus Handicap Inventory (THI) scores over a treatment period. There was significant improvement of tinnitus that exceeds the established minimal clinically important difference (MCID), demonstrating a profound impact on patient quality of life and psychological well-being. Furthermore, the technology maintains an excellent safety profile as a non-pharmacological intervention, offering a scalable and personalized pathway for patients who have exhausted conventional options. By shifting focus from palliative care to active neuromodulation, the integration of taVNS and digital therapeutics represents a sophisticated progression in audiological medicine and a promising new standard for the long-term management of chronic tinnitus.

Planned Session 55

Engineering and Device Challenges in Tinnitus Therapy

PS 55-5

Regulatory Issues in Tinnitus Device Approval

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One of the major changes in the Digital Medical Products Act is the introduction of the RWE system. Apart from the existing controlled clinical trial-centered evaluation, it has been able to conduct more realistic and continuous evaluations such as post-marketing monitoring, permission change, and expansion of indications by utilizing actual practice data (RWD) generated at actual medical sites and daily lives, and in addition, it can be used as accumulated data of post-marketing clinical tracking (PMCF) required by MDR in conducting EU MDR for domestic companies.
Next, the cybersecurity obligations became clear with major changes. Manufacturers and importers are required to take measures to protect patients from electronic infringement as their information is used, and related data have become mandatory when reviewing permits. This is a measure to minimize the risk of increasing social awareness of recent personal information leakage and hacking issues, which means that developers should consider security from the beginning of their development in response to these risks.
One of the major changes in the Digital Medical Products Act is the introduction of the "Component Performance Evaluation" system. Existing (in vitro diagnostic) medical devices had to be evaluated only as finished products, but in the Digital Medical Products Act, not only finished products but also individual components such as AI algorithms and sensors can be evaluated in advance. If the finished product is composed of verified elements in the future, the procedure is simplified accordingly during the approval and approval process, and companies can shorten the approval and approval process. This change in the system in Korea can be said to be a system that satisfies both the needs of companies and consumers due to the rapid release of products introduced with digital technology and the strengthening of the weak security field.
Along with the major changes in the contents of the Digital Medical Products Act, the digital medical device classification and designation system has changed. Unlike existing (in vitro diagnostic) medical devices, the classification and rating of digital medical devices has been changed to a system in which companies judge themselves and the government verifies them based on the company's self-judgment. This change can be said to have improved the accuracy and speed of item classification for the latest advanced technologies.
The government's preemptive introduction and application of the system has implications for Korea's leading digital medical device technology, and it is expected to serve as a stepping stone for related companies to enter the market internationally.

Keywords: Digital Medical Devices, AI Medical Devices, Health Support Devices, Medical Devices Act Key Issues

Planned Session 56

Speech, Language and Cognition II
PS 56-1

Multidisciplinary follow-up of teenagers and young adults with cochlear implants: Study approach and baseline characteristics

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Early pediatric cochlear implantation is strongly associated with positive early language outcomes; however, knowledge about long-term outcomes in adolescence remains limited. The Teenager and Young Adults Cochlear Implant (TAYACI) study is a multidisciplinary follow-up investigating auditory, vestibular, linguistic, mental health, and etiological outcomes in individuals who received cochlear implants (CIs) during early childhood. The overarching aim is to better understand long-term outcomes and sources of interindividual variability following early implantation.

Participants aged 12–22 years who received their first CI before 30 months of age, were followed clinically over time at a single tertiary hearing implant center, and who followed a mainstream education curriculum were invited to participate. Of 109 eligible individuals, 50 participated; 46 completed comprehensive clinical assessments and four completed questionnaire-based assessments only. The mean age at first CI was 15.6 months (SD = 6.0). Almost all participants used spoken language as their primary mode of communication and were enrolled in mainstream educational settings. The majority came from families with high parental educational levels, and more than half had received Auditory Verbal Therapy in early childhood.

Earlier age at implantation was associated with better language comprehension one-year post-implantation, confirming previous findings on the importance of early auditory access. The TAYACI protocol includes detailed assessments of hearing, vestibular function and balance, spoken language skills, mental health and psychosocial well-being, as well as etiological factors. This comprehensive design enables exploration of interactions between sensory, cognitive, psychological, and etiological factors and their contribution to long-term outcomes.

This invited presentation will introduce the TAYACI cohort, outline the multidisciplinary assessment framework, and present preliminary findings. Ongoing and future sub-studies will further examine how early cochlear implantation impacts adolescents and young adults across multiple domains, with the goal of informing long-term clinical follow-up, counseling, and individualized intervention strategies.

Planned Session 56

Speech, Language and Cognition II
PS 56-2

Modelling the Contributions of Auditory, Speech, Language, and Cognitive Processes to Speech-in-Noise Perception in School-Aged Children: Diagnosing Children's Listening Difficulties

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Understanding speech in noisy and reverberant environments, such as classrooms, requires the integration of auditory, language, and cognitive abilities. Many children struggle to listen in such settings. The vast majority of children with listening difficulties (LiD) are diagnosed with peripheral hearing loss. However, at least 5% of children referred to audiology services present with normal peripheral hearing. In these cases, diagnosis can be challenging because the roles of contributing deficits can differ between children. It is imperative to develop more sensitive and consistent diagnostic tools for children with LiD because correct diagnosis is the first step toward successful treatment. Untreated LiD can negatively impact long-term academic outcomes.

As a first step toward better diagnosis, we explored relationships among auditory processing, phoneme identification, sentence understanding in noise, language, cognitive abilities, and reading performance in a representative sample of 221 school-aged children. Using a structural equation model enabled us to simultaneously consider how bottom-up auditory processing and top-down language and cognitive processing contribute to speech-in-noise outcomes.

Our structural equation model showed that bottom-up auditory resolution of nonspeech sounds supports phoneme identification in noise, which in turn facilitates sentence understanding in noisy and reverberant conditions. Sentence understanding in noise was strongly supported by top-down language abilities, while memory and intelligence contributed indirectly by enhancing language abilities. Reading performance in this cohort was primarily influenced by cognitive factors, particularly nonverbal intelligence. Notably, cognitive abilities had minimal direct impact on nonspeech auditory processing measures, supporting a conceptual separation between auditory processing and cognitive abilities.

This study is the first to simultaneously quantify the direct and indirect contributions of auditory, language, and cognitive abilities to children's speech-in-noise perception and reading performance. Our findings underscore the multifactorial nature of LiD and the clinical need for a multidisciplinary diagnostic approach as a first step toward effective remediation.

Keywords: Auditory Processing Disorder, Listening Difficulties, Speech in Noise

Planned Session 56

Speech, Language and Cognition II
PS 56-3

The Role of General Intelligence in Individual Differences in Speech-in-Noise Performance

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Objective
This study investigates the role of general cognitive ability in explaining individual differences in speech-in-noise (SIN) performance.

Background
People with similar hearing loss often differ in their ability to understand speech in noise and in how much they benefit from hearing-aid fitting. They also vary in perceived listening effort despite comparable SIN scores. Variability in general cognitive ability may explain such individual differences. Research in this area has focused on specific domains like working memory, but psychologists have known for over 120 years that performance on any task can be predicted from performance on any other task to some degree (the 'Positive Manifold'). This shared variance reflects "general cognitive ability". By assessing core domains of cognition including fluid intelligence (Pattern Completion), processing speed (Digit Symbol Substitution), and working memory (Corsi Block Tapping), we estimated an index of general cognitive ability.

Methods
209 normal-hearing, native American English-speaking adults (M = 54.44, SD = 7.35) completed an online cognitive battery; 156 additionally completed a Spectro-temporal modulation (STM) detection test. Speech recognition in six-talker babble noise was then measured at signal-to-noise ratios of -3, 0, and 3 dB.

Results
Preliminary analyses revealed significant positive correlations between SIN scores and fluid intelligence ($r = .41$, $p < .001$), processing speed ($r = .42$, $p < .001$), and working memory ($r = .22$, $p < .01$) tests. Higher STM thresholds predicted lower SIN scores ($r = -.26$, $p < .01$). The cognitive tasks were also significantly intercorrelated ($p < .001$), consistent with the positive manifold, but were not correlated with STM thresholds ($p > .05$).

Conclusions
Cognitive tasks and STM sensitivity account for significant variability in SIN performance. Considering cognitive ability may enhance audiometric sensitivity, help to refine patient expectations, and improve hearing-aid outcomes.

Keywords: Cognition, Speech-in-noise, General Intelligence

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Planned Session 56

Speech, Language and Cognition II
PS 56-4

Predictive factors of the benefit of sequential bilateral cochlear implant in patients with post-lingual hearing loss

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The aim of this study was to identify which factors and variables may be potential predictors of speech perception performance in sequentially implanted adults. A retrospective cohort documentary study was conducted in accordance with the ethical principles of the institution involved. The sample consisted of adults with post-lingual hearing loss who underwent sequential bilateral cochlear implant (CI) surgery and met the inclusion criteria established for this study. The variables analyzed were: inter-implant interval, use of hearing aids, preoperative pure-tone average (PTA) before the second CI surgery, and speech perception results with both cochlear implants at 12 months of device use and at the most recent follow-up for the first CI before the sequential surgery. Sixteen adults of both sexes participated, with a mean age of 48.1 years. Hearing aid use time showed no impact on speech perception performance. However, those who used a contralateral hearing aid (bimodal condition) presented better results in quiet and in noise conditions, 83.5% and 37.8% (n=6), respectively, while those who did not use hearing aids obtained 49.7% and 21.7% (n=7). The mean inter-implant interval (10.3±7.5 years), age at first surgery (35.3±5.6 years), age at second surgery (45.6±8.5 years), and PTA (104.1 dBHL) showed weak correlation with performance regardless of condition. Speech perception scores varied according to the time interval between surgeries: up to 5 years (20%–40%), 6–10 years (25%–50%), and over 11 years (25%–75%). A correlation was observed between the first and second CI results. The variables analyzed in this study showed no statistically significant relationship for predicting speech perception performance under the evaluated conditions. Despite sample limitations, the analyses corroborate findings from several previous studies

Keywords: Cochlear Implantation, Adult, Speech Perception

Planned Session 57

Hearing Loss in Dementia
PS 57-1

SENSEcog care Australia: Supporting hearing and vision needs of people with dementia in long-term care

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Background: Around 90% of long-term care residents with dementia have hearing and/or vision impairment. These impairments frequently go unsupported, exacerbating the impact of dementia and leading to loss of independence, social isolation, anxiety, and depression. We implemented and evaluated a hearing and vision intervention co-designed with residents, family and care-workers. The intervention included a sensory champion, care-worker training, integration of hearing/vision support into daily tasks, visual reminders and hearing/vision support stations to store devices (e.g. glasses and hearing aids).
Methods: Data were collected at baseline, 3 months and 6 months after intervention commencement. Quality of life was measured using the Health Utilities Index Mark 3 (HUI-3) and the Quality of Life – Aged Care Consumers (QOLACC) instruments. Secondary outcome measures included mental well-being (Geriatric Anxiety Inventory, Geriatric Depression Scale) and social isolation (Social Isolation Measure).
Results: Twenty-one residents completed assessments at all three time points. Quality of life improved significantly at 3 months on the HUI3, (corresponding to large effect size η^2=0.19), whereas the 6-month gain was not statistically significant. There were no significant changes in QOLACC scores. There was a significant reduction in social isolation, but no change in mental well-being outcomes.
Conclusion: The evaluation provides evidence that simple strategies to support day-to-day hearing/vision needs are effective in improving quality of life and reducing social isolation among aged care residents with hearing/vision impairments. Outcomes from this project have been integrated via a global initiative to develop recommendations for hearing/vision care for aged care providers.

Planned Session 57

Hearing Loss in Dementia
PS 57-2

Supporting hearing aid use for people with dementia who are living in the community

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Background: Hearing loss is common among people with dementia living in the community and may exacerbate dementia-related challenges. Although hearing aids can reduce hearing difficulties and improve quality of life, people with dementia are less likely to use them, and use often declines over time. Limited understanding of factors influencing hearing aid use constrains the development of effective support strategies. This mixed-methods study, informed by behaviour change theory, examined influences on hearing aid use among people with mild–moderate dementia living in the community.

Methods: Quantitative correlates of hearing aid use were analysed in n=239 participants from the SENSE-Cog Europe Randomised Controlled Trial using bivariate and multivariate logistic regression. Potential predictors were organised using the Capabilities–Opportunities–Motivations model of Behaviour (COM-B). Qualitative barriers and enablers were explored through semi-structured interviews with n=11 UK-based intervention arm participants, guided by the Theoretical Domains Framework.

Results: Multivariate analysis identified four factors significantly associated with hearing aid use: greater self-perceived hearing difficulty (OR 2.61, 95% CI 1.04–6.55), poorer hearing acuity (OR 0.39, 95% CI 0.20–0.56), higher cognitive ability (OR 1.19, 95% CI 1.08–1.31), and country of residence. Qualitative findings highlighted enablers including establishing routines for hearing aid use and care, high-quality devices, perceived benefits, and responsive support. Barriers included handling and maintenance difficulties, particularly when troubleshooting support was delayed.

Conclusion: Hearing aid use in people with dementia is shaped by interacting intrinsic capability and motivation, and extrinsic social and environmental factors. Tailoring interventions to individual capabilities and motivations, while accounting for environmental context and support systems, may optimise hearing aid use and improve quality of life for people living with dementia and comorbid hearing loss.

Planned Session 57

Hearing Loss in Dementia
PS 57-3

Hearing rehabilitation for people living with dementia in residential care

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Most long-term care (LTC) residents are living with comorbid sensory and cognitive decline; however, associated communication difficulties are commonly attributed to dementia, with hearing loss receiving little attention. Although accommodation for hearing loss is foundational in addressing LTC residents' needs and care planning, this is rarely managed appropriately or effectively in residential care, especially for those with dementia.

In recent post-pandemic years, governing bodies worldwide have been undertaking revision of LTC standards to address gaps in care. Key areas of reform emphasize person-centered care, accessibility, improved staff training and a culture of safety and well-being, all of which require consideration of residents' ability to hear and communicate. In Canada, extensive consultation with health care professionals has given audiologists an important opportunity to help ensure that revised LTC design and care principles support residents with hearing loss.

This presentation will describe how a national advocacy proposal highlighting the importance of hearing health care and the role of audiology in LTC was developed by audiologists in Canada for the purpose of informing policy makers about the need to incorporate hearing services into LTC. The adoption of many of these recommendations by Canadian national standards associations may give audiologists the opportunity to reimagine a more integrated system-wide role in interprofessional LTC teams supporting the functioning of residents with hearing loss.

Recommendations for comprehensive hearing rehab interventions that address the physical and social environment, staff training in behavioral communication strategies and use of both personal and institutional technology will be presented, with modifications to practice that help to ensure successful outcomes for residents living with dementia.

Planned Session 57

Hearing Loss in Dementia
PS 57-4

Hearing Loss in Dementia: What does hearing loss mean for patients who already have cognitive impairment? How do we address it?

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Sensory health and cognitive impairment, including dementia, stand at the intersection of two major public health challenges. Sensory impairments are among the most common and disabling comorbidities among individuals aging with cognitive impairment yet frequently go unrecognized and unaddressed. Among sensory impairments, hearing loss is one of the most common comorbidities among persons living with dementia. Prevalence estimates, based on audiometric data, range from 60 to over 90% in specialized memory clinics and approximately 70-80% among community-dwelling cohorts of older adults. As age-related conditions, the prevalence of hearing loss increases with age and is higher among those with greater severity of cognitive impairment. Proxy-rated hearing loss by care partners and healthcare providers underestimate hearing loss among older adults with cognitive impairment. Sensory impairment among individuals with cognitive impairment is associated with increased number and severity of neuropsychiatric symptoms. However, persons living with dementia have low rates of hearing aid use, around 20%, and face barriers to traditional clinic-based hearing care. Most persons living with dementia go untreated and hearing care disparities exist by race and ethnicity. This presentation will review current epidemiology of hearing loss among persons living with dementia and our growing understanding of impact of hearing loss on the well-being and care of persons living with dementia. Furthermore, to meet the unique needs of persons livings with dementia, this presentation will share opportunities to provide hearing care through mobile technologies and novel, community-delivered approaches in support of holistic dementia care that incorporates hearing health and its role in aging well with dementia.

Planned Session 58

Genetics: Implications and Therapeutics
PS 58-1

Genetic Hearing Loss: Updates on genetic diagnosis and inner ear gene therapy

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Hearing loss is the most common sensory disorder in humans. Despite the advent of next-generation sequencing, diagnosing genetic disorders remains challenging. We perform comprehensive genomic profiling of sensorineural hearing loss (SNHL) using a systematic multi-tiered approach, from single-gene analysis to whole-genome sequencing (WGS), complemented by functional assays and bioinformatic analysis. WGS analysis identified pathogenic variants in an additional 20 families, primarily structural variants. Comparative analysis reveals higher frequencies of single pathogenic alleles in recessive genes within our cohort compared to controls. Subsequent analysis, including in silico predictions and in vitro validation, identifies three deep intronic pathogenic variants on opposite alleles. Finally, we map the genome-phenome landscape of SNHL at the level of inner ear function. Our results highlight WGS as a transformative tool for precision medicine in genetic diseases. In parallel, advancements in understanding of the genetic architecture and molecular mechanisms of hearing loss have led to significant progress in inner ear gene therapies. Presently, cytosine base editors (CBEs) and adenine base editors (ABEs) have been successfully used in treating hearing loss in hereditary deafness mouse models, suggesting that base editors hold potential as one-time treatments for hereditary deafness caused by pathogenic point mutations. Here, we identify an East Asia-specific founder mutation of DFNB111, the homozygous c.220C>T variant in MPZL2, that contributes to a significant proportion of hereditary deafness cases in multi-center cohort study. The development of humanized mouse models and the successful correction of founder mutation in MPZL2 using a single PAM-flexible ABE with reduced bystander editing and off-target effects, delivered via viral or non-viral vectors, represent a significant advance in base editing-based gene therapy, suggesting great promise for treating hereditary deafness.

Planned Session 58

Genetics: Implications and Therapeutics
PS 58-2

Clinical situations where genetic testing for deafness is strongly recommended and informative

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Cochlear implantation is currently the treatment of choice for children with severe to profound sensorineural hearing impairment (SNHI). However, cochlear implant (CI) outcomes vary widely among recipients. Genetic diagnosis provides direct clues to the pathogenesis of SNHI, enabling personalized medicine for CI candidates.
In this talk I will present our experience on how genetic information can help to tailor the clinical decision for cochlear implantation. With confirmed genetic diagnoses, clinicians will be able to: (1) delineate the natural history of SNHI and the timing of cochlear implantation; (2) predict the benefit of CI in patients with retrocochlear pathologies of genetic origin; and (3) select appropriate CI devices/electrodes for patients with specific genetic mutations.

Planned Session 58

Genetics: Implications and Therapeutics
PS 58-3

Genetic landscape in undiagnosed syndromic hearing loss: Insights from whole-exome sequencing and phenotype similarity analysis

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Background:
Several hundred syndromic disorders account for approximately 30% of the genetic causes of hearing loss. Because of such extreme heterogeneity, genetic diagnosis often goes undiagnosed for syndromic hearing loss with infrequent phenotypes. Sensitive and practical strategies need to be developed. Whole exome sequencing (WES) analysis is a highly sensitive strategy to identify causative genes in undiagnosed patients with syndromic hearing loss, but is laborious and requires handling of enormous datasets. An efficient approach to detect causative genes by WES analysis is to focus on one or several sets of prioritized genes. Systems to search for symptom-related genes by automatic calculation of phenotypic similarity can detect candidate causative genes if precise and detailed clinical features are provided.

Materials and Methods:
Genetic causes of undiagnosed syndromic hearing loss were examined using a combination of WES and a phenotype similarity search system called PubCaseFinder in 55 families with syndromic hearing loss of unknown causes. We first focused on protein-affecting gene variants with low minor allele frequency (MAF) values in pre-defined deafness genes, including those associated with both nonsyndromic and syndromic hearing loss. Then, we focused on genes selected using the phenotype similarity search system, PubCaseFinder as highly related to the symptoms in each patient. For patients who underwent duo or trio WES analysis without identification of causative genes, we also applied our previous method of using additional sets of genes, including those identified in mouse models of hearing loss or highly expressed in macaque cochlea, for prioritized analyses, together with co-segregation analysis to search for novel candidate genes.

Results:
We prescreened patients for several relatively frequently detected deafness genes or cytomegalovirus infection in order to focus on identification of rare causative genes of syndromic hearing loss. In total, 55 unrelated families (115 subjects) with syndromic hearing loss recruited from collaborating hospitals were analyzed. Most probands (44 cases, 80%) were diagnosed as having hearing loss before 2 years old, and the majority (38, 69%) were sporadic cases. Probands exhibited one or multiple abnormalities in other organs, including motor developmental delay (17 cases), ophthalmological disorders (11 cases), and developmental delay (7 cases). Other clinical features included abnormalities of the central nervous system, heart, digestive organs, and multiple growth retardation. In addition, 14 cases (25%) showed inner, middle, or outer ear malformation.
First, we identified causative genes in 18 families (33%) based on a set of pre-defined deafness genes prioritized for analysis. The identified genes consisted of both genes associated with syndromic hearing loss (PTPN11, CHD7, KARS1, OPA1, DLX5, MITF, SOX10, MYO7A, and USH2A) and those associated with nonsyndromic hearing loss (STRC, EYA4, and KCNQ4). Among these, association of a coding variant of DLX5 with incomplete partition type I (IP-I) anomaly of the inner ear was identified for the first time in a patient. Next, patients in which causative genes were not successfully detected among pre-defined deafness genes were subjected to prioritized analysis of phenotype-related genes, and we successfully identified three distinct causative genes in 3 families: CFAP52, COL1A1, NSD1. To identify novel candidate genes associated with hearing loss, probands in whom no causative gene was identified by prioritized analyses were subjected to duo or trio WES analysis. Consequently, a de novo heterozygous variant of ZBTB10 (NM_001105539.3:c.1378A>T (p.K460*)) was detected as a sole candidate in a sporadic case with IP-I. A mouse model with a homozygous Zbtb10 frameshift variant resulted in embryonic lethality, suggesting the importance of this gene for embryonic development.

Conclusion:
WES analysis combined with phenotype similarity search revealed a wide spectrum of rare causative genes in patients with syndromic hearing loss. These results indicate that various types of rare syndromes are responsible for a substantial proportion of syndromic hearing loss. We also demonstrated the potential of phenotype similarity search by using individual clinical data as a query for efficient filtering in clinical genetic testing and for identifying syndromic diseases. Singleton, not trio, WES analysis, with candidate gene filtering based on patient clinical features, is useful to detect genes causative of undiagnosed diseases, emphasizing the importance of precise and detailed medical examination in the diagnosis of syndromic diseases.

Planned Session 58

Genetics: Implications and Therapeutics
PS 58-4

Efficacy and safety of DB-OTO gene therapy in children with profound deafness: Updates and early speech results from the phase 1/2 CHORD trial

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Purpose: DB-OTO, a dual adeno-associated virus 1 gene therapy, was designed to enable hearing in individuals with otoferlin-related deafness. CHORD is an ongoing, multicenter, open-label registrational trial (NCT05788536) evaluating the safety and efficacy of DB-OTO.
Methods: Pediatric participants with biallelic pathogenic or likely pathogenic variants in the otoferlin gene and profound deafness are being enrolled, including one site in Japan. DB-OTO is administered as a unilateral or bilateral intracochlear infusion (7.2 × 1012 vector genomes/ear). Hearing sensitivity is assessed by pure tone audiometry (PTA) and Auditory Brainstem Response (ABR). Speech perception abilities are evaluated using clinician and caregiver Global Impression Scales. Semi-structured parent/caregiver interviews were conducted at Week 48.
Results: Efficacy and safety results from 12 participants have been presented previously. At Week 24, 9/12 (75%) participants met the primary endpoint, reaching a hearing sensitivity threshold (PTA ≤70 dB hearing level [HL]; P=1.1 × 10−13, Clopper–Pearson 95% CI: 0.43–0.95) and 9/12 (75%) met the key secondary endpoint, demonstrating an ABR to click ≤90 dB normal HL (P=1.1 × 10−13, Clopper–Pearson 95% CI: 0.43–0.95). Stability or further hearing improvements were observed by Week 48; 10/12 (83%) met the primary efficacy threshold (PTA ≤70 dB HL) and were able to hear conversational or soft speech, 5/12 (42%) achieved normal hearing sensitivity. Ten participants completed the Global Impression Scales at Week 48; 6/9 (67%) and 6/10 (60%) had much improved or very much improved speech perception, based on available data from clinician and caregiver ratings, respectively. No DB-OTO-related adverse reactions were reported. Parent/caregiver interviews provided insights into the real-world impact on participants and their families.
Conclusion: DB-OTO may enable hearing that translates into favorable speech outcomes in children with otoferlin-related deafness, with a favorable safety profile.
Presented by Tera Quigley, on behalf of the CHORD study investigators: Manohar Bance, Daniela S. Carvalho, John H. Greinwald Jr, Steven A. Harvey, Akira Ishiyama, Evie C. Landry, Hubert Löwenheim, Lawrence R. Lustig, Manuel Jesus Manrique-Rodriguez, Robert Nash, Rubén Polo, Cedric V. Pritchett, Jay T. Rubinstein, A. Eliot Shearer, Ignacio del Castillo, Peter Weber, Yanping Chen, Gary Wilson, Susan Irvin, Hazem Hassan, Jeffery J. Anderson, C. Eduardo Corrales, Jonathon P. Whitton, and Vassili Valayannopoulos.

Planned Session 58

Genetics: Implications and Therapeutics
PS 58-5

Genetic Vasculopathy of the Inner Ear in Fabry Disease: Cochleovestibular Phenotypes and Implications for Precision Audiology

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Fabry disease (FD) is an X-linked lysosomal storage disorder caused by pathogenic variants in the GLA gene, leading to α-galactosidase A deficiency and systemic accumulation of globotriaosylceramide (Gb3). Progressive glycosphingolipid deposition in vascular endothelial and neural tissues results in widespread microvascular dysfunction, including involvement of the inner ear.
We investigated cochleovestibular phenotypes in a clinical cohort of genetically confirmed FD patients, with particular attention to the IVS4+919G>A late-onset cardiac variant, which is highly prevalent in East Asian populations. Comprehensive audiological assessments demonstrated a high prevalence of auditory dysfunction, with hearing loss present in more than 70% of patients and tinnitus reported in over half. Vestibular symptoms, including vertigo and imbalance, were also frequently observed. Objective vestibular testing revealed both peripheral and central abnormalities, including vestibular hypofunction and canal paresis, suggesting microvascular and neural involvement of the vestibular pathways.
To contextualize these findings at the population level, nationwide analyses using Taiwan's National Health Insurance Research Database further demonstrated increased risks of auditory and peripheral vestibular disorders among FD patients.
Together, these results identify cochleovestibular dysfunction as a clinically important neurological phenotype of Fabry disease. Integrating genetic diagnosis with systematic audiological and vestibular evaluation may enable earlier detection of disease involvement and provide accessible biomarkers for precision monitoring of therapeutic interventions.

Planned Session 59

Vestibular Disorders in Special Populations
PS 59-1

Meniere disease and vestibular migraine: Genetic and immune perspective

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Background: Genomic and proteomic research support that Meniere disease (MD) and vestibular migraine (VM) are different conditions. Despite of MD and VM have different diagnostic criteria, both share a recurrent episodic syndrome with audiological symptoms during the attacks and deep phenotyping with serial pure tone audiograms are essential to make the clinical diagnosis. The goal of this study is to summarize the genomic and proteomic studies in VM and MD to get a better understanding of the pathophysiology
Methods: Genomic and proteomic human studies in VM and MD published in 2016-2025 were retrieved to summarize the available scientific evidence to define biomarkers for both conditions.
Results: MD is a rare clinical phenotype defined by vertigo attacks associated with sensorineural hearing loss and tinnitus. Exome sequencing has identified rare variation in ~20 genes in familial cases with partial overlap in sporadic individuals. Two MD immunophenotypes (autoinflammatory and Th2-mediated) suggest a divergent immune response in ~50% of sporadic MD with potential specific immunomodulators available for each immunophenotype. VM is a much more clinical syndrome defined by migraine symptoms associated with vestibular episodic symptoms. VM has a significant familial clustering supporting a genetic contribution mediated by common variants. Cytokine profiling (IL- 1β, CCL3, CCL22, and CXCL1) and single cell transcriptomics support that MD and VM have different molecular mechanisms, immune profile and therapeutic approach.
Conclusions: Cytokine profiling and genetic testing can differentiate MD and VM and support different molecular mechanisms for each condition.

Keywords: Genetics, immune response, vestibular disorders

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Planned Session 59

Vestibular Disorders in Special Populations
PS 59-2

Vestibular function testing in pediatric population

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Vestibular disorders in children may affect their psychomotor development and quality of life.
Vestibular assessment in this population may be challenging, as cooperation can be limited and adult testing protocols are not always suitable.
This presentation addresses the importance of early vestibular evaluation in children and describes how vestibular function can be explored from a young age using playful and child-friendly clinical examination techniques. By adapting standard vestibular tests into game-based tasks, meaningful clinical information can be obtained while maintaining the child's engagement.
Practical tips will be provided to help clinicians successfully perform pediatric vestibular examinations, optimize cooperation, and improve diagnostic reliability. These strategies aim to facilitate the integration of vestibular testing into routine pediatric otolaryngology practice and support earlier identification and management of vestibular disorders in children.

Planned Session 59

Vestibular Disorders in Special Populations
PS 59-3

Pediatric Vestibular Monitoring Recommendations for High-Risk Populations

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Diagnostic vestibular testing in the pediatric population, particularly with infants and young children, has made significant advancements in recent years. Modifications such as bone conduction for VEMP testing, remote camera for vHIT, and use of ENG or infrared recording for rotational chair testing, have expanded the patient age range these tests can be reliably completed with. There is also a growing body of evidence showing the high prevalence of vestibular hypofunction in children with sensorineural hearing loss and the potential impacts this can have on a child's development. This may include gross motor delays, increased fall risk, academic concerns, and problems with cognition and attention.

This presentation will share clinical guidelines and recommendations for monitoring pediatric populations at high risk for vestibular hypofunction. The high-risk populations included in this presentation are cochlear implant (CI) candidates and recipients and infants/children with congenital cytomegalovirus (cCMV). Additional hearing loss etiologies with a high-risk of bilateral vestibular hypofunction will be discussed. Results from vestibular monitoring in pediatric patients with CI and cCMV from this hospital will be shared.

Planned Session 59

Vestibular Disorders in Special Populations
PS 59-4

Vestibular Assessment in Pediatric Hearing Loss: An Overlooked Clinical Necessity

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The inner ear houses two interconnected sensory systems: the cochlea for hearing and the vestibular apparatus for balance and spatial orientation. Yet in clinical practice, we routinely assess one while often neglecting the other. When a child presents with hearing loss, the focus remains exclusively on auditory rehabilitation—cochlear implants, hearing aids, speech therapy—while vestibular function is rarely evaluated unless balance problems become obvious. This approach fundamentally misunderstands the nature of inner ear pathology.

The Shared Vulnerability:
The anatomical proximity and common embryological origin of cochlear and vestibular structures make them equally vulnerable to the same pathological processes—genetic mutations, infections (CMV, bacterial meningitis), ototoxic medications, inner ear malformations, and immune-mediated damage. Evidence increasingly demonstrates that vestibular dysfunction is not a rare complication but rather a frequent companion of hearing loss, with prevalence rates ranging from 20% to 70% depending on the severity and etiology of deafness. Our data confirms this reality: nearly half of children with hearing loss present vestibular impairment, a proportion that increases dramatically with profound deafness but remains significant even in mild to moderate cases.

The Developmental Impact :
For a hearing child, vestibular dysfunction creates balance challenges. For a deaf child, it creates a double sensory deprivation with cascading developmental consequences. The vestibular system is fundamental for motor milestone acquisition, postural control, gaze stabilization, and spatial navigation. Children with combined cochleo-vestibular deficits face delayed walking, increased fall risk, difficulty with physical activities, and challenges in academic performance—particularly in reading, where gaze stability is essential. These children are learning to navigate a silent world while simultaneously lacking the internal compass that guides movement and orientation.

The Cost of Not Looking :
By failing to systematically assess vestibular function, we miss opportunities for early intervention when vestibular rehabilitation is most effective, we leave families without explanation for their child's clumsiness or motor delay, we compromise safety, as these children face higher injury risk, we underestimate the true burden of the child's disability, affecting educational planning and support services and we delay adaptive strategies that could significantly improve quality of life

The Path Forward :
Vestibular assessment should become an integral component of the diagnostic workup for any child with hearing loss, regardless of severity. It's time to recognize that hearing loss is an inner ear problem, not just a cochlear one.

Planned Session 59

Vestibular Disorders in Special Populations
PS 59-5

Vestibular phenotypes in the patients with genetic hearing loss

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Background: The vestibular phenotypes of patients with genetic hearing loss are poorly understood. Methods: we performed genetic testing including exome sequencing and vestibular function tests to investigate vestibular phenotypes and functions in patients with genetic hearing loss. Results: Among 627 patients, 143 (22.8%) had vestibular symptoms. Genetic variations were confirmed in 45 (31.5%) of the 143 patients. Nineteen deafness genes were linked with vestibular symptoms; the most frequent genes in autosomal dominant and recessive individuals were COCH and SLC26A4, respectively. Vestibular symptoms were mostly of the vertigo type, recurrent, and persisted for hours in the genetically confirmed and unconfirmed groups. Decreased vestibular function in the caloric test, video head impulse test, cervical vestibular-evoked myogenic potential, and ocular vestibular-evoked myogenic potential was observed in 42.0%, 16.3%, 57.8%, and 85.0% of the patients, respectively. The caloric test revealed a significantly higher incidence of abnormal results in autosomal recessive individuals than in autosomal dominant individuals ($p = 0.011$). The genes, including SLC26A4, COCH, KCNQ4, MYH9, NLRP3, EYA4, MYO7A, MYO15A, and MYH9, were heterogeneously associated with abnormalities in the vestibular function test. Conclusions: In conclusion, diverse vestibular symptoms are commonly concomitant with genetic hearing loss and are easily overlooked.

Planned Session 60

Music Perception

PS 60-1

New Directions in Speech and Music Perception

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The human auditory system is often studied through the lens of what it already knows. While research on speech perception examines familiar phonemic inventories, research on music perception typically examines scales, harmonies, and rhythms encoded through decades of cultural exposure. This approach, while productive, introduces a fundamental confound: it is impossible to disentangle the brain's intrinsic auditory processing capacities from the accumulated weight of prior experience. The work presented here takes a different approach, using artificially constructed musical systems as controlled experimental environments in which listeners encounter sound structures they have never heard before. What emerges from this research is a unified account of auditory learning, prediction, and reward with direct implications for clinical audiology, hearing rehabilitation, and the emerging field of music-based intervention.

The Bohlen-Pierce (BP) scale provides the central case study. Unlike the twelve-tone equal temperament system that underlies Western music, the BP scale divides the tritave — a frequency ratio of 3:1 — into thirteen steps, producing intervals that share no overlap with familiar Western pitch relationships. To Western-trained listeners, BP melodies sound unmistakably foreign. Yet within minutes to hours of structured exposure, listeners extract the statistical regularities of this new tonal system, developing sensitivity to its implicit grammar and, with repeated exposure, nascent aesthetic preferences for its characteristic harmonic resolutions. This behavioral trajectory mirrors what is observed in infant speech perception: the auditory system does not wait for explicit instruction but instead continuously tracks distributional regularities in the acoustic input, building probabilistic models of what sounds belong together and what sounds will come next.

This process — statistical learning — is now understood to operate across speech and music through overlapping neural substrates. Regions of auditory cortex, inferior frontal gyrus, and subcortical structures including the basal ganglia and cerebellum participate in the extraction of sequential dependencies, whether those dependencies are phonotactic patterns in a new language or melodic patterns in an unfamiliar scale. The BP paradigm allows researchers to observe this system in a state of genuine naïveté, uncontaminated by prior exposure, providing a clean window onto the mechanisms that also govern how infants acquire native phonology, how adults learn a second language, and how cochlear implant recipients reorganize their auditory processing to accommodate a transformed acoustic signal.

Central to this framework is the brain's role as a prediction machine. Rather than passively receiving acoustic input, the auditory brain continuously generates forward models of what it expects to hear, compares those predictions against incoming sound, and updates its internal representations in response to prediction error. Music, because of its high degree of temporal and tonal structure, is an unusually powerful driver of this predictive machinery. Dopaminergic reward signals are released not only when musical expectations are met but also — and perhaps more powerfully — when they are violated in ways that are subsequently resolved. This expectation-reward architecture explains why music is universally emotionally evocative and why it degrades with such characteristic patterns in conditions that compromise prediction circuitry, including Parkinson's disease, depression, and age-related cognitive decline.

Not everyone, however, experiences music as rewarding. Approximately five percent of the general population exhibits musical anhedonia — a selective inability to derive pleasure from music in the absence of broader emotional blunting or hearing loss. Neuroimaging and white matter tractography reveal that individuals with musical anhedonia show reduced functional connectivity between auditory cortex and the nucleus accumbens, the core of the mesolimbic reward system. Crucially, this disconnection appears domain-specific: monetary and social rewards remain intact. Musical anhedonia thus constitutes a natural experiment in reward system architecture, demonstrating that different reward modalities are at least partially dissociable at the neural level. For audiology, this finding carries practical implications: the assumption that music-based interventions will be universally beneficial requires qualification, and individual differences in auditory reward sensitivity should be assessed alongside conventional audiometric measures when designing therapeutic protocols.

The translational arc of this research leads to two promising clinical domains. First, rhythmically modulated music calibrated to theta and gamma frequency bands has demonstrated efficacy in supporting attentional function in listeners with ADHD and in promoting memory-related neural oscillations in aging populations. Second, gamma-frequency acoustic stimulation embedded in musical contexts is under active investigation as a non-pharmacological approach to Alzheimer's disease, exploiting the brain's preserved sensitivity to rhythmic auditory input even in advanced stages of neurodegeneration. In both cases, understanding the mechanisms of auditory statistical learning and prediction informs the design of more targeted, dose-responsive interventions.

The research trajectory described here — from laboratory studies of an alien musical scale to clinical protocols for aging and neurodevelopmental conditions — reflects a broader principle: that the most powerful tools for understanding auditory processing are those that push the system to its learning limits. By studying how the brain constructs meaning from sound it has never encountered, we gain insight into the computational principles that govern all auditory perception, in health and in disease.

Planned Session 60

Music Perception

PS 60-2

Assessing the music appreciation skills of cochlear implant recipients through their differential assessment of musical instrument tones

William MARTENS

Linguistics, Macquarie University, Australia

Although the cochlear implant (CI) has been a great success in restoring speech perception after profound hearing loss, surveys of CI recipients indicate their inability to enjoy listening to music when its perception via CI is compared to their memories of musical sound experienced during a previous period of normal hearing. Given the relatively poor perception of musical pitch experienced by cochlear implant (CI) recipients, the most adequate assessment of their music appreciation skills must include a comprehensive characterization of their capacity to hear timbral differences between musical instrument sounds. For this project, two distinct perceptual tasks were included in an assessment of musical instrument tones heard in isolation (rather than in a polyphonic or melodic context). The set of presented tones comprised two distinct performances on each of six orchestral instruments, including oboe, clarinet, bassoon, French horn, trumpet, and trombone. The perceptual tasks were focussed upon this set of 12 loudness-matched musical instrument tones that were presented at matched fundamental frequencies using a spectrotemporal analysis (allowing for the resynthesis of the temporal evolution of harmonic amplitudes, as illustrated for a single clarinet tone in the figure). The first task required unilateral CI recipients to first make two-alternative forced choice (2AFC) responses between pairs of musical instrument tones on perceptual attributes such as tonal brightness. The second task required those same unilateral CI recipients to rate the pairs of tones on their global similarity (based on perceived dissimilarity without respect to any particular timbral attributes).

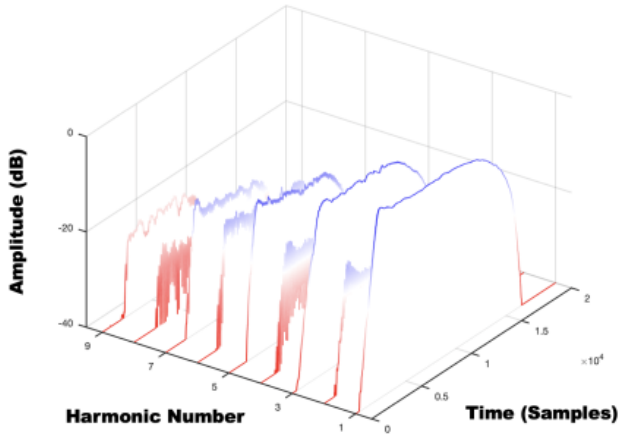


Figure Spectrotemporal analysis of a fortissimo tone performed on the clarinet

Beyond a more global evaluation of music appreciation that might rely on overall impressions, the enjoyment of musical sound was approached here from a more elemental and analytical viewpoint with the aim of understanding the important perceptual features affecting the enjoyment of music by CI recipients. Because the participants were unilateral CI recipients, a particularly informative exploration of their perceptual experience of musical timbre was enabled: An experimental result was achieved that allowed for the derivation of a quantitative relationship between timbre as heard by the "electric" ears of those participants to timbre as heard by their remaining normal-hearing "acoustic" ears. Indeed, the perceptual magnitude of timbral differences between the tones could be referenced to a common psychological scale that was shared for comparisons made within-ear and between-ear by these unilateral CI recipients. The obtained dissimilarity judgments were submitted to an INdividual-Differences SCALing analysis (INDSCAL) to generate a two-dimensional "timbre space" that revealed the relative positions of the members of the two sets of tones for two types of comparisons, those comparison having been made within-ear versus between-ear. The resulting quantitative assessment of audible differences in musical timbre revealed which of two underlying timbre dimensions was more substantially affected by CI use.

Planned Session 60

Music Perception
PS 60-3

Listening beyond hearing: Neural responses to emotions in music and implications for cochlear implant users and AI-generated music

Kyung Myun LEE

School Of Digital Humanities And Computational Social Sciences, Korea Advanced Institute of Science and Technology, Korea

Our laboratory investigates how humans listen beyond hearing—how they experience and feel emotions in music—using EEG and computational approaches, with the broader goal of developing human-centered music technologies. In bringing this work to an audiology audience, this talk asks: how can neural evidence from music-emotion research help define and measure CI users' access to music as an emotional and aesthetic experience, beyond audition alone? We connect our prior work to emerging needs in CI research and propose directions where audiology, neuroscience, and music technology can meet.

First, this talk presents our EEG studies showing how brain responses differ when listeners engage with emotionally meaningful music—such as when they listen to preferred versus non-preferred pieces, and when factors like familiarity, fandom, and deep immersion modulate neural dynamics during listening. These findings suggest that subjective musical experience is accompanied by measurable neural signatures, motivating a CI-relevant framework for objective assessment of music-related affect and engagement. More broadly, this perspective highlights a gap in the current CI music literature: while perceived emotion (what emotion a piece seems to convey) and felt emotion (what the listener actually experiences) are distinct constructs, relatively few studies with CI users explicitly separate and examine both. We discuss the possibility that brain responses could serve as an index of felt emotion in CI-mediated music listening.

Second, drawing on an ongoing study in our group on CI users and music emotion, this talk discusses implications for the accessibility of generative AI music technologies for CI users. By comparing CI users' emotion responses to human-composed music and AI-generated music, we examine how emerging AI music technologies may shape access to musical emotion—potentially supporting emotional communication, but also introducing new distortions or barriers. This work motivates a discussion of current limitations in AI music generation from an accessibility standpoint and outlines directions for improving emotionally meaningful, CI-compatible generative music.

Planned Session 60

Music Perception
PS 60-4

Hearing Health in Higher Music Education: Changing Culture, Changing Outcomes

Kris CHESKY

School of Medicine & Peabody Conservatory, Johns Hopkins University, United States of America

Music-induced hearing loss concerns remain among the most enduring and preventable audiologic challenges worldwide. Yet many educated musicians—including teachers and performers—are unaware, underinformed, or inadequately prepared to address these risks in their professional and societal roles.

Tertiary music institutions and other training environments rarely provide systematic education, competency development, or structured mitigation strategies for students, faculty, staff, and administrators. In July 2025, the First Global Summit on Occupational Health in Music convened at Johns Hopkins University in Washington, D.C, to formally reposition music participation within an occupational health framework (www.occupationalhealthinmusic.org).

Central to this initiative is the Total Musician Health™ model, which integrates biopsychosocial, public health, and developmental perspectives to advance prevention strategies tailored to music-specific exposures and contexts. The Summit emphasized that every educated musician should possess the awareness, knowledge, and competencies necessary to manage music-specific occupational health concerns—including those related to hearing—on behalf of themselves, their students, colleagues, and audiences.

This presentation highlights emerging global efforts to embed hearing-conservation infrastructure into higher music education. Cultural transformation at the institutional level is essential to achieving measurable improvements in hearing outcomes associated with learning, performing, creating, teaching, and consuming music.

Planned Session 60

Music Perception
PS 60-5

From timbre perception to auditory scene analysis: Effects of musicianship across auditory and tactile modalities

Loonan CHAUVETTE[1,2]

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[2]*School Of Rehabilitation, Laval University, Canada*

Objective: The study examines the impact of training on timbre perception across auditory, tactile, and auditory-tactile modalities using musicianship as a model of training-related plasticity.

Background: Timbre is a multidimensional perceptual feature arising from several spectral and temporal acoustic properties of complex sounds, which play an important role in auditory scene analysis. Although multimodal auditory-vibrotactile assistive devices show considerable potential for sensory augmentation and auditory rehabilitation, our understanding remains limited regarding 1) the comparative effectiveness of auditory and tactile modalities for timbre perception, 2) the cross-modal integration of timbre-related acoustic features, 3) the possibility of improving unimodal and bimodal timbre perception through training, and 4) the relationship between timbre perception abilities and musical scene analysis.

Method: Thirty non-musicians and fifteen musicians with normal hearing and vibrotactile sensitivity were included. Discrimination thresholds were measured for three spectral (number of harmonics, harmonic roll-off, even-harmonic attenuation) and three temporal (attack time, amplitude modulation depth, and amplitude modulation frequency) timbre-related acoustic features using an ABX paradigm with an adaptative staircase procedure. Some participants (22 non-musicians, 12 musicians) also completed the Music-in-Noise Test (MINT). For both tasks, stimuli were presented in auditory, tactile, and auditory-vibrotactile conditions through insert earphones and the Multichannel Vibrotactile Gloves, a vibrotactile assistive device developed in our laboratory.

Results: Participants could discriminate all timbre-related acoustic parameters using vibrotactile stimulations alone, with some evidence of multimodal integration for temporal features. Musicians exhibited lower thresholds than non-musicians, especially in auditory-vibrotactile conditions. Exploratory analyses further suggest associations between timbre perception and MINT scores.

Conclusion: Findings show that musical training is associated with enhanced timbre perception abilities, particularly under multimodal stimulation, which appear to translate into improvements in auditory scene analysis. This suggests that benefits of vibrotactile assistive devices can be improved through training, pointing to new avenues for auditory rehabilitation.

Keywords: Timbre perception, Multisensory perception, Assistive device

Special Session 01

British Society of Audiology - Emerging Clinical Innovation: National Collaboration and Quality

SS 01

Emerging clinical innovation: National collaboration and quality

Silvia DI BONAVENTURA[1], Verity LANGLANDS[2], Siobhan BRENNAN[2]

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[2]Manchester Centre for Audiology and Deafness, The University of Manchester, United Kingdom

This session will highlight how national collaboration is shaping the evolution of audiology practice across the UK, with a focus on translating evidence into high-quality clinical care. Drawing on current work in electrophysiology, auditory processing, and complex needs, the session will illustrate how shared expertise, coordinated guidance development, and collective problem-solving are supporting clinicians across diverse practice settings.

Session Outline:
1. Introduction and opening remarks "Driving innovation through national collaboration" (10 mins)

Speaker: Verity Langlands

An overview of how national networks and shared expertise are helping to advance audiology practice across the UK.

2. "From evidence to clinical practice: implementing electrophysiology guidance" (20 mins)

Speaker: Siobhan Brennan

An overview of current developments in electrophysiology guidance, highlighting clinical considerations to support practice across services.

3. "Auditory Processing Disorder: evidence, guidance and emerging practice" (20 mins)

Speaker: Silvia Di Bonaventura

An outline of evolving UK approaches to APD and the role of guidance in supporting assessment and management.

4. "Advancing practice for complex audiological needs" (20 mins)

Speaker: Verity Langlands

A look at pathway development and practical strategies for working with individuals who present with complex audiological profiles.

5. Closing Remarks – "Turning insights into action: future directions" (10 mins)

Speaker: Silvia Di Bonaventura

A summary of key messages and reflections on opportunities for future development across audiology.

Special Session 02

American Academy of Audiology
SS 02

American Academy of Audiology Special Session

Patricia GAFFNEY[1,2], Ryan MCCREERY[2,3], Matthew FITZGERALD[2,4], Devin L. MCCASLIN[2,5], Christopher SPANKOVICH[2,6]

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[3]*Center For Hearing Research, Boys Town National Research Hospital, United States of America*
[4]*Department of Otolaryngology-Head and Neck Surgery, Stanford University, United States of America*
[5]*Department of Otolaryngology-Head and Neck Surgery, University Of Michigan - Michigan Medicine, United States of America*
[6]*Department of Otolaryngology-Head and Neck Surgery, University of Mississippi Medical Center, United States of America*

This Special Session brings together five leading U.S. researchers to present timely updates on emerging evidence across key areas of audiology, highlighting advancements in clinical practice, technology, and patient outcomes. Each presenter will share new findings from ongoing research initiatives, offering attendees a forward-looking perspective on the evolving scientific landscape. . This session delivers a comprehensive blend of cutting-edge research and organizational insight designed to inform and strengthen audiologic practice worldwide.

Patricia Gaffney, AuD, MPH- The American Academy of Audiology continues to advance the profession through newly developed and updated guidelines, strategic documents, and forward-looking professional initiatives. This portion of the session will highlight the Academy's most recent publications, emphasizing their relevance to contemporary practice and offering practical approaches for integrating these resources into everyday clinical decision-making.

Ryan McCreery, PhD -Current clinical speech recognition assessments for children often do not illuminate the listening and communication difficulties experienced by children with mild degrees of hearing loss. Speech recognition scores in quiet for children with mild hearing loss are often near ceiling levels, and even speech recognition in speech-shaped noise or multitalker babble may not be different than children with normal hearing levels. To address the limited options for clinical speech recognition tests, pediatric audiologists and researchers collaborated to develop a novel speech recognition test battery that could be implemented in any pediatric audiology clinic with two speakers that more accurately reflects the listening challenges of children with mild hearing loss. We collected data from 105 children with mild bilateral hearing loss and 102 age-matched children with typical hearing to assess an automated masked speech recognition task with four conditions: 1) speech-shaped noise, 2) two-talker masker, 3) two-talker masker with reverberation, and 4) two-talker masker with the target and masker spatially separated. Children with mild bilateral hearing loss had higher signal-to-noise ratios for 50% than children with normal hearing, but the differences between conditions were largest for the two-talker masker with reverberation and the two-talker masker with spatial separation. For a subset of children with mild hearing loss who wore hearing aids, speech recognition in noise was better with a hearing aid than without a hearing aid. Like the unaided data, the largest effects of amplification and aided audibility on speech recognition in noise were observed in the two-talker masker with reverberation and two-talker masker with spatial separation. These novel speech recognition tasks were validated in 5 pediatric audiology clinics and were judged by pediatric audiologists to be feasible for clinical assessment of children with hearing loss.

Devin McCaslin, PhD- Early identification of vestibular dysfunction in infancy is critical, given its role in postural control, visual stabilization, and the acquisition of motor milestones. However, current vestibular assessment tools are not optimized for infants, contributing to delayed diagnosis and intervention. We have developed and patented a compact rotational system that enables reliable measurement of the horizontal canal vestibulo-ocular reflex (hVOR) in infants beginning at birth. The system integrates a secure infant seating platform with surface electrode-based eye movement recording, allowing for safe, non-invasive assessment at physiologic rotational frequencies. In our early feasibility testing, we have successfully obtained stable and repeatable hVOR responses across infants during the first 12 months of life. Ongoing longitudinal data collection will establish normative developmental trajectories and enable identification of infants at risk for vestibular impairment, including those with hearing loss or congenital cytomegalovirus infection. This work represents the first step toward a scalable vestibular screening tool suitable for the newborn period and early well-baby care. Early detection may support more timely rehabilitative intervention and improved developmental outcomes.

Christopher Spankovich, AuD, PhD- Mild therapeutic hypothermia (MTH) has shown significant promise for otoprotection from ototoxic drugs, noise exposure, and iatrogenic injury. We have previously demonstrated significant reduction in cisplatin induced ototoxicity with ear level MTH delivered via thermoelectric cooling of the ear canal. In the present work, we characterize mechanisms for ear level MTH for protection from cisplatin induced injury. We will also introduce a novel method to induce vestibular caloric responses using ear level temperature manipulation via a thermoelectric stimulus that can overcome some challenges of water and air based calorics. Data was collected in adult Long-Evans rats and human cadavers. We observed reduction of cisplatin uptake into the inner ear as a primary mechanism of MTH mediated protection. We also observed ability to elicit vestibular calorics applying monaural ear canal temperature delivery comparable to water. Temperature transfer in human tissue demonstrated ability to achieve MTH via

ear canal cooling. Thermoelectric temperature manipulation of the ear canal provides a simple method for otoprotection and novel method for inducing vestibular calorics.

Matthew Fizgerald, PhD- Assessment of speech-recognition abilities is a fundamental component of audiologic assessment. Nonetheless, longstanding challenges remain, including difficulties in testing non-native speakers, potential bias in scoring, and the need for in-person evaluation. Here we address these issues with automatic speech recognition (ASR), an approach which is increasingly feasible given advances in artificial intelligence and speech recognition systems. Here we tested more than 30 native English speakers, half with normal hearing and half with bilateral sensorineural hearing loss. All participants were tested on several tests of speech recognition in quiet and noise. Responses were independently scored by multiple audiologists and the ASR system. Correspondence for human and ASR scoring was high, exceeding 93% for sentence-based tests. This correspondence was similar for patients with and without hearing loss and did not vary with the baseline level of performance. In a random sample of discrepancies between human and ASR scoring, approximately 50% can be readily addressed by tuning our system, including homonym resolution, unintended language switching, or recording issues. Remaining mismatches reflected either ASR limitations or errors in human scoring. Preliminary work indicates similar feasibility for non-English speech materials such as Mandarin. Taken together, these data suggest that ASR can reliably score open-set speech recognition tests and may ultimately support clinical and remote applications.

Special Session 03

Spanish Association of Audiology -
New Horizons in Audiology Publishing: Towards a Global, Open, and Multilingual Scientific Community

SS 03

New Horizons in Audiology Publishing: Towards a Global, Open, and Multilingual Scientific Community (Insights from AUDITIO, The Spanish Journal of Audiology)

Carlos Ricardo BENITEZ-BARRERA[1,2,3,4], Oscar M. CAÑETE[5], Raul SANCHEZ-LOPEZ[3], José Juan BARAJAS DE PRAT[4]

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[2]School of Psychology, New Zealand, University of Auckland, New Zealand
[3]Institute of Globally Distributed Open Research and Education (IGDORE), Søborg, Denmark
[4]Clínica Barajas, Spain
[5]School of Medical Technology, Andrés Bello National University, Chile

This panel explores how scientific publishing in audiology can evolve toward a more global, open, multilingual, and clinically impactful model. Using AUDITIO (The Spanish Journal of Audiology) as a case study, the session brings together perspectives from editorial leadership, clinical research, and practice to illustrate how regional journals can drive innovation, methodological rigor, and equitable knowledge dissemination. The panel convenes four current and former editors of AUDITIO who will demonstrate how regional scientific platforms such as AUDITIO can function not only as dissemination venues for high-quality research, but also as mechanisms for research development, clinical translation, and international collaboration.

The opening presentation, led by Dr. Carlos Benitez-Barrera, current Director of AUDITIO, will position AUDITIO as a model for specialty publishing. In a field where most high-impact journals operate exclusively in English, linguistic barriers limit access to scientific evidence for large segments of the global clinical community. With more than 550 million Spanish speakers worldwide, the need for rigorous, peer-reviewed research in Spanish extends beyond translation; it reflects a fundamental issue of equity, inclusion, and scientific participation. This presentation will examine how open-access, multilingual publishing models can strengthen global engagement in audiology, foster regional research capacity, and reduce the gap between research production and clinical implementation.

The second panelist will be Oscar Cañete, current Associate Editor of AUDITIO. He will address how regional journals such as AUDITIO can disseminate the development and validation of language-specific audiological questionnaires. Drawing on his own work published in AUDITIO, including contributions on the Spanish validation of the Speech, Spatial and Qualities of Hearing Scale (SSQ), Dr. Cañete will highlight his efforts to ensure the psychometric rigor, cultural appropriateness, and functional relevance of audiological assessments for Spanish-speaking populations across diverse regions.

The third presentation will be given by Dr. Raúl Sánchez López, former Editor-in-Chief of AUDITIO. He will examine his work on the feasibility and utility of cognitive screening using the Montreal Cognitive Assessment (MoCA) in Spanish hearing centers. This multicenter study, published in AUDITIO, suggests that approximately 30% of patients in routine audiological settings in Spain may present indicators consistent with possible cognitive impairment. This work highlights the importance of integrating cognitive screening within audiological care for Spanish-speaking populations and demonstrates how linguistically contextualized research can inform culturally responsive clinical pathways and interdisciplinary referral practices.

The final panelist will be Dr. José Juan Barajas del Prat, co-founder and former Editor-in-Chief of AUDITIO. Drawing on his recent contributions to the journal on auditory brainstem response (ABR) reliability and hearing-aid verification in Spanish-speaking populations, he will examine how objective measurements can support transparent and reproducible clinical decision-making. By incorporating signal-quality metrics into ABR interpretation and combining real-ear verification with speech audibility indices, his work demonstrates how clinical data can be translated into clear, evidence-based decisions. These contributions illustrate how regionally grounded scientific publishing can elevate standards of practice while maintaining accessibility for Spanish-speaking professionals.

Collectively, this session illustrates how a multilingual, open-access journal can contribute to scientific rigor, clinical innovation, and global collaboration.

Special Session 03

Spanish Association of Audiology - New Horizons in Audiology Publishing: Towards a Global, Open, and Multilingual Scientific Community

SS 03-3

Feasibility and Utility of Cognitive Screening in Spanish Hearing Centers: A Multicenter MoCA Study

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Authors: Raul Sanchez-Lopez[1], Jesús Valero-Garcia[2], Ana Barón Duque[3], Pilar San Martín Landa[4], Ana Rubio Griñán[5], Ana María Pérez Rodriguez[5], Paula Sánchez Fernández[6], Marlene Rodríguez-Ferreiro[7]

Background: As the link between hearing loss and cognitive decline becomes increasingly evident, audiology clinics represent a strategic frontline for early detection. However, cognitive screening is not yet a universal standard in clinical audiological practice. This study evaluates the feasibility and utility of the Montreal Cognitive Assessment (MoCA, v8.1) within independent Spanish hearing centers.

Methods: This multicenter, observational, cross-sectional study involved 131 participants (aged 56–96 years; mean 75.2; 48% male) attending routine audiological appointments, including first-time visits, fittings, or follow-ups for hearing aids and implants. Certified hearing aid specialists administered the MoCA alongside a comprehensive audiological battery (otoscopy, pure-tone audiometry, and speech audiometry) and a Cognitive Reserve Questionnaire (CRC).

Results: MoCA scores primarily clustered between 20 and 25. Using a conservative cutoff of <21 to indicate potential cognitive impairment, 31% of the sample scored below the threshold. Analysis of variance identified age, level of schooling, and maximum speech discrimination percentage as the most significant predictors of MoCA performance. While the degree of hearing loss and the morphology of the speech audiometry curve did not significantly affect the scores, the MoCA correlated moderately with Cognitive Reserve (R=0.54). Notably, participants with less than a secondary education scored significantly lower, highlighting the influence of educational demographics on screening outcomes.

Conclusions: The findings suggest that approximately 3 out of 10 patients in Spanish audiological settings may present some degree of cognitive impairment. The strong association between maximum speech discrimination and MoCA scores suggests that speech-in-quiet performance may serve as a clinical "red flag" for cognitive health. These data support the systematic integration of cognitive screening in audiology centers to enhance personalized rehabilitation and facilitate timely referrals to neurology or geriatrics.

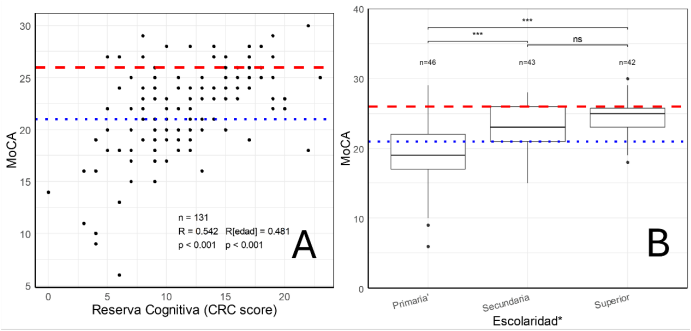


Figure Relationship between cognitive measures. Panel A: Scatter plot showing Cognitive Reserve Questionnaire (CRC) vs. Montreal Cognitive Assessment (MoCA) scores with Pearson correlation. Panel B: MoCA score boxplots by education level (*primary, illiterate, a

Special Session 04

International Evoked Response Audiometry Study Group -
The Potential of Potentials: What Auditory Evoked Potentials Can Tell Us About Hearing

SS 04-1

What can we learn from examining cases of mixed hearing loss in infants assessed following newborn hearing screening?

Lisa CALLAHAN

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Background: Mixed hearing losses present significant challenges for diagnosis and management in infants. The often-fluctuating conductive component can make establishing accurate air and bone conduction Auditory Brainstem Response (ABR) thresholds challenging, which in turn can affect the choice and application of appropriate management options. This study aimed to identify the numbers of children diagnosed with a mixed hearing loss following newborn hearing screening, examine whether there were any identifiable risk factors for mixed hearing loss in this population and to analyze the patterns of clinical results and reporting of mixed hearing loss for infants.

Methods: A retrospective database and file audit was undertaken for children seen for infant diagnostic hearing assessments by the Children's Audiology Service between January 2014 and December 2023. Relevant information was extracted from the files and databases, and analyzed descriptively.

Results: Mixed hearing loss was found to be a relatively rare outcome within the service, being found in approximately 2% of the infants seen for diagnostic hearing assessments following newborn hearing screening. 72% of the children with mixed hearing loss had one or more risk factors for permanent or long-term hearing loss. Mixed hearing losses typically required a high number of ABR thresholds to make an accurate and complete diagnosis. Reporting of mixed hearing losses can be challenging and inconsistent, especially where important information is incomplete or absent. There are several limitations to accurately diagnosing mixed hearing losses, including limited bone conductor intensity ranges and challenges with effective masking.

Conclusions: This outcomes of this audit have been used to inform quality improvement activities within the service, including allocation of clinicians to referrals, allocating additional time and appointments where initial assessments are suggestive of mixed hearing loss and upskilling clinicians on reporting the outcomes of mixed hearing loss appointments and counselling of families with mixed hearing loss.

Keywords: Mixed Hearing Loss, Diagnostic Hearing Assessment, Auditory Brainstem Response (ABR)

Special Session 04

International Evoked Response Audiometry Study Group -
The Potential of Potentials: What Auditory Evoked Potentials Can Tell Us About Hearing

SS 04-2

Preoperative assessment of auditory function using round-window and intracochlear eABR and the correlation to postoperative outcome

Martin WALGER

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Introduction: Preoperative recording of electrically evoked auditory brainstem responses (eABR) is a valuable method for assessing the functional status of the auditory nerve and brainstem in clinically difficult CI candidates with cochlear malformations, aplasia, or hypoplasia of the auditory nerve, post-vestibular schwannoma surgery, or severe forms of auditory synaptopathy/auditory neuropathy (AS/AN).
Methods: Preoperative eABR recording was performed in a clinical cohort of 14 patients with complex disorders, particularly following surgery for vestibular schwannoma/acoustic neuroma or severe forms of AS/AN. In all cases, electrical stimulation was performed extracochlearly via the round window niche and additionally in selected cases intracochlearly using the Auditory Nerve Test System (ANTS; MedEl company, Austria) with charge-balanced square pulses. Electrical stimulation was performed either with the freely programmable ISIS neurostimulator (inomed company, Germany) or via the Maestro stimulation software (MedEl company, Austria).
Results: The eABR thresholds, the detectability of waves eII, eIII, eV, and the suprathreshold behavior of the waveforms were used to evaluate the eABR classification according to the Gibson Score [1]. The postoperative results of speech perception (Freiburger monosyllable comprehension test) at three months after initial fitting showed a significant correlation to the Gibson Score. Further evaluation of the postoperative outcome is ongoing.
Conclusions: The results of eABR support the indication for CI provision in difficult cases and at the same time provide valuable prognostic information for the rehabilitation outcome after cochlear implantation.

References:
[1] Gibson WP, Sanli H, Psarros C. The use of intra-operative electrical auditory brainstem responses to predict the speech perception outcome after cochlear implantation. Cochlear Implants Int. 2009;10 Suppl 1:53-7. doi: 10.1179/cim.2009.10.Supplement-1.53. PMID: 19142884.

Special Session 04

International Evoked Response Audiometry Study Group -
The Potential of Potentials: What Auditory Evoked Potentials Can Tell Us About Hearing

SS 04-3

Intracochlear electrocochleography and electrically evoked auditory brainstem responses in patients with auditory neuropathy spectrum disorders

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Purpose: The aim of this study was to evaluate the applicability of intracochlear electrocochleography (ECochG) and electrically evoked brainstem response (eABR) registration after cochlear implantation (CI) for revealing electrophysiological features of different forms of auditory neuropathy spectrum disorders (ANSD) and predicting rehabilitation outcomes.
Material and methods: 22 children with ANSD of different etiology were enrolled in the study. Intracochlear ECochG and eABR registration after CI were performed in 23 ears. Registration of eABR was performed using specific for certain CI system programming software and hardware and clinical system for the registration of evoked potentials.
Results: Cochlear microphonic was recordable in 21 cases. The summating and compound action potentials were recordable in 7 cochlear implant users. There was diversity in ECochG results within the group of children with the same etiology of ANSD. On the other hand, there were cases when ECochG results were almost identical even in patients with different etiology and pathophysiology of ANSD.
The eABRs were registered in 7 children with OTOF-related ANSD and in 9 children with perinatal risk factors. Presence of eABRs in OTOF-related cases matches the pathophysiology of auditory synaptopathy. In 3 ears with hypoplastic cochlear nerve eABRs were absent or partially recordable only in bipolar mode of stimulation of basal turn. In children with unknown etiology in 2 cases eABRs were recordable from all stimulated electrodes (auditory synaptopathy) and in other 2 cases were absent (auditory neuropathy). Rehabilitation outcomes after CI corresponded to the results of eABR registration and were better among children with eABRs and were better among children with eABRs.
Conclusions: Intracochlear ECochG does not provide a reliable differentiation of different types of ANSD. Registration of eABRs in monopolar stimulation mode is valuable for differentiating ANSD types and predicting outcomes of cochlear implantation in children with ANSD.

Keywords: Auditory Neuropathy Spectrum Disorder; Electrocochleography; Electrically Evoked Brainstem Responses; Cochlear Implantation.

Special Session 04

International Evoked Response Audiometry Study Group -
The Potential of Potentials: What Auditory Evoked Potentials Can Tell Us About Hearing

SS 04-4

Sensitivity to changes in interaural phase as a function of frequency: Comparison of age effects measured with behavioral and electrophysiological tasks

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Temporal fine-structure processing, as measured with binaural tasks, has been shown to decline with increasing age in adults. The purpose of this study was to determine whether an electrophysiological test of binaural temporal processing could be used as a proxy measure for behavioral performance to reliably capture this age dependence.

The behavioral measure was the upper frequency limit for differentiating in-phase from out-of-phase tones. This was assessed in both quiet and in background noise. The electrophysiological measure was the acoustic change complex elicited by epochs of interaurally out-of-phase frequency modulation carried by tones of different frequencies. Adults with normal/near-normal hearing were tested on both measures. There were 20 participants in each of the three age groups categorized as young, middle-aged, and older.

The upper frequency limit measured behaviorally declined with age, as found in previous studies. It also declined in the presence of background noise, but the noise effect was equivalent across age groups. The robustness of the acoustic change complex also declined with age and as a function of the carrier frequency.
However, correlations between the behavioral and electrophysiological measures were modest at best, suggesting that the electrophysiological test as implemented in this study did not provide a robust proxy for behavioral performance.

Special Session 04

International Evoked Response Audiometry Study Group -
The Potential of Potentials: What Auditory Evoked Potentials Can Tell Us About Hearing

SS 04-5

Use of Cortical Auditory Evoked Potentials in Cochlear-Implanted Children

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Introduction: Early cochlear implantation (CI) in children with severe-to-profound hearing loss requires reliable methods for objectively validating device programming. Measuring implant performance in very young children can be challenging, as behavioral assessments are often limited. Automated cortical auditory evoked potentials (CAEPs) provide an objective measure of auditory perception in young cochlear-implanted children, complementing these behavioral tests. CAEPs not only help to confirm adequate device function but also guide audiologists in adjusting CI settings.

Objective: To determine the feasibility of recording CAEPs in pediatric CI recipients at their follow-up visit, identify methodological challenges in clinical implementation, and assess how CAEP outcomes may help ensure optimal implant function and programming.

Methods: This retrospective study included children implanted before 25 months of age in a specialized cochlear implant center between 2021 and 2025. Cortical recordings were performed using either the HearLab™ device or the Duet® (IHS) system, with stimuli presented at 65 dB SPL.

Results:Most of the children successfully completed testing, and demonstrated at least one identifiable cortical response. The primary challenges included poor cooperation in some children (movement, distraction) and electrical artifacts linked to CI stimulation. Interpreting absent CAEP responses proved complex, particularly due to progressive mapping protocols in early-implanted children. Although 70–80% of early-implanted children ultimately achieve language skills comparable to their hearing peers, approximately 20–30% face persistent linguistic difficulties. CAEPs offer objective insight into the quality of cortical auditory stimulation, which is crucial for language development.

Conclusion: Integrating CAEPs into routine clinical follow-up of young cochlear-implanted children is feasible and may allow clinicians to identify those at higher risk of delayed language outcomes. By reassuring families about device functionality and assisting audiologists in fine-tuning CI settings, CAEP-based protocols have the potential to optimize rehabilitation strategies and improve language development

Keywords: CAEPs, Cochlear Implant, fitting

Special Session 04

International Evoked Response Audiometry Study Group -
The Potential of Potentials: What Auditory Evoked Potentials Can Tell Us About Hearing

SS 04-6

Rhythmic priming of phonetic perception in the context of aural rehabilitation: Electrophysiological responses to a prime that compensates for cochlea delay

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Background: Frequency-dependant transmission delay in the cochlear, can be counteracted with chirps which have an adjuvant effect on ABR amplitudes. As the upper auditory brainstem is also implicated in the precise transfer of afferent timing information, this study explores whether chirps could be used to prime phonetic perception and thus be useful in the context of aural rehabilitation. Specifically, trains of CE-chirps were used to prime a phonetic syllable discrimination task.

Methods: 64-channel EEG data was acquired from participants (N=14) performing a vowel quantity discrimination task. Priming conditions were: 1) Regular, where CE-chirps were presented at an isochronous SOA of 45 ms, which was also the salient durational difference in the discrimination stimuli; 2) Random, where chirps were randomly distributed in the priming window; and 3) pink noise only. Behavioural, sensor (electrode) and source level (auditory alpha clusters based on Equivalent Current Dipoles) measures were derived and electrophysiological results focused on a 3 sec poststimulus maintenance period.

Results: Behavioral results showed no effect of priming condition but significantly lower discrimination accuracy when the syllables were different in duration. Sensor-level analyses, from FCz and Global Field Power, showed no effect of priming or syllable pair. An auditory α cluster localized to the left Medial Temporal Gyrus (MTG, Brodmann Area 21) showed a divergence in event-related spectral perturbation results whereby there was synchronization in the noise only condition and desynchronization for both chirp conditions.

Conclusion: These results indicate that perceptual priming, based on chirps that compensate for cochlear temporal dispersion, influences the cortical processing involved in the maintenance of a speech discrimination task. This may be due to upregulation of subcortical instances of the auditory pathway, or the prime influencing phonological buffering in the left MTG.

Keywords: speech perception, electrophysiology, perceptual priming

Special Session 05

Brazilian Academy of Audiology - Ears of Tomorrow: Advances in Child Auditory Behavior Research in Brazil

SS 05-1

Integration between Auditory Processing and Executive Functions in Childhood

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Auditory processing involves the interpretation and communication of auditory information. There is ongoing debate about whether it represents a distinct construct from cognition or whether there is substantial overlap between the two. Central Auditory Processing Disorder (CAPD) primarily affects children and is highly prevalent among individuals diagnosed with learning difficulties such as dyslexia, attention deficit hyperactivity disorder. However, CAPD can also affect adults of all ages due to multiple etiologies, including cerebrovascular disease, neurotoxicity, and neurodegeneration.

Listening effectively under adverse acoustic conditions remains a frequent complaint among individuals with auditory processing difficulties. In some cases, these challenges stem from reduced signal audibility caused by peripheral hearing loss or masking effects of background noise. Nevertheless, researchers acknowledge the role of higher-level executive functions, particularly the interaction between central auditory and cognitive systems.

Central auditory processing refers to the perceptual processing of auditory information by neural centers and transmission pathways between the cochlea and the primary auditory cortex. Cognitive processing involves cortical-level information processing, including memory, speed, and language functions. Together with peripheral hearing mechanisms, these processes enable a listener to "hear" and to "listen"—attending to signals, extracting relevant information, interpreting meaning, reflecting, and responding.

Several studies suggest a high comorbidity between CAPD and other neurodevelopmental disorders. Given the complexity of the relationship between auditory processing and cognition, this topic has been the focus of extensive research. Studies indicate that cognitive deficits—such as impairments in working memory and attention—may exacerbate the difficulties experienced by children with auditory processing disorders.

For these reasons, continued discussion and further research are crucial to clarifying the intricate interactions between auditory and cognitive processing.

Special Session 05

Brazilian Academy of Audiology - Ears of Tomorrow: Advances in Child Auditory Behavior Research in Brazil

SS 05-2

From structure to function in childhood: How ear development shapes acoustic absorbance and DPOAE components

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This study investigated how structural and functional maturation of the auditory periphery influences wideband absorbance (WBA) and otoacoustic emission (OAE) measures during childhood. Children aged from 6 days to 11 years and 10 months with normal hearing were evaluated across five age groups. Measurements included wideband tympanometry (WBT), transient-evoked otoacoustic emissions (TEOAE), and distortion product otoacoustic emissions (DPOAE) using the Interacoustics Titan and ER10X.

Results revealed consistent age-related changes in outer and middle ear acoustic properties. Equivalent ear canal volume and middle ear resonance frequency increased significantly with age, stabilizing after 3–5 years. WBA showed greater energy absorbance at low (250–600 Hz) and high (8000 Hz) frequencies in newborns, decreasing progressively through childhood. Both TEOAE and DPOAE levels and components were highest in newborns and 6–8-month-olds, declining with age, particularly above 2000 Hz.

Correlational analyses demonstrated that larger ear canal volumes were moderately associated with lower OAE amplitudes, while higher WBA values positively correlated with stronger TEOAE and DPOAE responses at mid-to-high frequencies (2000–5000 Hz). These findings suggest that part of the developmental reduction in OAE amplitude may reflect changes in energy transmission through the maturing ear canal and middle ear rather than purely cochlear factors.

Overall, this work highlights the strong interdependence between structural maturation of the outer and middle ear and functional OAE outcomes, emphasizing the need for age-specific reference data in pediatric auditory assessment.

Special Session 05

Brazilian Academy of Audiology - Ears of Tomorrow: Advances in Child Auditory Behavior Research in Brazil

SS 05-3

Overcoming Barriers: Strategies to Improve Early Intervention Adherence in Low-Income Families with Hearing-Impaired Infants

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Family engagement plays a crucial role in the therapeutic process of children with hearing impairment, significantly influencing the development of auditory and language skills, particularly during early childhood. One of the major challenges in pediatric auditory rehabilitation is non-adherence to the consistent use of electronic hearing devices. Evidence indicates that children need to use these devices for at least 10 hours daily to ensure adequate access to speech sounds. Consequently, there is growing consensus on the importance of monitoring daily usage and measuring auditory dosage, which includes unaided audibility—particularly relevant for mild and moderate hearing losses.

At the Center for Hearing in Children (CeAC), a public service in Brazil for diagnosing and rehabilitating children with hearing impairment, several challenges have been observed among low-income families. Expectations regarding rehabilitation outcomes are often low, and the benefits of amplification are not immediately evident in infants and young children. Additional barriers include maternal education, difficulty understanding written materials, cultural differences between families and professionals, travel distance, and the presence of multiple disabilities. Consistent attendance at therapy sessions remains a significant challenge despite positive experiences with parental support groups.

To address these issues, in 2025 CeAC implemented remote follow-ups via WhatsApp, supported by artificial intelligence, to deliver answers, videos, and educational materials to families. Given Brazil's widespread mobile phone use, this approach aligns with the Ministry of Health's recommendations. The presentation will discuss the effectiveness of remote communication in improving family engagement, therapy attendance, and consistent device use compared to data collected before implementation.

Special Session 05

Brazilian Academy of Audiology - Ears of Tomorrow: Advances in Child Auditory Behavior Research in Brazil

SS 05-4

"FROM DETECTION TO INTERVENTION IN NEWBORNS: A BRAZILIAN EXPEIRIENCE"

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In 2022 Brazil had 2,54 million live births. It was the lowest number of births in the last 45 years. Our goal is to reach Newborn Hearing Screening (NHS) for all children born in maternities and hospitals before discharge. Although Brazil has a federal law demanding all children to have hearing screening, according to the Ministry of Health, around 43% of all babies are screened at birth. São Paulo city is the biggest town in Brazil, and city secretary of health has implemented a structured program in 2010, for Universal Newborn Hearing Screening, followed by hearing assessment, and intervention when necessary. In this presentation it will be shown results collected from 75,969 newborns from São Paulo city. Results for NHS, Hearing Assessment and Loss to Documentation and Follow up will be shown. The data show 0,13% of Loss to Documentation, and 99,87% of coverage for NHS. Low risk babies had 32,1% normal hearing; 22,7% conductive hearing loss; 45,2% sensorioneural hearing loss and no Auditory Neuropathy Spectrum Disorders. For High-Risk babies 30.7% had normal hearing, 36% conductive hearing loss; 29,3% sensorioneural hearing loss; and 4% Auditory Neuropathy Spectrum Disorders. The efforts to increase the coverage of NHS in Brazil are being held by scientific societies, together with the Ministry of Health. New guidelines are being published by 2025 and will be shown at the end of this presentation.

Special Session 05

Brazilian Academy of Audiology - Ears of Tomorrow: Advances in Child Auditory Behavior Research in Brazil

SS 05-5

Hearing and Balance in Children: Diagnostic Challenges in Hyperacusis, Tinnitus, and Vestibular Assessment

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Hyperacusis, tinnitus, and dizziness are increasingly recognized in children, yet their clinical presentation and underlying mechanisms remain poorly understood. In pediatric populations, particularly in Brazil, these conditions are underdiagnosed due to the scarcity of validated assessment tools and standardized diagnostic criteria. This research program aims to address these gaps by developing and validating protocols for the early identification and differential diagnosis of auditory hypersensitivity, tinnitus, and vestibular dysfunction in children.

The studies include translation, cultural adaptation, and psychometric validation of international instruments assessing auditory perception, sound tolerance, and tinnitus characteristics. In parallel, pilot studies are being conducted to develop pediatric-specific audiological and vestibular assessment protocols, integrating behavioral, physiological, and self-reported measures. A key focus is the correlation between subjective complaints (e.g, tinnitus perception and sound discomfort) and objective parameters of auditory and balance function, aiming to clarify their neurophysiological and functional bases.

The expected outcomes include the establishment of normative data for Brazilian children, the validation of reliable diagnostic instruments, and the generation of reference parameters to support clinical decision-making. By contributing to the standardization of diagnostic procedures in Speech-Language Pathology and Audiology, this research seeks to enhance the precision and effectiveness of clinical interventions. Ultimately, the findings will support the implementation of evidence-based screening, diagnostic, and follow-up protocols, improving early identification and management of auditory and vestibular disorders in children.

Special Session 05

Brazilian Academy of Audiology - Ears of Tomorrow: Advances in Child Auditory Behavior Research in Brazil

SS 05-6

Language Environment Analysis (LENA) system as a tool for analyzing turn-talking and home auditory environment.

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Auditory rehabilitation goes beyond the use of electronic devices. Family guidance and an acoustically appropriate home environment play a fundamental role in language development. In this context, the Language Environment Analysis (LENA) system emerges as an important tool to support the assessment of child's linguistic environment. LENA helps quantify adult–child conversational turns, the amount of speech exposure between adults and children, and the overall acoustic characteristics of the environments in which the child lives. Information such as the presence of environmental noise, electronic media (e.g, televisions and radios), periods of silence, and the quality of auditory input are essential indicators for understanding and guiding the development of language and communication skills. These factors provide valuable insights for planning effective intervention strategies in auditory and language rehabilitation.

This study used the Language Environment Analysis (LENA) system to assess the auditory and linguistic environment of children with hearing loss. A total of 30 children with hearing loss ranging from mild to profound degree participated in the study. The children were between 18 and 60 months of age,

All recordings were carried out on a weekend day, in order to capture a typical family communication environment. Each child wore the LENA recording device for an average duration of 16 hours, covering most of their daily routine. The recordings were automatically processed by the LENA software, which generated quantitative measures related to speech exposure, conversational interaction, and acoustic characteristics of the environment.

The results indicated that the overlap index was higher than the indices related to background noise and distance. This finding suggests that overlapping speech occurred more frequently in the children's language environments than interference caused by environmental noise or speaker distance.

In conclusion, the LENA system proves to be a valuable tool for supporting family guidance, particularly in relation to conversational turn-taking and the quality of the home environment. By providing objective data on distance, background noise, silence, overlap, and mindful versus non-mindful auditory input, LENA offers insights that extend beyond the clinical setting. These measures help professionals and families better understand everyday communication dynamics, allowing for more informed guidance and strategies that promote richer, more effective interactions in the child's natural environment. This broader perspective strengthens family involvement and enhances the continuity between clinical intervention and daily life.

Special Session 06

French Society of Audiology
SS 06-1

Exploring the Mechanisms Underlying Third Window and Related Abnormalities

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Third mobile window syndromes arise from defects or low-impedance regions in the otic capsule beyond the physiologic oval and round windows, creating an abnormal "third window" that alters inner-ear fluid dynamics and audiovestibular function. The resulting shunting of perilymphatic pressure explains the hallmark clinical features — a pseudo-conductive low-frequency air-bone gap, enhanced bone conduction, autophony, and sound/pressure-evoked dizziness or vertigo — across a broad spectrum of anatomical variants.

Anatomical and Radiological Classification: Why It Matters

Our group proposed a unitary anatomo-clinical and radiological classification of Third Mobile Window Abnormalities (TMWA) that encompasses all known variants of otic capsule dehiscence (OCD), including:

Extralabyrinthine OCDs (true dehiscences) — e.g, superior semicircular canal dehiscence (SSCD), posterior semicircular canal dehiscence;

Intralabyrinthine TMWA-like abnormalities mimicking third window physiology without clear CT evidence;

Multiple and CT-negative variants, recognizing complex presentations where symptoms occur with minimal radiologic change.

This classification is essential because an ever-increasing number of lesser-known OCD variants have been documented — extending well beyond SSCD — and all share common audiovestibular signatures due to reduced local hydrodynamic resistance.

Spectrum of Variants and Clinical Implications

The third window concept now includes a spectrum of otic capsule defects, involving:

Semicircular canal dehiscences (superior, posterior, lateral);

Vascular contacts with labyrinthine structures;

Cochleo-facial nerve dehiscence (CFD) and other peri-petrosal variants;

CT-negative or near-dehiscence areas with similar physiology;

Enlarged vestibular aqueduct and other atypical presentations.

Patients with multiple ipsilateral dehiscences are not rare — nearly 18–20 % in systematic CT reviews — and often present with higher symptom burdens than those with a single classic dehiscence.

Surgical Challenges and Treatment Failure

The existence of multiple weak areas of the otic capsule can be a key mechanism underlying surgical failure. In our monocentric series, many patients with a confirmed SSCD who underwent standard plugging experienced poor or disappointing postoperative outcomes, often because additional lesser-known OCDs were overlooked preoperatively.

Thus, comprehensive radiologic evaluation — including high-resolution CT with tailored multiplanar reconstructions — is crucial to identify all potential low-impedance areas. Recognizing these multiple vestibular and cochlear dehiscences before surgery can alter the therapeutic strategy, potentially combining repairs or adopting different approaches to avoid residual or recurrent symptoms.

Clinical and Diagnostic Integration

Integrating the classification into clinical practice helps to:

Systematize diagnosis and reduce underdiagnosis of non-SSCD third window abnormalities;

Improve selection of candidates for intervention;

Provide a framework for predicting and preventing surgical failure in complex third window cases;

Guide ENT surgeons and radiologists toward a more targeted HRCT interpretation and multidisciplinary planning.

Special Session 06

French Society of Audiology
SS 06-2

Contribution of functional and ASL MRI in exploring the central processing of sound information in groups of hearing-impaired children

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State of the art:
Sensory deprivation such as deafness can cause changes in the organization of cortical maps.
In addition, some children have central hearing disorders without the mechanisms involved being fully understood.
ASL magnetic resonance imaging allows us to compare the perfusion of the brain at rest in groups of deaf children with that of age-matched groups of hearing children.

Objective:
Does ASL MRI provide a better understanding of the central mechanisms associated with hearing loss?

Studies :
Through a retrospective study, we aimed to investigate differences in cerebral blood flow (CBF) at rest prior to implantation in children with congenital deafness compared to normally hearing children. While temporal perfusion increased with age in normally hearing children, it remained stable in deaf children. We showed a critical period around 4 years old, where in the context of auditory deprivation, there is a lack of synaptic activity in auditory regions. These results support the benefits of early cochlear implantation to maximize the effectiveness of auditory rehabilitation and to avoid cross-modal reorganization (Coez et al, 2019).

Through a prospective study, we aimed to explore differences in cerebral blood flow at rest in children with isolated auditory processing disorder (Ga) compared to normally hearing children (Gc). Individual 3D T1 MRIs did not reveal any anatomical abnormalities, nor did voxel-by-voxel (VBM) group analysis. However, in ASL MRI, the Ga compared to the Gc, showed hyperperfusion at rest in right frontotemporal regions (Rouillon et al, pending conclusion).

Conclusion:
These two studies of groups of children demonstrate the value of an ASL sequence in the imaging assessment requested during a pre-implantation assessment or for central hearing disorders, in order to better understand the central mechanisms involved. The definition of strict inclusion criteria (isolated auditory processing disorder without other comorbidities) proved to be a crucial point in the analysis of the data. The causes of hearing loss in children are increasingly well documented genetically. ASL MRI imaging would allow for more specific exploration of the differences in expression of each of these genes in the organization of the central nervous system.

Special Session 06

French Society of Audiology
SS 06-3

Hearing aids fitting on children with APD: A correlation between PROMs and amplification

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Since 2019, a cohort of 24 children with APD has been monitored in the child audiophonology unit of the Necker Hospital by a multidisciplinary team. These children have all benefited from a bilateral hearing aid fitting which has been assessed by a battery of central hearing tests and PROMs, whose results only rarely reflect the improvement felt by the children and confirmed by the PROMs offered to the children and their parents. It seemed therefore relevant to compare the modes of prosthetic fitting of these children by studying the levels of amplification, the acoustic coupling and the use or not of an HF microphone. We'll present our results and try to find correlations with their age, the results of the Data-Logging and those of the PROMs we used.

Special Session 06

French Society of Audiology
SS 06-4

Gene Therapy for Deafness: Current Targets and Clinical Implementation

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Gene therapy for hearing loss has transitioned from experimental promise to clinical reality. The first FDA-approved treatment for congenital deafness targets OTOF mutations causing auditory neuropathy, marking a fundamental shift from compensatory devices to biological restoration. This presentation examines which genetic forms of deafness are currently treatable, the practical challenges of implementation, and the necessary changes to clinical practice.

OTOF-Related Auditory Neuropathy
The AAV-OTOF gene therapy represents the breakthrough treatment for children aged 12 months to 18 years with biallelic OTOF mutations. Clinical trials demonstrate remarkable outcomes, with word recognition improving from 4% to 60% post-treatment in some patients. The therapy works by delivering functional otoferlin protein to inner hair cells, restoring synaptic transmission between hair cells and auditory nerve fibers. This addresses auditory neuropathy at its biological source rather than bypassing the damaged system as cochlear implants do.

Other Targets in Clinical Development
DFNB9 mutations affecting auditory neuropathy spectrum disorder are currently in clinical trials, particularly in collaboration with research institutions like Institut Pasteur. GJB2-related connexin deficiencies, which account for a significant proportion of genetic hearing loss, are being investigated as potential targets. TMC1 mutations affecting hair cell mechanotransduction represent another promising avenue. These genetic targets share a common characteristic: they affect specific, well-understood biological pathways amenable to gene replacement or augmentation strategies.

Near-Future Expansion
The therapeutic landscape will expand significantly over the next 3-5 years. Hair cell regeneration therapies using ATOH1 or Math1 gene delivery could address sensorineural hearing loss more broadly. Syndromic forms including Usher syndrome and Pendred syndrome are under investigation. Perhaps most dramatically, preventive therapies for age-related and noise-induced hearing loss are in early development. Technological advances include improved AAV vectors with enhanced cochlear delivery efficiency, CRISPR-based approaches for permanent genetic correction, and extended therapeutic windows allowing treatment beyond the current narrow age ranges.

Clinical Considerations
Patient selection requires comprehensive genetic screening to identify appropriate candidates. The timing of intervention is critical—treatment must occur within specific developmental windows when the auditory system remains plastic. Safety considerations include immunogenicity risks, potential off-target effects, and long-term monitoring requirements. Surgical delivery via intracochlear injection demands specialized training and carries inherent risks to cochlear structures. These technical challenges necessitate centralization of care in specialized, high-volume centers with multidisciplinary expertise.

Transforming Clinical Practice
Universal newborn genetic screening programs must be implemented to identify candidates during the narrow therapeutic window. Rapid diagnostic pathways are essential—confirmation cannot wait months as with traditional genetic counseling timelines. Multidisciplinary teams integrating geneticists, audiologists, ENT surgeons, and rehabilitation specialists become mandatory rather than optional. Counseling protocols require complete revision to include gene therapy as a treatment option alongside traditional interventions.

Integration with Existing Technologies
Gene therapy is not replacing cochlear implants but creating a complementary treatment tier. For appropriate candidates, sequential strategies may involve gene therapy followed by implantation if residual deficits persist. This approach preserves cochlear anatomy for future interventions while potentially enhancing outcomes through biological restoration of auditory pathways. The decision tree becomes more complex, requiring sophisticated assessment of genetic profiles, residual hearing, and individual prognosis.

Timeline and Realistic Expectations
Short-term (2025-2026), expect limited rollout in specialized tertiary centers with established patient registries and rigorous outcome tracking. Clinical guidelines and standardized protocols are under development but remain provisional. Medium-term (2027-2030), expansion to additional genetic targets and broader geographic availability across major medical centers is anticipated. Integration into standard treatment algorithms will occur gradually as long-term safety and efficacy data accumulate. Widespread accessibility remains years away, constrained by cost, technical complexity, and the need for specialized infrastructure.

Special Session 06

French Society of Audiology
SS 06-5

COCHLEAR IMPLANTATION IN ADULTS WITH AUDITORY NEUROPATHY SPECTRUM DISORDER: AUDITORY OUTCOMES AND PROGNOSIS FACTORS

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Background: Most studies on cochlear implantation (CI) in patients with auditory neuropathy spectrum disorder (ANSD) focused on paediatric populations, and reported improvements in speech intelligibility and language acquisition in 50 to 94% of cases; In contrast, research on adults is spare. The objective of this retrospective study was to evaluate the auditory outcomes and prognostic factors of CI in adult patients diagnosed with ANSD.
Methods. Thirty-one adults with confirmed ANSD, who underwent CI were included. Audiological outcomes were measured before and 6, 12, and 24 months after CI in quiet and noise, and patients were arbitrarily divided into good (>50% speech scores at 1-year in quiet) and poor performers. Pre- and post-implantation data were analyzed to identify prognostic factors for good performance.
Results. The mean age at CI was 47±17 years, with a follow-up of 6±0.7 years. At 1-year post-implantation, the mean speech intelligibility in quiet improved significantly by 40±6.3% from preoperative baseline. For the good performers (n=16), speech intelligibility in quiet and in noise increased as early as 3 months post-implantation to reach 78±3.9% in quiet and 75±7.1% in noise at 1-year post-implantation. In contrast, poor performers (n=15) did not improve their scores. Patients with post-synaptic ANSD seemed to have poorer outcomes, although it did not reach significance.
Conclusion. Despite the challenges, CI remains a viable option for adult patients with ANSD, with nearly half of the population demonstrating improvements in speech intelligibility, in quiet and in noise. However, the patient must be informed that the result is not guaranteed.

Special Session 06

French Society of Audiology
SS 06-6

Efficacy of lip-reading training in adults with acquired hearing loss: A study in Single Case Experimental Design

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Context and objectives.
Most adults with postlingual hearing loss use visual information to help them with lip reading. (Delmas et al, 2025) This skill can be trained with speech therapists. So far, there is no evidence in the literature of lip reading training's efficacy. (Prat dit Hauret et al, 2022). Hence, the study's main objective is to show the efficacy of a standardised lip reading training on visual speech understanding. The secondary ones are to show improvement on audiovisual speech understanding and on communication in daily life.
Methods.
A rehabilitation program consisting of 24 sessions, comprising 72 exercises, was developed. Exercises were on visual speech only, audiovisual speech in noise and auditory-cognitive. To show its efficacy, an AB Single Case Experimental Design (SCED) was adopted. SCED are prospective methods characterized by extensive repetition of outcome measurements over time — before, during, and after the targeted intervention. This type of methodology provides a high level of evidence (Centre for Evidence Based Medicine d'Oxford, 2011). One of its main advantages is that it requires only a small number of patients, as each individual serves as its own control. Data analysis is based on a combination of visual representations and specific Bayesian statistical methods. (Krasny-Pacini & Evans, 2018) (Manolov & Rochat, 2024). The first phase (baseline) comprised 6 to 8 sessions (length randomly determined) of auditory-cognitive training only. The second one (intervention) consisted of 16 sessions of lip reading training. At each session, visual, auditory and audiovisual assessments were conducted to monitor changes in performance over time. A goal attainment scale (GAS) was also used to address the specific needs of each patient.
Musical sequence discrimination served as a control task. Patients with severe visual or cognitive disorders or with severe tinnitus were not included in the study. Six patients were included in the study. All were women aged 49 to 85 years old (mean=72.5 y.o.) with various aetiologies (Menière disease: 2, Otosclerosis: 1, Age-related hearing loss: 1, Unknown: 2). Two presented with moderate hearing loss and 4 with severe hearing loss. All participants have been wearing hearing aids daily (at least 8 hours per day) for a minimum of 6 months.
Results.
The intervention is ongoing; results will be presented at the WCA congress.
Conclusion.
In audiology, randomized clinical trials can be difficult to conduct due to small and heterogeneous patient populations. As a result, the use of experimental designs based on individual treatment effects is increasing in audiology (Taoui et al, 2023). To our knowledge, this study is the first to apply a single-case experimental design to demonstrate improvement following speech therapy in hearing-impaired patients.

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Special Session 06

French Society of Audiology
SS 06-7

Assessment of listening effort and cognitive fatigue before and after cochlear implantation in adults

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Introduction: A large number of cochlear implanted adult patients develop very satisfactory speech integration abilities in quiet and moderately noisy environments in the months following cochlear implantation. However, understanding speech in complex listening situations (ambient noise, competing voices, and unfamiliar speakers) often remains difficult and requires increased listening effort and cognitive fatigue, which can have multiple consequences. The aim of this study is to measure changes in listening effort and cognitive fatigue before and after cochlear implantation, as well as the links with auditory, communicative, and social abilities.

Methods: 77 patients (44 women and 33 men, average age = 58 years) with severe to profound progressive hearing loss who had undergone unilateral or bilateral cochlear implantation with a minimum of 12 months of post-implant follow-up were included in this retrospective study. Data from auditory perception tests, communication and social interaction assessment scales, and listening effort and quality of life questionnaires were analyzed before cochlear implantation and 12 months after implantation.

Results: Listening effort and cognitive fatigue decreased significantly one year after cochlear implantation for all patients ($p<0,001$). Furthermore, the intensity of listening effort experienced by patients before cochlear implantation correlated with their self-assessment of quality of life ($r = -0,65$, $p <0,001$) but this was not the case one year after implantation. Finally, no correlation was observed between listening effort and hearing or communication abilities before and after cochlear implantation.

Conclusion: Listening effort and cognitive fatigue decrease following cochlear implantation, but there are significant interindividual variations that appear to be related to intrinsic and extrinsic factors specific to each individual's personality and environment. The development of new tools enabling a more precise assessment of these factors could improve multidisciplinary care for listening effort and help optimize auditory rehabilitation.

Special Session 06

French Society of Audiology
SS 06-8

From Data to Practice: How Machine Learning Improves Hearing Aid Efficacy in Real-World Settings

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Objective:
To evaluate the effectiveness of hearing aid fitting in improving speech intelligibility in quiet and noise, and to identify the key predictive factors influencing hearing aid outcomes using a large-scale, data-driven approach.

Methods:
A retrospective cohort study was conducted using audiological data collected between 2018 and 2021 from 77,661 adult hearing aid users fitted in a nationwide network of hearing care centers. Speech perception outcomes were assessed using standardized speech-in-quiet (SPIQ) and speech-in-noise (SPIN) tests, comparing unaided and aided conditions. Machine learning analysis was performed using eXtreme Gradient Boosting (XGBoost) to identify predictive factors of hearing aid outcomes. Feature importance and individual factor contributions were explored using SHapley Additive exPlanations (SHAP) values.

Results:
Hearing aid fitting resulted in significant improvements in speech intelligibility, with an average gain of 11 dB for speech reception threshold in quiet and 3.1 dB signal-to-noise ratio in noise. The analysis revealed that outcomes were strongly influenced by hearing aid technology level, fitting parameters—particularly amplification around 2 kHz—and patient adherence to device use. Binaural loudness balancing emerged as a systematically beneficial factor across all degrees of hearing loss, with a pronounced effect on speech understanding in noise. Daily hearing aid use exceeding nine hours was associated with significantly better outcomes, especially in patients with moderate-to-severe hearing loss.

Conclusion:
This large-scale machine learning analysis demonstrates the relevance of big data approaches for evaluating hearing aid outcomes and identifying clinically meaningful predictive factors. Beyond device technology, the expertise of the hearing care professional—through personalized fitting strategies and follow-up—plays a critical role in optimizing patient benefit. These findings support the development of more personalized, evidence-based hearing rehabilitation strategies.

Special Session 07

German Society of Audiology - Audiological Care and Cochlear Implant Provision in Germany

SS 07-1

Prevalence of hearing loss in individuals with intellectual disabilities: A population-based long-term study

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Background: Previous studies have suggested that the prevalence of hearing loss in individuals with intellectual disabilities (ID) is 5- to 10-fold higher than in the age-matched general population (e.g. Evenhuis et al. 2003). Such hearing impairments often remain undetected and untreated. A German cohort study investigated the prevalence of hearing loss across all age groups, as well as the feasibility, benefits, barriers, and costs of an outreach program offering repeated hearing screenings, diagnostics, interventions, and follow-up monitoring in the everyday environments of individuals with ID. This program was compared with standard care and with an invitation-based program conducted in a clinical setting (Neumann et al. in preparation).

Methods: A total of 1,053 individuals with ID aged 1–90 years from 158 institutions (e.g. schools, daycare centres, residential and vocational facilities) received hearing screenings and reference measurements in their daily living environments. If a screening was failed, further audiological diagnostics were performed, followed by initiation of treatment, referral for external diagnostics, or monitoring of an existing intervention. A control cohort of 141 individuals was invited to undergo the same procedures in clinical settings. The entire program was repeated after one year to assess outcomes. Prevalence rates, comorbidities of hearing loss, and hearing-related quality of life were evaluated.

Results: In the outreach cohort, hearing loss was diagnosed in approximately 44% of participants. About 68% of these cases had previously been unknown, and 90% were un- or undertreated. In one third of cases, neither the individuals themselves nor their caregivers suspected any hearing problem (Zielonkowski et al. 2025). Screening and diagnostic procedures yielded conclusive results in 96% of cases. Screening specificity was 96.4%, and sensitivity was 98.0%. None of the invited individuals in the control cohort participated in the screening.
The prevalence of hearing loss varied by age (ca. 30% among children aged 1–6 years, ca. 32% among school-aged children and adolescents, and ca. 66% among adults) and by type of facility—for example, 82% in adult residential homes. Recommended interventions were implemented in only a minority of cases, such as 33% of prescribed hearing aids.
Discussion and Conclusion: The high prevalence of hearing loss across all age groups and the inadequate care situation call for universally and regularly implemented outreach programs offering hearing screenings, diagnostics, interventions, (re)habilitation, and ongoing monitoring for individuals with ID. To ensure the successful implementation of such programs, however, comprehensive education for professionals, caregivers, family members, and society as a whole is essential to raise awareness of hearing challenges, the importance of hearing testing, and appropriate ear and hearing care in the social environments of people with ID.

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Special Session 07

German Society of Audiology - Audiological Care and Cochlear Implant Provision in Germany

SS 07-2

Cochlear implantation in Germany: Standardization of care through guidelines, certifications and registers

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Cochlear Implants (CI) have been a success story in treating profound hearing loss in adults, infants and children. To assure the quality of the treatment process, guidelines, assessments and certification protocols have been established. We will show the patients' pathway in the process for evaluation and treatment with Cis in Germany. These will be the recommendations of the German Society of Otorhinolaryngology, Head and Neck Surgery (GSORLHNS) for structure and process quality. Also, the implementation of a national CI register, organized by the GSORLHNS, but mandated by federal law. And the technical quality aspects of the CI audiologist and the CI assistant of the German Society of Audiology. These are embedded in the larger picture of Centers of Audiology and CI treating entities, which need to undergo a yearly recertification process.

Special Session 07

German Society of Audiology - Audiological Care and Cochlear Implant Provision in Germany

SS 07-3

Objective auditory assessment in CI candidates: indication, test batteries and quality assurance

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Cochlear implant (CI) indication in children and adults is always based on a comprehensive assessment of audiological, medical, and educational-psychological findings. This interdisciplinary preoperative evaluation of hearing and communication abilities is described in the guidelines for CI treatment issued by the German Society of Otorhinolaryngology [1].

Objective test results are particularly important in early childhood when determining indications following failed newborn hearing screening (UNHS) and insufficient benefit from hearing aid provision. Objective test batteries include impedance audiometry (tympanometry, stapedius reflex measurement), recording of otoacoustic emissions (TEOAE, DPOAE), and auditory evoked potentials (AEP). In addition to Click-evoked auditory brainstem responses (ABR), frequency-specific threshold estimation using narrow-band chirp-ABR and chirp-based auditory steady-state responses (ASSR) plays a central role. There is consensus that a CI indication may exist if the objective detection thresholds of AEPs are above 70 dB HL.

In complex clinical cases, such as cochlear and auditory nerve malformations, severe forms of auditory synaptopathy/neuropathy (AS/AN), or following acoustic neuroma surgery, electrocochleography (ECochG) and preoperative recording of electrically evoked ABR (eABR) can be used to evaluate the functional status of the auditory nerve and brainstem. Electrical stimulation at the promontory or the round window niche can be performed using the freely programmable ISIS neurostimulator (inomed, Germany). In addition, intracochlear electrical stimulation can be performed using the Auditory Nerve Test System (ANTS; MED-EL).

Continuous quality assurance of all diagnostic procedures, including personnel training in the performance and evaluation of audiometric examinations, is an essential prerequisite for reliable CI indication.

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Special Session 07

German Society of Audiology - Audiological Care and Cochlear Implant Provision in Germany

SS 07-4

Cochlear Implantation, Fitting and Results in Asymmetric Hearing Loss

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Cochlear Implantation is an efficient treatment for deaf children and postlingually deafened adults. Indication criteria vary between countries. In contrast to many other countries, the German guidelines for Cochlear Implantation [1] provide audiometrical limits as indication criteria based on the ear to be implanted. In particular, cochlear implantation is possible when monosyllabic speech recognition is less or equal than 60 % with an optimal fitted hearing aid (HA) at conversational level (i.e. 65 dB SPL) regardless the hearing status of the contralateral ear. Additionally, there are no explicit threshold values for puretone loss: When the chance of improvement by cochlear implantation people are CI candidates. Because of this relaxed criterion the proportion of people with asymmetric hearing loss (AHL) is very high.

Three different patient groups have to be considered: 1. Patients with single sided deafness with normal hearing on the contralateral ear 2. Patients with moderately impaired hearing using a HA contralateral, and 3. Patients with severe hearing loss or complete deafness contralateral.

Speech processor fitting has to take into account the contralateral hearing. When a HA is used acoustic amplification has to be adjusted in parallel to CI fitting in order to normalize binaural loudness perception. Usually, CI fitting is accompanied by listening training and counselling.

CI outcome and outcome measurements vary between these groups. Outcome measures focus on speech recognition in quiet for group 3. For group 1 and 2 speech recognition in noise and directional hearing are important outcome parameters. Beside the audiometrically measured improvement patient reported outcome measures (PROMs) are evenly important. They are parameterized by standard hearing aid questionnaires as the Abbreviated Profile of Hearing Aid Benefit (APHAB). In our center audiometric evaluation and PROM are performed after six month of CI usage.

For subjects with AHL monosyllabic word recognition in quiet at 65 dB SPL increases from 55 % with HAs to 75 % with HA and CI. Speech recognition thresholds for sentences (with fixed noise at 45 dB SPL) decrease from 10.9 dB SNR to 7.25 dB SNR. For the APHAB CI provision leads to improvement in all four subscales. The EC (ease of communication) improves by 27 %, background noise (BN) and Reverberation (RV) improve only by 9.5 % and 13, respectively. Interestingly, the Aversiveness (AV) decreases by 12 %. This means that speech recognition improves in quiet and in noise without the costs of unwanted increase of aversiveness. To our knowledge, this is the first description of improvement of the AV scale.

In summary, asymmetric hearing is the standard case in audiological practice. About two third of the adult CI population use a CI on one side and a HA on the contralateral side. From the audiological view, outcome measures are identical to earing aid inventories.

Special Session 07

German Society of Audiology - Audiological Care and Cochlear Implant Provision in Germany

SS 07-5

Anatomy-based fitting versus standard mapping of CI-processors: Final results of a crossover randomized controlled intervention study

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Background: Cochlear implants (CIs) improve hearing for deaf patients but often provide moderate sound quality, especially in noisy environments and for music. One issue is the standard, non-individualized frequency mapping, which may significantly distort neural stimulation. A recently proposed method, anatomy-based fitting (ABF), customizes frequency mapping based on electrode position. While ABF is expected to improve hearing, habituation effects complicate comparisons. To address this, a prospective study with a randomized crossover design was conducted.
Material & Methods: Study participants were randomly assigned to either the Standard Map (SMP) group or the Anatomy-Based Fitting (ABF) group. Following an initial three-month familiarization period with their assigned mappings, participants switched to the alternative mapping for an additional three months. After a total of six months, all participants underwent programming with both mapping alternatives for a subsequent three-month period, during which they were allowed to alternate between the two mappings to determine their preferred setting. Speech perception was evaluated in quiet using the Freiburg Monosyllables (FMS) test, and in the presence of background noise using the Matrix Sentence Test (MST) at different testing intervals to assess the individual benefits associated with each mapping approach. Additionally, the subjective quality of hearing was measured using the Speech, Spatial and Qualities of Hearing Scale (SSQ) questionnaire.
Inclusion criteria specified that participants must be adults with a unilateral or bilateral first-time cochlear implant indication, a duration of deafness not exceeding 10 years, complete or nearly complete insertion of the cochlear implant electrode, and either unilateral or simultaneous bilateral cochlear implantation. All participants received Synchrony 2 implant devices (MED-EL, Innsbruck, Austria), utilizing the Sonnet 2 or the Rondo III processors. The study recruited data from 1 case with a Flex24 electrode, 8 cases with Flex26 electrodes, 40 cases with Flex28 electrodes, and 37 cases with FlexSoft electrodes. In nine instances, the implants were placed during simultaneous bilateral surgery.
Results and observations: Of the 77 subjects recruited, 23 patients have been marked as dropouts to date for various reasons. Three of them complained about the sound of the standard map after being accommodated to ABF mapping, while six patients complained vice versa about sound quality after conversion from standard to ABF mapping. Forty-Eight subjects (56 ears) completed the study so far. The results at the endpoint of the study showed that the median FMS for the SMP and ABF groups was 60.0% and 57.5%, respectively, and that the median MST SRT was +0.40 dB SNR and +0.70 dB SNR in the SMP and ABF group respectively.
The ABF setting was the preferred option for 26 subjects, while the SMP setting was the preferred choice for 12 subjects. Seven subjects did not express a preference. The median SSQ quality score for the SMP preferred group was 4.9 (N = 12) and 5.9 (N = 26) for the ABF preferred group. Overall, the ABF setting was rated by all subjects with a median of 2.3 and the SMP setting with 3.0 in (German) school grades (1-excellent, 5-poor), indicating slightly better hearing quality in the ABF group.
When analyzing the data segmented by preferred settings, it was observed that the SMP-preferred group exhibited a median MST SRT of +2.4 dB SNR for the SMP setting and +5.0 dB SNR for the ABF setting. In contrast, the ABF-preferred group demonstrated a significantly lower median MST SNR of +0.4 dB SNR for either SMP or ABF settings.
Discussion:
No significant difference in speech perception scores was observed between the two settings at the end of the study. However, a strong preference for anatomy-based fitting (ABF) was noted, particularly among patients with single-sided deafness (SSD). Calculating the speech perception scores according to the preferred settings reveals that the ABF group consistently achieves better scores, regardless of the filter bank setting.
Initially, some individuals reported that their own voice sounded different, and sometimes unpleasant, when switching between the two fitting maps. This was particularly evident among women. This perception often resulted in a stronger preference for the anatomy-based fitting (ABF).
Participants were encouraged to test both settings during the three months prior to the study endpoint. However, it is possible that one setting was used more frequently than the other. Analysis of the data logging revealed that some participants had used one setting almost exclusively throughout the three-month period.
Conclusion: The results analyzed thus far demonstrate that there is no significant advantage for ABF over SMP in terms of speech perception scores. However, the ABF group showed a tendency towards improved sound quality and higher preference scores.

Special Session 07

German Society of Audiology -
Audiological Care and Cochlear Implant Provision in Germany

SS 07-6

Hearing in Tune: Music-Based Psychoacoustic Frequency Fitting in Cochlear Implant Users

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Recent developments in cochlear implant (CI) fitting emphasize individualization, often relying on anatomy-based approaches derived from computed tomography scans and pitch function models. However, such methods may introduce inaccuracies due to model assumptions. In this study, we propose and evaluate a novel individualized, psychoacoustic, music-based approach to frequency fitting that bypasses these assumptions by directly comparing pitch perception between ears.

Patients performed interaural pitch comparisons using piano tones, enabling individualized frequency adjustments based on subjective experience. A pilot study demonstrated that this approach substantially improved perceived sound quality through the CI. The improvements were achieved by conducting acoustic–electric and electric–electric pitch matches, with bimodal pitch alignment often requiring frequency shifts of up to half an octave below the default Maestro center frequencies.

This individualized, psychoacoustic frequency-based fitting represents a promising alternative to both standard and anatomy-based methods. Instead of relying on electrode positions mapped with Greenwood function models, it draws on direct psychoacoustic assessments of pitch perception. While the procedure is time-consuming and demanding for both patients and audiologists, it may be particularly valuable when sufficient residual hearing is present and the CI user has musical training.

Special Session 08

Japan Audiological Society -
Recent Advances in Japan Audiology Research

SS 08-1

Four-year changes identified through a municipal survey for early detection of hearing loss in older adults

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Background:
Hearing loss is highly prevalent among older adults and has significant effects on communication, social participation, mental health, quality of life, and cognitive function. Untreated hearing loss has also been associated with frailty, depression, and increased risk of dementia, making early detection and timely intervention essential components of healthy aging strategies. Nevertheless, age-related hearing loss typically progresses gradually and is often unrecognized by affected individuals. As a result, many older adults do not seek medical care or rehabilitation until communication difficulties become severe. This delay reduces opportunities for early intervention and may contribute to functional decline and social isolation. In rapidly aging societies such as Japan, establishing community-based mechanisms for early detection and intervention is therefore an urgent public health priority.

Aim:
This study aimed to clarify changes in municipal initiatives addressing hearing loss among older adults by comparing surveys conducted in 2020 and 2024 under the Elderly Health Promotion Program of the Ministry of Health, Labour and Welfare.

Methods:
Following the notification of national subsidies for the Elderly Health Promotion Program, PwC Consulting LLC conducted surveys targeting local governments. The speaker served as chair of the review committee for both survey projects.
In 2020, a nationwide questionnaire assessed municipal efforts to identify older residents with hearing loss and policies related to hearing aid use. The survey was distributed to all 1,741 municipalities, and responses were received from 940 (54.0%).
In 2024, the survey targeted 117 municipalities responsible for implementing initiatives for older individuals with hearing loss. These included designated cities (population ≥500,000), core cities (≥200,000), and special wards with administrative functions equivalent to municipalities. Responses were obtained from 62 municipalities (53.0%).
In 2023, the project developed the Guidelines for Collaboration Among Stakeholders for Early Detection and Intervention for Older Individuals with Hearing Loss to promote coordinated action among municipalities, healthcare providers, and community stakeholders. Because the 2024 survey also examined guideline utilization and implementation challenges, the wording of several questions differed from that used in 2020.

Results:
In 2020, only four municipalities (0.4%) reported conducting hearing screening for residents aged 65 years and older. Among municipalities not implementing screening, 95.1% indicated they had no plans to introduce such programs. Identification of older adults with hearing difficulties at community centers and similar gathering venues was conducted by only 2.2% of municipalities. Methods used included adding hearing-related items to frailty checklists (five municipalities), observing communication difficulties during interactions (four), and questionnaire-based identification (four). When asked why identification measures were not implemented, the most common responses were "no specific requests from residents" (70.1%) and "lack of legal backing" (63.2%).
In 2024, 74.2% of municipalities reported implementing support measures for hearing loss, representing a substantial increase in engagement. Additionally, 9.7% were considering implementation, 4.8% had considered but not implemented measures, and 11.3% had never considered such initiatives. The most common initiative was subsidies for hearing aid purchase costs (58.7%), followed by lectures and consultation seminars on hearing health (52.2%). Other measures included conducting hearing tests, distributing informational leaflets, referring eligible individuals to certified hearing aid specialists, and supporting continued hearing aid use. The most frequently cited trigger for initiating these measures was residents' requests (41.3%), followed by emerging research findings indicating the need for action (32.6%).

Discussion:
In Japan, public subsidies for hearing aids are nationally standardized only for individuals with severe hearing loss (average hearing threshold ≥70 dB) who qualify under the Welfare of Persons with Disabilities Act. No nationwide uniform subsidy system exists for individuals with mild to moderate hearing loss; however, an increasing number of municipalities have introduced local subsidy programs to address this gap and promote hearing care.
The survey findings suggest notable progress in awareness-raising activities and early detection efforts at the municipal level. However, municipal staff reported persistent challenges in post-detection follow-up. These include difficulty ensuring that individuals accurately understand the need for medical consultation, challenges in tracking and re-contacting individuals who do not seek care, and

limited access to specialists or consultation services in some regions. These barriers highlight the need for clearer referral pathways and stronger collaboration between municipalities, healthcare providers, and community organizations.

Conclusion:
Comparison of surveys conducted four years apart demonstrates substantial progress in municipal initiatives promoting early detection and intervention for hearing loss among older adults. Despite these advances, strengthening follow-up systems, improving access to specialist care, and enhancing intersectoral collaboration remain critical challenges. Broader public awareness initiatives targeting healthcare professionals beyond otolaryngology, as well as citizens across all age groups, are needed to strengthen early detection pathways and ensure continuity of care.

Acknowledgments:
We sincerely thank the review committee members, the Ministry of Health, Labour and Welfare, and municipal staff who cooperated with the surveys.

Special Session 08

Japan Audiological Society -
Recent Advances in Japan Audiology Research

SS 08-2

Establishing standardized conditions for clinically available sound-localization tests: A multicenter approach

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Sound localization is essential for auditory spatial awareness. The process relies on interaural differences in timing and level, and spectral cues. This study aimed to standardize sound-localization testing conditions across facilities in Japan, analyze the impact of early reflected sounds on localization accuracy, and compare outcomes between individuals with normal hearing and those with unilateral hearing loss. This study included 77 participants with normal hearing and 45 individuals with unilateral hearing loss, at 11 facilities. Sound-localization tests were conducted using nine loudspeakers arranged in a 180° horizontal arc. The stimuli consisted of Comité Consultatif International Téléphonique et Télégraphique (CCITT) and low-pass CCITT noise bursts at randomized levels of 50, 55, and 60 dB SPL. The reflected sound measurements employed time-stretched pulses to analyze early reflections (4–7 ms). The localization accuracy was assessed using the root-mean-square error and mean deviation score. Localization performance was negatively influenced by early reflections, with reflected sound envelope area and peak values within 4–7 ms correlating significantly with reduced accuracy ($r = -0.535$ to -0.555). Participants with normal hearing achieved a root-mean-square error of $2.0° \pm 4.8°$, whereas participants with unilateral hearing loss exhibited significantly greater errors ($68.4° \pm 40.7°$, $p < .001$). Asymmetries in the left–right response accuracy correlated positively with the reflected sound characteristics ($r > 0.6$). Noise type (normal vs. low-pass CCITT) did not significantly impact performance in either group. Early reflections significantly compromise sound-localization accuracy, particularly in smaller testing environments where reflections overlap with direct sounds. Standardized testing protocols, in which early reflections are controlled, are critical for reliable assessments. The use of sound-absorbing materials can enhance the test precision, particularly in the clinical evaluation of unilateral hearing loss. These findings emphasize the need for optimizing acoustic conditions to improve the reliability and accuracy of sound-localization testing.

Special Session 08

Japan Audiological Society -
Recent Advances in Japan Audiology Research

SS 08-3

Current status of auditory rehabilitation with hearing aids in Japan

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Hearing aids are the most common and widely used means of auditory compensation and rehabilitation for individuals with hearing loss. This presentation reviews the current status of hearing aid practice in Japan, focusing on:
1. problems and countermeasures related to hearing aid care for older adults, and
2. cartilage conduction hearing aids, a novel hearing aid technology developed in Japan.

1) Current Status and Challenges of Hearing Aid Practice in Japan
According to Japan Trak 2022 [1], a large-scale survey on hearing aid usage, the adoption rate among individuals in Japan who are aware of having hearing loss is only 15%, which is markedly lower than that reported in other countries. Overall satisfaction with hearing aids is also low, at approximately 50%. These results indicate that Japan faces significant challenges related to both low hearing aid adoption and low user satisfaction.
One major factor contributing to the low adoption rate is the high proportion of individuals with hearing impairment who do not discuss their hearing loss with an ear doctor and/or family doctor. The survey revealed that only 38% of individuals who perceived hearing difficulties had discussed their hearing loss with an ear doctor and/or family doctor. Furthermore, even among those who did consult a physician, 63% did not receive positive medical advice. This lack of recommendation by physicians is considered an important factor contributing to the low adoption rate.
To address these issues, the Japan Society of Otorhinolaryngology–Head and Neck Surgery (JSO-HNS) has promoted public awareness campaigns encouraging individuals who notice hearing difficulties to seek medical evaluation and consider hearing aid use when hearing loss is diagnosed. In addition, the society has developed and distributed clinical response manuals for physicians and encourages active recommendation of hearing aids to patients with self-perceived hearing loss.
Low satisfaction with hearing aids in Japan has also been attributed to differences in the hearing aid distribution system compared with other countries. In Japan, hearing aids can legally be sold without specialized education in audiology, and no formal qualification is required for sales personnel. Consequently, many hearing aids are fitted and sold by individuals without sufficient knowledge or technical skills. Inadequate fitting and the sale of expensive devices for commercial purposes are considered major contributors to dissatisfaction.
Although Japan does not have a nationally licensed profession equivalent to audiologists, it does have a certification system for Certified Hearing Aid Technicians, who possess specialized knowledge and skills related to hearing aid fitting. Japan Trak 2022 reported higher satisfaction rates (64%) when certified technicians were involved in the fitting process. Increased involvement of certified technicians is therefore expected to improve hearing aid outcomes.
The JSO-HNS is promoting closer collaboration between physicians and certified hearing aid technicians, while the Ministry of Health, Labour and Welfare has implemented training programs to improve vendors' technical skills and encourage certification. These initiatives have led to a steady increase in the number of certified hearing aid technicians.

2) Cartilage Conduction Hearing Aids as a New Hearing Rehabilitation Option
Cartilage conduction hearing aids were introduced in Japan in 2017 and have since been adopted by nearly 200 medical institutions. At present, they are commercially available only in Japan.
By placing a vibrator in contact with the auricular cartilage, effective sound perception can be achieved. This new transmission pathway, known as cartilage conduction, differs from conventional air conduction and bone conduction mechanisms. Hearing aids that utilize this cartilage conduction mechanism are referred to as cartilage conduction hearing aids [2].
The device is a behind-the-ear hearing aid with a small, lightweight vibrator attached to the ear tip portion. The vibrator is custom-made based on an ear impression and fixed similarly to an earmold. In cases where insertion is difficult due to congenital anomalies such as microtia, the device can be secured using double-sided adhesive tape. No headband or compression fixation is required, resulting in improved comfort and cosmetic appearance.
A major advantage of cartilage conduction hearing aids is their high effectiveness in patients with external auditory canal atresia. Because sound is transmitted through vibration, sufficient hearing benefit can be achieved even in such cases. Compared with conventional bone conduction hearing aids, cartilage conduction hearing aids offer superior comfort and aesthetics, and unlike bone-anchored hearing aids (BAHA), they do not require surgical intervention.
In a multicenter study conducted at nine institutions involving 256 cases [3], most fitted cases involved bilateral or unilateral external auditory canal atresia (n = 65 and 124, respectively). Purchase rates after trial use were high, at 86% and 78%. High purchase rates (78%) were also observed in patients with chronic otorrhea for whom air conduction hearing aids were difficult to use, whereas the rate was lower (37%) in patients able to use air conduction hearing aids.
Sufficient benefit is expected up to moderate sensorineural hearing loss in patients without abnormalities of the external or middle ear, and bone conduction thresholds of 40 dB or less in patients with external auditory canal atresia. In selected cases of non-osseous

canal atresia due to inflammation, trauma, or postoperative changes, excellent outcomes may be achieved even when bone conduction thresholds exceed 40 dB.

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Special Session 08

Japan Audiological Society -
Recent Advances in Japan Audiology Research

SS 08-4

Development of Japan's first comprehensive guidelines for LiD/APD based on stakeholder needs

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Listening difficulties (LiD) and auditory processing disorder (APD) are increasingly recognized in individuals who experience significant real-world listening problems, especially in noise, reverberation, or multi-talker situations, despite normal or near-normal audiograms. In Japan, however, terminology, assessment practices, and support pathways have varied across disciplines, creating uncertainty for patients and families as well as clinicians and educators. This invited lecture introduces the development of Japan's first comprehensive guidelines for LiD/APD, presented as a practical guidance document designed to translate stakeholder needs into implementable recommendations.

In this project, "guidelines" refers to consensus-based guidance intended to support clinical and educational decision-making; it is not positioned as a rigid rulebook. Stakeholder priorities were gathered from relevant groups (e.g, individuals with listening difficulties and caregivers, clinicians, and educators) and integrated with the current evidence base and international discussions. LiD is treated as a symptom-based construct, while APD is positioned as an overlapping concept best understood through a multilayer model that considers auditory processing, language, cognition, psychosocial factors, and listening environments. A pragmatic "diagnosis for support" approach is proposed: start from the person's reported difficulties, confirm peripheral hearing status, and collect targeted information necessary to design individualized support.

Recommendations address standardized history taking and questionnaires, audiologic assessment including speech-in-noise and binaural measures, and appropriate selection and interpretation of auditory processing tests where available. Support strategies emphasize improving signal-to-noise ratio and reducing listening load (environmental modifications and assistive listening systems such as remote microphone technology), communication strategies, psychoeducation, and reasonable accommodations in educational and workplace settings. Finally, we highlight evidence gaps and propose priorities for future research and iterative updates so the guidelines/guidance can evolve with emerging evidence and stakeholder feedback.

Special Session 08

Japan Audiological Society -
Recent Advances in Japan Audiology Research

SS 08-5

Precision medicine for genetic hearing loss revamped by advances in information technology

Tatsuo MATSUNAGA

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Hearing loss has a profound impact on learning, employment, and quality of life. The primary cause of hearing loss in newborns, children, or young adults is genetic. There is an extremely large number of genes responsible for hearing loss; more than 150 genes cause nonsyndromic hearing loss alone, and more than 300 genes are associated with hearing loss accompanied by other clinical features. Recently, the relationships between genetic changes and clinical features have been gradually elucidated. As a result, prediction of clinical features by genetic testing became much more precise in patients with hearing loss. However, the number of target genes or variants for hearing loss has been limited in clinical genetic tests because of technical and financial problems.

Recent progress in technologies and information, especially NGS and large-scale public database helped to overcome these issues. In contrast, when the causative gene is identified through genetic testing, integrating genetic information with the clinical manifestations and clinical test results allows for more accurate prediction of the course of hearing loss as well as selection of appropriate treatment strategies. In patients who had genetic diagnosis, associated symptoms may also be noted after the onset or even before the onset. This would also facilitate the early diagnosis and early intervention for the symptoms.

Although fundamental treatments for the genetic hearing loss are quite limited at present, therapies using artificial organs such as cochlear implants are available. In addition, therapies or preventive therapies are available for some associated symptoms. To improve the outcome of these therapies, early diagnosis by genetic tests is quite effective. This presentation will give an overview of the current state of individualized medicine for genetic hearing loss revamped by advances in information technology in Japan.

Special Session 09

New Zealand Audiological Society - Innovations and Insights from Audiology in Aotearoa New Zealand

SS 09

Innovations and Insights from Audiology in New Zealand

Katrina LIGHT[1], Tare LOWE[2], Greg A. O'BEIRNE[3], Zoë HECTOR[4], Katherine JEPSEN[3], Peter THORNE[5], Craig LETT[6], Michelle A. POKORNY[7], Erin KEACH[8], Holly Fb. TEAGLE[7], Neil HESLOP[9]

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[5]*Audiology, Eisdell Moore Centre, University of Auckland, New Zealand*
[6]*Faculty of Medical and Health Sciences, University of Auckland, New Zealand*
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[8]*Audiology and Newborn Hearing Screening, Health New Zealand, New Zealand*
[9]*Southern Cochlear Implant Programme, New Zealand*

New Zealand's audiology community is dedicated to advancing hearing health through collaboration, research, and culturally responsive practice. The New Zealand Audiological Society (NZAS) session brings together leading voices to share developments in service delivery, workforce training, and equity-focused care across Aotearoa and neighbouring Pacific countries.

The session will include 10 minute presentations from each of the following:
- Katrina Light, NZAS Professional Advisor
- Tare Lowe, NZAS Executive Council Tangata Whenua representative
- Greg O'Beirne, University of Canterbury
- Zoe Hector and Kate Jepsen, University of Canterbury
- Peter Thorne, University of Auckland
- Craig Lett, MNZAS Audiologist
- Michelle Pokorny and Erin Keach, MNZAS Audiologists
- Holly Teagle (University of Auckland) and Neil Hislop (Southern Cochlear Implant Programme)

Session highlights include:
• An overview of audiology in New Zealand and our evolving professional landscape.
• NZAS's journey in developing and implementing our Te Tiriti o Waitangi policy within the society's mahi (work).
• The creation of clinical tools supporting culturally safe care for Māori clients.
• Insights into university training programmes and their role in preparing audiologists for practice in New Zealand's unique environment.
• The development of ear and hearing care services in the Pacific, emphasising training and support for local professionals.
• The evolution of tele-audiology in New Zealand, addressing barriers to care across distance.
• Innovations in advanced audiology practice within hospital and community settings.
• Recent work on equity and access for cochlear implant services.

Despite our location "down-under" in the South Pacific, New Zealand continues to strive for innovation and clinical excellence, ensuring high-quality ear and hearing care for all our people and neighbouring countries.

Special Session 09

New Zealand Audiological Society - Innovations and Insights from Audiology in Aotearoa New Zealand

SS 09-6

Teleaudiology in New Zealand: Development and future direction

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Teleaudiology services have seen a rapid change in New Zealand over the past few years. While prolonged covid-19 lockdowns served as a major catalyst for clinicians and patients to use teleaudiology services, this was followed by a contraction of services once in-person services resumed.

New Zealand has geographic barriers and service-provision constraints that create challenges for people to access audiology services. Teleaudiology has divided into multiple service channels: direct-to-patient services, where services are provided directly to the patient in their location, and between-clinic services, where audiological services are provided remotely between clinical locations. Future challenges include developing teleaudiology to support services to other areas within the Pacific, and building flexible models to balance clinical accuracy, service accessibility, cultural responsiveness and workforce capability.

Special Session 09

New Zealand Audiological Society - Innovations and Insights from Audiology in Aotearoa New Zealand

SS 09-8

Equity and access for cochlear implant services in New Zealand

Neil David Peter HESLOP[1], Holly Fb. TEAGLE[2]

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Co-Presenters

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Southern Cochlear Implant Programme, NZ
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Aotearoa New Zealand is home to a diverse population of 5.3 million people, comprising a heterogeneous mix of ethnicities, including a significant Māori population. Healthcare obligations to Māori under Te Tiriti o Waitangi and the recommendations of the Waitangi Tribunal call for a commitment to achieving equitable health outcomes for Māori.

The cochlear implant (CI) service in Aotearoa is government-funded for those eligible, and includes audiological and medical/ surgical care, and ongoing support and (re)habilitation services. However, additional fundraising and advocacy have been required to access all parts of the country. The providers of cochlear implant services recently studied the delivery of services and equity practices (1). This presentation follows the study's recommendations to share our best practices with others, supporting an equity-focused community of practice. Equity recognises that different people with different levels of advantage require different approaches and resources to get equitable health outcomes (2).

Results from the CI programmes between 2016 and 2022 show that there is no significant difference between Māori and non-Māori adults or children with respect to the rate of acceptance for surgery. In addition to sharing results from the 2025 publication, this presentation will describe the strategies and resources that have been developed to work towards achieving an equitable service. Work remains to co-design an outcome framework and data suite with Māori to measure Indigenous-inspired success alongside clinical success. This will encourage the audiology community, which provides entry-level care for hearing loss in adults in Aotearoa New Zealand, to refer all appropriate candidates to cochlear implant programmes.

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2. Ministry of Health – Manatū Hauora. Equity: Te mana tautika [Internet]. 2024 [cited 2024 Oct 15]. Available from: https://www.health.govt.nz/ strategies-initiatives/programmes-and-initiatives/equity

Special Session 10

Nordic Audiology Society -
"New Technologies and Prioritization"
How to Balance Resources and Demands in an Audiological Setting

SS 10-1

Implementing National Quality Requirements and Digital Visitation in adult HA treatment in DK

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Background: Implementing New National Quality Guidelines in a Danish public health set-up

Discussion: In his presentation I will try to give a short overview of the implications of the New Danish Guidelines and how implementation will call for new strategies in best practice in order to maintain a resonable balance between resources and demand for high quality care for all patients in an aging population.

How can new technological solutions free clinicians to do what they do best?
How can research support hard prioritization of limited ressources - both financial and in work force, and how does collaboration through the Nordic Audiological Society and other international network inspire and help us navigate in this cross-field between demands for best practice, limited resources, new investigative meassurements and new technologies?

Special Session 10

Nordic Audiology Society -
"New Technologies and Prioritization"
How to Balance Resources and Demands in an Audiological Setting

SS 10-2

Implementing User-Operated Audiometry in Denmark

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User-operated audiometry has been proposed as a means to increase accessibility and efficiency in hearing health care, but successful clinical implementation requires careful consideration of workflows, patient pathways, and clinical responsibility.

This lecture presents ongoing implementation studies of user-operated audiometry in Denmark, with a particular focus on how the method can be integrated into existing models of hearing rehabilitation.

Different patient treatment pathways will be described, including a pathway in which parts of the assessment is conducted as remote care in collaboration with local ENT clinics. Drawing on real-world clinical experience, the lecture discusses potential benefits such as reduced waiting times and increased flexibility, as well as key challenges related to referral triage, logistics, and data sharing. Practical considerations and lessons learned from implementation are highlighted to support safe and sustainable use of user-operated audiometry in routine clinical care.

Special Session 10

Nordic Audiology Society -
"New Technologies and Prioritization"
How to Balance Resources and Demands in an Audiological Setting

SS 10-3

Effective Implementation of Automated Audiometry in Clinical Practice

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Purpose: This abstract reports on the development of a Collaborative Audiologic Reception (CAR) that utilizes the audiologist worktime saved by replacing manual hearing tests with automated ones. The results presented here concern one specific setup for which the aim was to investigate the feasibility of a workflow model for a small sized CAR, though others are under investigation within the project and will be reported in the conference presentation. Specifically, this study focused on whether the workflow predicted by a quantitative workflow prediction model was operationally feasible from an audiology personnel perspective.
Methods: A quantitative model simulated both the flow of the patients through the CAR and the tasks of the personnel. The model was built for a CAR with two rooms for counselling, three units running the Automated Method for Testing Auditory Sensitivity (AMTAS), one room for manual audiometry and four different waiting rooms. Based on prior estimations of the duration of each patient activity and personnel task, the patient-intake interval was optimized to 11 minutes.
This workflow was then evaluated in cooperation with the Audiological clinic in Örebro, Sweden. Prior to intake, patients filled out a custom hearing health questionnaire. Once in the CAR, patients underwent initial consultation, AMTAS testing, AMTAS quality assessment, manual (screening) audiometry – if poor AMTAS quality was indicated, and finally a brief counselling session.
Results: In two hours' time, 10 scheduled patients successfully went through the CAR, run by two audiologists. These results indicate both that the workflow was operationally feasible and that the workflow prediction by the simulation model was accurate. The CAR workflow was 2-3 times as efficient as the current clinical workflow.
Conclusion: The CAR concept developed in this study offers an efficient way for hearing clinics to use automated audiometry to meet the globally increasing demand for hearing health care.

Special Session 10

Nordic Audiology Society -
"New Technologies and Prioritization"
How to Balance Resources and Demands in an Audiological Setting

SS 10-4

Tinnituskaka: A model for digital, resource-saving tinnitus care

Dag Lyngve SUNDE

Ent, Snr Hjelset, Norway

Tinnitus affects millions worldwide, yet access to structured follow-up remains limited.
Traditional care models are often resource-intensive and fragmented. Tinnituskaka represents a digital model for home-based tinnitus management, developed and implemented in Norway.

The idea behind Tinnituskaka is that we can habituate to tinnitus. The treatment approach we use is a combination of Tinnitus Retraining Therapy (TRT) and Cognitive behavior therapy (CBT).

Built in collaboration with the Norwegian digital health platform Youwell, Tinnituskaka is integrated into the public healthcare system and offered as a nationwide service. Tinnituskaka enables remote follow-up through a secure web interface and combines standardized examination, more than 7 hours of video-based theory from TRT and CBT, structured interactive exercises, therapist-led group webinars, the possibility of a second opinion, and validated self-report tools.

Clinical data show that patients with severe tinnitus (THI > 58) experience significant improvement in tinnitus distress when using Tinnituskaka. Tinnituskaka also allows therapists to monitor more patients with less time spent per individual, thereby reducing outpatient load and optimizing resource use.

Tinnituskaka illustrates how digital innovation in audiology can be both person-centered and cost-efficient, transforming tinnitus care from sporadic consultation into self-management and continuous home-based care.

Special Session 11

British Academy of Audiology - Quality Assurance in Paediatric Audiology: Who Is Looking?

SS 11-1

Beyond the Audiogram: Empowerment, Governance, and Psychological Safety in Paediatric Cochlear Implant Care.

Nicole EGLINTON

Audiology, Little Allied Health, Australia

Advancements in hearing technology and early identification have significantly improved communication outcomes for children who are Deaf or Hard of Hearing (DHH). However, as diagnostic pathways increasingly rely on objective measures, clinical systems risk shifting toward a procedural "tick box" approach that can undervalue parental insight, behavioural observation audiology, and multidisciplinary clinical judgement, with potential consequences for the accuracy and effectiveness of clinical outcomes. The audiogram, while essential, represents only part of a child's hearing and communication profile.

Drawing on experience, 23 years as a paediatric audiologist and 12 years as Managing Director of a multidisciplinary allied health service including audiologists, speech pathologists, and a child and family counsellor, this presentation explores family and clinician experiences across cochlear implant pathways. Consistent themes emerge internationally, including within the UK and Australia, where families report limited choice, reduced access to balanced information, and hesitation in raising concerns or seeking second opinions. These challenges are often greatest at key decision-making points, highlighting the importance of family centred collaborative care throughout the journey.

Parallels between the Kingdon review of children's hearing services: Final report in the UK (Kingdon et al, 2025) and the Independent Governance Review, Paediatric Cochlear Implant Program, Women's and Children's Health Network South Australia, Final report (Department for Health and Wellbeing, 2024) highlight systemic gaps in governance, inconsistent protocols, and cultures that have negatively influenced transparency, curiosity, and collaborative practice. These gaps limit psychological safety for clinicians across all career stages, and their ability to question practice or integrate multidisciplinary perspectives, together with the impact on young clients and their families.

Aligned with the 2026 World Congress of Audiology themes, this presentation advocates for paediatric cochlear implant models that balance technological advancement with behavioural expertise, elevate parental voice as critical clinical data, strengthen governance frameworks, and foster psychologically safe, collaborative teams to support optimal outcomes for children and families.

Keywords: Family centred care; Psychological safety; Clinical governance

References

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Special Session 11

British Academy of Audiology - Quality Assurance in Paediatric Audiology: Who Is Looking?

SS 11-2

Righting the wrongs: The journey to improvement in UK Paediatric Audiology

Claire BENTON

President, British Academy Of Audiology, United Kingdom

In 2020 a panel consisting of members of professional bodies and charities within the UK published a rapid review into paediatric audiology, highlighting concerns over the impact of the Covid-19 pandemic on services. The review made four clear recommendations to governing bodies asking for national oversight for paediatric audiology from birth to transfer to adult services, clear service specifications, joined up commissioning and mandated quality assurance. In the years between 2020 and 2026 evidence of the consequences of these recommendations not being met emerged.

Following a significant incident of multiple misdiagnosis of children in Scotland, and subsequent reviews across England, failings across the profession were seen. Themes around lack of governance, changes in education, under-funded workforce, poor infrastructure, and absence of appropriate quality assurance emerged. Many children have come to harm due to these failings.

Across the devolved nations of the UK, work streams were stood up to review and audit all paediatric services and to begin to address the root causes of a system-wide failing. The process has taken its toll on the workforce, with clear evidence of moral injury and a need for sustained wellbeing support.

The Kingdon review of children's services (Kingdon et el, 2025) summarised what had happened across England, highlighting the impact of the families affected. The recommendations made are now being reviewed within government.

Reflections on how a profession, who at an individual level cares deeply about the population it serves and believes it delivers safe audiological care, can over time drift far from the standards it aimed to deliver will be made. Sharing lessons learnt throughout this process and how the UK is now proceeding at pace along its improvement journey.

Keywords: Paediatric Audiology; Quality Assurance

References:
Kingdon, C, Smith, L, & Brown, A. (2025) Kingdon review of children's hearing services: Final report. UK Department of Health and Social Care.
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Special Session 11

British Academy of Audiology - Quality Assurance in Paediatric Audiology: Who Is Looking?

SS 11-3

Developing a safe, effective and sustainable workforce for high quality audiology services

Saima Luxmi RAJASINGAM

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Authors: Imko Meyenburg, Peter Macdonald, Jagjit Sethi and Saima Rajasingam

Internationally, workforce planning models are focussed on balancing supply and demand, rarely addressing factors such as demographic shifts and evolving health needs. As health conditions grow more complex and the population ages, traditional staffing estimates are no longer sufficient. There is a clear imperative for improved workforce planning to ensure adequate staff numbers to deliver audiology safely and and effectively; the British Academy of Audiology (2021, 2022) and NHS England (2024) agree that urgent workforce improvements are needed, but there is still no consensus on safe minimum staffing levels or the optimal skill mix for high-quality audiology services. Additionally, healthcare workers across the NHS report experiencing psychological stress and symptoms of burnout (Alexander, 2024).

This research aimed to establish markers of quality in audiology service provision and estimate the audiology workforce requirements to meet current and projected demand for services, based on population changes and anticipated efficiencies. Following analysis of focus group data with Heads of Service in England to identify markers of quality, a needs-based model was developed by (1) analysing NHS stocktake dataset to determine current workforce and quality markers, (2) creating an epidemiological model to predict changes in service population over 10 yrs (3) use of BAA recommendations to estimate mean activity times and staff-to-patient ratios. Overall, the estimated 10-year audiology workforce safe staffing levels for England (total numbers across banding), based on our three models (steady state, population growth, and mixed model) are 2829, 1238, and 1745 for paediatrics and 4372, 2245, and 4667 for adults. Further analysis to address workforce equity and the impact of changes in skill mix and service delivery models is required, alongside global considerations (e.g, for Low and Middle-Income Countries).

Special Session 11

British Academy of Audiology - Quality Assurance in Paediatric Audiology: Who Is Looking?

SS 11-4

Facing the challenges of quality assurance in audiology: A panel discussion.

David MAIDMENT

School of Sport, Exercise and Health Sciences, Loughborough University, United Kingdom

Following presentations on quality improvement in paediatric audiology, family-centred care, and developing a safe, effective, and sustainable workforce, the session will culminate in an interactive Q&A discussion. The discussion will focus on shared challenges and future priorities, including quality assurance, protecting, and strengthening paediatric audiology services, supporting families through meaningful engagement, and addressing current and future workforce pressures both in the UK and international. The session aims to promote reflective dialogue, shared learning, and practical insights for clinicians, service leads, educators, and policymakers seeking to safeguard the quality and sustainability of audiology services worldwide.

Special Session 12

International Bureau for Audiophonologie - BIAP Recommendations in Review: Updates in Hearing and Vestibular Assessment and Intervention

SS 12

Intro - International Bureau for Audiophonologie (BIAP) - BIAP Recommendations in Review: Updates in Hearing and Vestibular Assessment and Intervention

Ioan Aurelian CURCA

Communication Sciences And Disorders, Audiology, University Of Western Ontario, Canada

The International Bureau for Audiophonologie (BIAP) is an international organization whose members contribute to the development of recommendations and professional guidance in audiology and related fields. This special session will present recent BIAP recommendations and updates in hearing and vestibular assessment and intervention.

The session will bring together active BIAP members involved in different areas of clinical practice. Presentations will address key topics across the lifespan, including early assessment and intervention in hearing-impaired children, the assessment and management of auditory neuropathy spectrum disorder (ANSD) in infants following newborn hearing screening, bimodal stimulation using hearing aids and cochlear implants, and vestibular disorders in children.

Together, these contributions will highlight important aspects of current BIAP recommendations and their application in clinical practice. The session will provide an overview of practical approaches to assessment and intervention, with relevance for clinicians working in both hearing and vestibular care.

Special Session 12

International Bureau for Audiophonologie - BIAP Recommendations in Review: Updates in Hearing and Vestibular Assessment and Intervention

SS 12-1

Early assessment and intervention in hearing impaired children: A timeline of BIAP recommendations

Monica Jubran CHAPCHAP

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Early identification, accurate diagnosis and timely intervention are key determinants of language, communication and psychosocial outcomes in children with hearing loss. Over the past 15 years, the International Bureau for Audiophonology (BIAP) has produced evidence-based recommendations addressing universal newborn hearing screening (UNHS), audiological assessment in the first year of life and early clinical management.

This presentation provides a chronological overview of BIAP recommendations guiding early assessment and intervention in infants and young children with hearing impairment. BIAP documents were reviewed and organized into a timeline. Core principles related to screening, diagnostic pathways, behavioral and electrophysiological assessment and early intervention were summarized.

Across successive recommendations, consistent topics emerged: (1) UNHS integrated within a multidisciplinary network; (2) establishment of a reliable working diagnosis by three months of age using a cross-check battery including otoscopy, immittance measures, otoacoustic emissions and auditory brainstem responses; (3) behavioral audiometry as an essential complement to objective tests; (4) early fitting of amplification and initiation of family-centered intervention, preferably before six months of age; and (5) special consideration for conditions such as unilateral hearing loss and auditory neuropathy spectrum disorder, requiring early counseling, close monitoring and individualized management.

BIAP recommendations increasingly emphasize quality, precision and coordination of early care, supporting early multidisciplinary assessment combined with timely, family-centered intervention as best practice in pediatric audiology.

Special Session 12

International Bureau for Audiophonologie - BIAP Recommendations in Review: Updates in Hearing and Vestibular Assessment and Intervention

SS 12-2

Auditory neuropathy spectrum disorder

Sebastian Romica COZMA

Surgery II, Grigore T Popa University of Medicine and Pharmacy Iasi, Romania

Introduction. A specific type of sensorineural hearing loss was first described and named Auditory Neuropathy (AN) by Starr et al. in 1996. Since 2008, this type of hearing loss has been defined as Auditory Neuropathy Spectrum Disorder (ANSD), describing a condition in which a patient's OAEs are or were at one time present, and the ABRs are abnormal or absent. Presently, ANSD is diagnosed based on the presence of cochlear microphonics (CM) and abnormal or absent ABR with or without abnormalities of OAE. Behavioural observation audiometry is an essential part of the ANSD diagnosis and must be performed before any intervention.

Prevalence and risk factors. ANSD may be present in newborns who are not at risk for hearing loss (between 0.006% and 0.03%), but the highest ever incidence reported in newborns at risk was 24%.

Lesion site. From audiological and electrophysiological measures, ANSD can be classified by the anatomical site of dysfunction: presynaptic or synaptic lesions (cochlear inner hair cell dysfunction and/or loss of ribbon synapses), and postsynaptic lesions (axonal neuropathies, dendritic nerve terminals, auditory ganglion cell disorders, myelin disorders, hypoplasia of the auditory nerve, auditory nerve conduction disorders).

Aetiology and classification. ANSD can have multiple causes: genetic (certain types of syndromic or non-syndromic hereditary hearing losses), malformations (auditory nerve hypoplasia or aplasia, brain anomalies), neurodegenerative diseases (Charcot Marie Tooth disease, Friedreich's ataxia), metabolic diseases or mitochondrial disorders. Acquired ANSD includes infection during pregnancy, prematurity, hyperbilirubinaemia/kernicterus and perinatal hypoxia.

The degree of hearing loss, as assessed by pure tone audiometry (PTA), found in patients with ANSD ranges from essentially subnormal hearing sensitivity to a profound hearing loss. Over time, the degree of hearing loss may have different types of evolution (stable, progressive, fluctuating) or the hearing may normalise.

Scope. This BIAP document is a recommendation for practical issues in the diagnostic assessment of ANSD in babies after newborn hearing screening.

There are currently different approaches to universal neonatal hearing screening in different countries. Cases of ANSD occurring in the well-baby population, screened only by OAE, may remain undetected until some problems are observed by the parents or professional staff.

For the early diagnosis of ANSD, it is necessary to perform a cochlear-sensitive auditory test (OAE) as well as ABR.

Recommendations. The main purpose of the audiological assessment in ANSD is to determine the degree of hearing impairment and the site of the lesion, on which depends both the indication of therapeutic intervention and the predictions of outcomes.

The audiological assessment includes: anamnesis and clinical otologic evaluation, middle ear measurements (tympanometry and stapedial reflex), clinical TEOAE and/or DPOAE, auditory brainstem responses (ABR) (including cochlear microphonics detection and electrocochleography), auditory steady state responses (ASSR), behavioural audiological measurements, cortical auditory evoked potentials (CAEP - can be used as a biomarker for the hearing threshold and auditory cortical development and as a clinical tool to guide the intervention choices) and vestibular assessment (the association of vestibular dysfunction in ANSD is part of ongoing research).

Multi-disciplinary approach. The management of a child with ANSD requires a multidisciplinary team approach that works in partnership with the family. For the diagnostic and intervention in ANSD and for parental counselling, the audiological assessment should be followed by different medical evaluations: Clinical genetic referral and genetic tests, pediatric referral, Imaging of the VIIIth cranial nerve, neurological evaluation, ophthalmological evaluation, and congenital cytomegalovirus infection testing.

Intervention. Should start as soon as possible based on the results of both audiological and multidisciplinary assessments. All children with ANSD, no matter the degree of their hearing loss, should start with early intervention by auditory stimulation in order to activate the maturation of the auditory pathways and to prevent sensory deprivation. Hearing aids should always be the first intervention step, no matter the age of the child.

Children with ANSD with hearing thresholds in the severe or profound range meet the criteria for cochlear implantation, solely based on the degree of hearing loss.

For patients with ANSD fitted with hearing aids who do not show good and stable progress in the development of speech, language, and communication, a cochlear implant can be the next step in the intervention.

For ANSD cases with unclear development, there may be a need for more time and more information based on multidisciplinary observations to recommend the best intervention.

In cases with unilateral ANSD, the indication for treatment remains particularly difficult.

Favourable CI outcomes can be anticipated in patients with certain aetiologies of ANSD, particularly in those with OTOF, WFS1, and OPA1 variants, while patients with cochlear nerve deficiency may have suboptimal outcomes. For children with a history and clear genetic aetiology suggestive of limited progress, the CI will be considered as early as possible.

Follow-up, outcomes and prognoses. The audiological results in children with ANSD may fluctuate during the follow-up, and some evidence of ANSD could disappear. It is essential to follow up the child with routine audiological tests. The improvement in cochlear nerve maturation in response to sound or electrical stimulation can be a good indicator of auditory pathway development.
Language and communication development should be assessed periodically, with the results of this monitoring being the leading factor for the management options.
Speech testing, such as speech detection thresholds or speech recognition thresholds in the neuropathic ear, typically yields poor results, and even poorer responses occur in the presence of background noise.
Present data show that the hearing, speech, and language development outcomes in children with ANSD are very heterogeneous, depending on associated disorders. Until now, there is no literature available on long-term results of children with ANSD, but treatment outcomes seem to be correlated closely with the underlying aetiologies.
Patients with poor improvements with hearing aids are candidates for CI and rehabilitation.
The observed efficacy of CI seems to be closely related to the locus of the lesion.
In presynaptic ANSD, outcomes are invariably good, with audiological results similar to those of patients with cochlear sensorial hearing loss. CI outcomes in postsynaptic ANSD have been reported as much more variable.



Figure Early management recommendations for infants with ANSD

Special Session 12

International Bureau for Audiophonologie - BIAP Recommendations in Review: Updates in Hearing and Vestibular Assessment and Intervention

SS 12-3

Bimodal stimulation: Hearing aid and cochlear implant, how does the brain respond to this combination?

Edilene BOECHAT

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Bimodal stimulation: how does the brain respond to this combination?
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Although the benefits of Cochlear Implants (CI) in the profound bilateral sensorineural hearing loss are much superior to those observed with hearing aids (Has) alone, they may be quite useful to prevent sensory deprivation and bring some sound cues . In the case of unilateral implantation, professionals must be aware that, even when the residual hearing in the contralateral ear is insufficient, there is an important contribution of these devices in a bimodal configuration (an acoustic input from a hearing aid on one ear is combined with electrical stimulation from a cochlear implant on the other ear).
The task of receiving two versions of the same sound signal will pose challenges in terms of temporal and spectral resolution, requiring intra- and inter-hemispheric plasticity. The resulting auditory image is integrated through the associative areas, leading to reconnections and restructuring of neuronal networks. The most important challenges for this integration in bimodal stimulation are temporal synchronization and spectral distortion.
The problem of synchronization (latency) is that there is a difference in milliseconds between the CI and the HA. In hearing aids, the soundwave needs time to reach the auditory nerve, unlike with cochlear implants where the auditory nerve is stimulated instantly.
Besides that, the distortion (place mismatch-electrode allocation) occurs because in the process of the amplified sound wave through the hearing aid there is a clear relationship between the exact position of the stimulation on the basilar membrane and the corresponding frequency. On the electric-stimulated side, the place depends on the mapping of the limited array of electrodes. This results in a lack of frequency specificity (sometimes also overlapping) in the cochlea of the stimulation for the same sound. (Francart & McDermott 2013)
Evidence shows that this strategy is beneficial and may improve sound recognition in noisy situations, attention and identification of the speech source. To achieve optimal performance and equalize both diverse sensations, one important goal is to compensate for the differences in loudness between both instruments.
Technology is constantly evolving to produce electronic devices increasingly communicable and manipulable, so that both stimulations are balanced, and less effort is needed for the brain to interpret the incoming sound. In this perspective, clinicians are expected to encourage their patients to never abandon their devices, no matter the results measured in the exclusive HA side.
The recommendation is to keep the contralateral ear stimulated until both implantations are found to be the best alternative possible.

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Special Session 13

Audiology Australia -
Research Innovations from Australia: Shaping the Future of Audiology

SS 13-1

UQ CHEAR: Delivering effective, equitable and sustainable solutions for hearing loss - Examples from Culturally responsive hearing services and aged care

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The UQ Centre for Hearing Research (CHEAR) includes researchers across disciplines including audiology, speech pathology, occupational therapy, physiotherapy, engineering, education, psychology, biostatistics and health economics working to develop effective, equitable and sustainable solutions so that everyone can achieve their goals in life without being limited by hearing loss.
Two areas of inquiry include i) culturally responsive hearing services and ii) aged care.
Almost 30% of Australians were born overseas. Australians from culturally and linguistically diverse (CALD) backgrounds are more likely to experience hearing loss, but they are less likely to access hearing services. We are partnering with people from CALD backgrounds and hearing healthcare providers to: a) Understand what helps and hinders children and adults from CALD backgrounds access hearing health care and b) Co-develop and test strategies to help people from CALD communities access hearing health care.
Around 90% of people in aged care have hearing impairment. Up to 60% also have dementia. Hearing needs of aged care residents often go unsupported, resulting in communication difficulties, isolation, greater dependency, confusion, and changed behaviour. We co-designed a home-delivered 'sensory support intervention' with input from residents, family members, aged care staff, and hearing and vision care professionals. We then implemented and evaluated the intervention in terms of feasibility and impact on residents' quality of life, wellbeing and functional ability.
Building on what we've learned from our aged care work, we engaged with >70 hearing, vision and aged care professionals in in 23 countries to develop international practice recommendations for aged care providers to provide hearing/vision support to residents.
These two examples demonstrate why the University of Queensland was identified as the top hearing and SLT research centre in Australia for research quality and impact.

Special Session 13

Audiology Australia -
Research Innovations from Australia: Shaping the Future of Audiology

SS 13-2

Addressing the social and communication impacts of hearing loss

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Acquired hearing loss affects communication for older adults and their families and this, in turn, can influence their ability to maintain and enhance social connections. Such connections are essential for well-being. This presentation will describe two multidisciplinary projects that explore these relationships. The research is being undertaken by audiology, speech pathology and psychology researchers from the University of Queensland Centre for Hearing Research (CHEAR) in Australia.

The first project uses qualitative and quantitative methods to examine the social worlds of older adults who present for hearing assessment and rehabilitation for the first time and how these may change over time if hearing aids are adopted. The second project is the re-development of an evidence-based group communication education program (ACE; Active Communication Education) for adults with hearing loss and their families. ACE has been translated into more than 10 languages and is used in many countries around the world. The new program, ACE Your Hearing, has been co-designed with end users – adults with hearing loss, their families and hearing care professionals – and includes new content and multi-media resources and a new flexible format.

Special Session 13

Audiology Australia -
Research Innovations from Australia: Shaping the Future of Audiology

SS 13-3

Revolutionising Hearing Healthcare with AI: From Industry Trends to NAL's Clinical Solutions

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Artificial Intelligence (AI) is transforming every industry, and hearing healthcare is no exception. AI chips are now becoming available in hearing aids with capabilities that can dramatically benefit people with hearing difficulty. AI solutions are appearing in hearing clinical services with the promise of rapidly changing how hearing care professionals (HCPs) deliver their services. These changes present both challenges and opportunities for HCPs to integrate AI into their practice.

This presentation will provide an overview of the application of AI in healthcare over the past several years and its implications for hearing healthcare. How AI might be used in hearing healthcare, how the role of audiology will evolve as AI is integrated into hearing services, and the ethical considerations in the use of AI in hearing healthcare will be discussed.

In addition, two recent AI-driven innovations for HCPs have been created by NAL, each bringing different solutions to help with the business needs of hearing clinics while elevating the capabilities of HCPs and improving client outcomes:

- COSI 2.0, an AI-powered digital tool that makes it easier for clients to articulate their hearing needs and measures progress with intervention. COSI 2.0 enhances patient engagement, streamlines clinical workflows, and equips businesses with the data needed to validate treatment effectiveness and drive growth.

- Virtual Personas, an AI-powered web tool enabling realistic, dynamic virtual patient interactions to enhance an HCP's communication and counselling skills with patients, producing better business outcomes.

These technologies, their research data, evidence of benefit, and explanation of how they can be incorporated into hearing clinics will be detailed in the presentation. Research at NAL in these areas will be used to provide insight into understanding these changes and provide guidance on how hearing care professionals can manage this evolution.

Special Session 13

Audiology Australia -
Research Innovations from Australia: Shaping the Future of Audiology

SS 13-4

Advancing equity in ear and hearing health for Aboriginal and Torres Strait Islander children: Outcomes from two National Ear Summits

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Aboriginal and Torres Strait Islander children bring deep cultural strengths and resilience yet continue to experience disproportionate and preventable rates of otitis media and hearing loss that can significantly influence language, learning, and life opportunities. Addressing this is a matter of equity and social justice. Building on Australia's world-class newborn hearing screening programs provides an opportunity to co-design an integrated, culturally safe system that ensures equitable access to ear and hearing care throughout childhood.

The Indigenous-led inaugural Ear Summit (May 2023) highlighted structural inequities, systemic racism, and the urgent need for culturally safe, community-led solutions. Guiding principles included shared decision-making, data sovereignty, integrated care models, and accountability. Opportunities for change focused on prevention, clear care pathways, and continuity of care through data linkage and coordinated systems.

Ear Summit II (August 2025) built on these foundations, identifying persistent gaps: lack of specialist services in Aboriginal Community Controlled Health Organisations (ACCHOs), absence of a national framework, fragmented data systems, and misaligned funding. Workforce shortages and policy failures continue to undermine equity, while educational and disability systems exclude children with chronic ear disease from essential supports.

Recommendations from both Summits converge on a co-designed National Framework with Indigenous-majority governance, integrated data strategies, and culturally safe performance indicators. Priorities include embedding ear health in maternal and child health programs, standardising school screening, expanding Aboriginal workforce capacity, leveraging technological innovations, and implementing tools to measure and address racism.

Together, these Summits provide a roadmap for systemic reform and global best practice—toward a connected, sustainable ear and hearing health system that empowers Aboriginal and Torres Strait Islander communities.

Special Session 14

South African Association of Audiologists - Necessity is the Mother of Invention: The South African Story

SS 14-1

This does not make sense, or does it? Cases of sudden idiopathic hearing loss

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This abstract is part of the Special Session titled: Necessity is the mother of invention: The South African story. My presentation is guided by published work, to presenting a South African narrative.
Background: Sudden onset hearing loss (SOHL) is becoming common and presents differently to individuals; hence, it is complex to diagnose. A combination of risk factors associated with this type of hearing, extends beyond the audiology profession. Thus, multi-phased intervention approaches to improve the quality of life (QoL) for the individuals impacted are necessary. In South Africa, the contextual facilitators and challenges impact on ear and hearing healthcare service and coverage. Therefore, the exploration of research designs influence our clinical practice and are warranted. This study aimed to explore the quality-of-life post-onset of SOHL whilst investigating effects on social, emotional and situational subscales to gain a multi-faceted understanding of this complex diagnosis.

Objectives: This study explored the lived experiences of adults post-SOHL diagnosis and the impact on the QoL. Facilitators of emotional and social aspects of counselling provided by audiologists post-SOHL diagnosis were established.

Method: This was a convergent parallel research study. Data were collected from the primary participants and secondary participants, face-to-face and telephonically. The Hearing Handicap Inventory for Adults (HHIA) screening tool and the semi-structured interviews were used for data collection. The data sets were analysed independently, viz. descriptive analysis and thematic analysis, to confirm the impact on the QoL post-SOHL diagnosis.

Results: The HHIA scores obtained were 84% and 50% for P1 and P2, respectively. Key themes that emerged from the interviews revealed that communication difficulties mostly impacted the QoL, which in turn influenced their mental and social well-being. Aural rehabilitation was perceived as ineffective support, thus the inability to reduce the impact on the QoL post-SOHL diagnosis.

Conclusion: The integrated findings indicated the impact on the QoL post-SOHL diagnosis. Convergent parallel methods should be considered by researchers to understand rare auditory pathologies and their impact on the QoL.
Contribution: Person-centred care (PCC) and family-centred care (FCC) are facilitators of counselling that audiologists can employ as QoL management strategies post-SOHL diagnosis.

Special Session 14

South African Association of Audiologists - Necessity is the Mother of Invention: The South African Story

SS 14-2

Does one size fit all? Exploring the effect of hearing aid impulse noise reduction on isiXhosa click sounds: A pilot study

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To advance audiology research in modern day South Africa we have to recognise the injustices of the past to create a better future. Historically, South African audiology research was focused on Afrikaans and English. Currently, no published data exists on how the language characteristics of African languages are processed by hearing amplification technology. Hearing aids are programmed using a fitting rationale that calculates the amount of amplification needed to make sounds audible. Additionally hearing aid features are applied to make non-speech sounds less bothersome while a hearing aid user is listening to speech. Impulse noise reduction was developed to reduce the amplitude of clicks and pops. Due to the acoustic similarities between isiXhosa click sounds and non-speech click sounds e.g, sudden onset and decay, high intensity and broad frequency spectrum - a potential gain limiting risk exists when amplifying isiXhosa click sounds through a hearing aid equipped with the impulse noise reduction feature.
This study investigated the interaction of isiXhosa click sounds and hearing aid signal processing. High quality, single female speaker, recordings were created of words containing the 18 types of isiXhosa click sounds. These recorded words were played in a controlled environment, and the output of one hearing aid, set to a flat 40dB hearing loss, was recorded while using one of two selected commercial fitting rationales (NAL-NL2 and DSL v5.0a) and switching impulse noise reduction on and off.
A factorial ANOVA detected no significant mean gain reduction ($p = .645$) of isiXhosa clicks with impulse noise reduction switched on or off, irrespective of the selected fitting formula. A significant finding was that DSL v5.0a's mean amplitude of isiXhosa click sounds was higher compared to NAL-NL2 ($p < .001$).
In practice this study's findings can be used during clinical decision making. Should more audibility of isiXhosa clicks be required the DSL v5.0a fitting rationale can be selected. In contrast, should more comfort of isiXhosa clicks be required, the NAL-NL2 fitting formula can be selected.
The intention of this study was not only to investigate the interaction of impulse noise reduction and isiXhosa click sounds, but to shed a glimmer of light on the diversity of languages spoken within South Africa and the boundless potential research opportunities that exist within the field of Audiology.

Keywords: Audiology research South Africa, isiXhosa click sounds, hearing aid signal processing, impulse noise reduction, fitting rationales (NAL-NL2, DSL v5.0a), language diversity in audiology.

Special Session 14

South African Association of Audiologists - Necessity is the Mother of Invention: The South African Story

SS 14-3

Cochlear Implantation in South Africa: Strengths, Disparities, and Lessons from a Dual Healthcare System

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Cochlear implantation in South Africa reflects a complex interplay between clinical expertise, patient demographics, and systemic healthcare challenges. As a middle-income country with pronounced socioeconomic inequality and a dual public–private healthcare system, South Africa offers insights that are highly relevant to the global audiology community.

In contrast to many high-income settings where paediatric implantation predominates, South Africa implants a higher proportion of adults. This trend is closely linked to the delayed identification of childhood hearing loss and the inconsistent implementation of newborn hearing screening programmes. Although national policies support early hearing detection and intervention, variable coverage and referral pathways continue to limit timely paediatric implantation.

South African cochlear implant programmes are characterised by strong multidisciplinary team structures and audiologists who acquire extensive additional training beyond standard professional qualifications. South African audiologists often develop advanced competencies through structured mentorship, broad clinical responsibility, and continuity of care across the implant pathway. This expertise supports flexible, evidence-based decision-making for complex indications such as asymmetrical hearing loss and single-sided deafness (SSD). Although many countries apply strict candidacy criteria for these indications, South Africa follows national guidelines while allowing motivated implantation supported by functional outcomes and clinical evidence.

Despite later implantation timelines and access constraints, South Africa demonstrates a low rate of cochlear implant non-use, a high proportion of adult implant recipients, and a strong conversion rate from hearing aid use to cochlear implantation. These outcomes reflect careful candidate selection, comprehensive counselling, and sustained audiologist-led follow-up.

Ongoing challenges include inequities arising from dual medical reimbursement models, fragmented newborn hearing screening, and delayed referrals by non–cochlear-implant–trained audiologists. This presentation provides a narrative overview of cochlear implantation in South Africa and considers lessons applicable to diverse healthcare contexts worldwide.

Special Session 14

South African Association of Audiologists - Necessity is the Mother of Invention: The South African Story

SS 14-4

The development, adaptation and validation of contextually relevant audiology tools

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For Audiology to be relevant, the local context needs to be taken into consideration. The contextual relevance of assessment and monitoring tools is essential for ensuring the validity and applicability of Audiology practice within diverse populations. This paper synthesises findings from several completed research projects to illustrate methodological considerations that support the development of locally appropriate audiological measures. Specifically, it highlights the role of rigorous research design, mixed methods approaches, and participant-informed processes in enhancing the cultural and linguistic suitability of assessment tools for the South African context. Examples include the establishment of normative data for the South African Dichotic Digits Test, the translation and cultural adaptation of the LittlEARS Auditory Questionnaire into isiZulu, and the implementation of the Sensitive Range for Ototoxicity (SRO) technique for high frequency hearing monitoring in patients undergoing treatment for multidrug resistant tuberculosis (MDR TB). Collectively, these studies demonstrate the importance of context-driven adaptation and validation to ensure accurate assessment and equitable service delivery in Audiology.

Special Session 15

Indian Speech-Language and Hearing Association (ISHA) –
Pediatric Hearing Loss Management Pathway in India

SS 15-1

Pediatric Hearing Loss Management Pathway in India

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This session brings together insights on the comprehensive journey of cochlear implantation and rehabilitation for children in India. It will shed light on the evolution of aids/ implantation protocols over two decades. The discussion will address the availability and challenges of rehabilitation services across public and private sectors nationwide, emphasizing cost and accessibility. Long-term care strategies will focus on follow-up challenges and the transition from pediatric to adult hearing services. Outcomes related to speech, education, and communication will be explored (highlighting approaches to oral, total, and bilingual communication), alongwith educational integration and support systems. The session also underscores the importance of using culturally relevant, indigenous tools for children with implants, or aids, examining the frequency and methods of monitoring. Moderated discussions after each presentation will synthesize strengths and identify gaps, concluded by a summary to guide future directions in pediatric hearing loss management in India.

Special Session 16

Taiwan Academy of Otology - Precision Audiology: From Whole Exome Diagnostics to Gene Therapy and AI Prognosis—A Taiwan Perspective

SS 16-1

The Diagnostic Yield and Genetic Spectrum of Whole Exome Sequencing for Hearing Loss in a Tertiary Taiwanese Cohort

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Objective: Hereditary factors account for approximately two-thirds of congenital hearing loss, yet conventional deafness gene panels often fail to identify many causative variants. This study assessed the diagnostic yield and clinical utility of whole-exome sequencing (WES) in patients with presumed hereditary sensorineural hearing loss (SNHL) in Taiwan.

Materials & Methods: Fifty-one patients with suspected hereditary SNHL from two tertiary medical centers underwent WES using Illumina NovaSeq platforms. Variant calling and annotation were performed using standard bioinformatic pipelines and Geneyx software, with pathogenicity referenced against ClinVar and OMIM databases.

Results: Causative variants were identified in 28 of 51 patients (diagnostic yield: 54.9%) across 11 different genes. No pathogenic variants were detected in 23 patients (45.1%). Importantly, we identified pathogenic variants in genes such as MPZL2, USH2A, MYO7A, MYO15A, TMPRSS3, TMC1, TECTA, and PAX3. Many of these are not included in standard targeted deafness gene panels used in tertiary medical centers, demonstrating the superior diagnostic value of WES for identifying rare or non-syndromic variants.

Conclusions: WES substantially improves genomic diagnosis in hereditary SNHL by expanding detection beyond traditional panels. Integrating WES into routine clinical practice facilitates precision diagnosis, enhances genetic counseling, and optimizes personalized management strategies for patients with hearing impairment.

Special Session 16

Taiwan Academy of Otology - Precision Audiology: From Whole Exome Diagnostics to Gene Therapy and AI Prognosis—A Taiwan Perspective

SS 16-2

Genetic Underpinnings and Management of Late-Onset and Adulthood Hearing Loss

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Adult-onset sensorineural hearing loss (SNHL) is commonly attributed to aging or cumulative environmental exposure. However, growing evidence suggests that a significant proportion of bilateral progressive hearing loss in adults has an identifiable genetic contribution. For hearing healthcare professional, recognizing when hearing loss may have a hereditary basis is increasingly important, as genetic diagnosis can influence prognosis, counseling, amplification strategy, and long-term management.

Autosomal dominant variants such as KCNQ4, COCH, and WFS1, as well as mitochondrial mutations including m.1555A>G, are increasingly recognized in adult clinics. These conditions often present with characteristic audiometric configurations, predictable progression patterns, or associated vestibular findings. Identifying such patterns can prompt appropriate referral for genetic evaluation and interdisciplinary care.

In addition, variants in GJB2, traditionally associated with congenital hearing loss, are now recognized as contributors to mild, progressive, or even late-onset phenotypes. The GJB2 c.109G>A (p.Val37Ile) variant, particularly prevalent in East Asian populations, demonstrates variable expressivity and incomplete penetrance. Individuals harboring this variant may present with subtle high-frequency or mild bilateral hearing loss that progresses over time and is often misclassified as early presbycusis. Recognition of this genotype–phenotype correlation is clinically important, as it reframes certain adult-onset cases as genetically mediated rather than purely age-related.

Importantly, genetic information may guide clinical decisions: anticipating progression to optimize timing of hearing aid fitting or cochlear implantation, avoiding ototoxic medications in susceptible individuals, and facilitating family counseling and cascade screening. Furthermore, accumulating evidence suggests that so-called presbycusis represents biologically heterogeneous subtypes influenced by gene–environment interaction rather than uniform age-related decline.

This presentation will provide a practical framework for hearing healthcare professional to identify red flags for genetic hearing loss, integrate genetic considerations into diagnostic work-up, and apply results to individualized rehabilitation planning. As precision medicine advances, incorporating genetic insight into routine audiology practice represents a critical step toward individualized, lifespan-oriented hearing care.

Special Session 16

Taiwan Academy of Otology - Precision Audiology: From Whole Exome Diagnostics to Gene Therapy and AI Prognosis—A Taiwan Perspective

SS 16-3

AI-Based Predictive Modeling for Clinical Course and Prognosis in Hereditary Hearing Impairment

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Purpose: Recessive GJB2 variants are the leading cause of hereditary hearing impairment and may contribute to progressive sensorineural hearing impairment (SNHI). However, the clinical course varies between individuals. The aim of this study is to establish a machine learning-based predictive model for GJB2-related SNHI to facilitate personalized medical planning and timely intervention.

Method: We retrospectively collected individuals with biallelic GJB2-related SNHI from a nationwide cohort between 2005 and 2022 were included. The dataset was randomly partitioned into training, validation, and test sets in a 72:8:20 ratio. Ten independent iterations were performed and the results were averaged. Various combinations of data preprocessing strategies and computational algorithms were evaluated, and the highest performing prediction model was selected. Model performance was assessed by the mean absolute error (MAE), as a measure of the deviation between predicted and actual hearing thresholds.

Results: Deep learning analysis was conducted on 2,184 audiometric measurements obtained from 449 individuals. Progressive SNHI was consistently observed across all models, regardless of age, sex, or genotype. The average rate of hearing deterioration was 0.61 dB HL per ear. The long short-term memory model achieved the best performance, yielding an average MAE of 4.34 dB HL and maintaining acceptable accuracy extending to four years.

Conclusions: We developed a machine learning based prognostic model to estimate a realistic hearing progression in GJB2-related SNHI. By translating predicted hearing trajectories into personalized surveillance strategies, this model facilitates clinical decision making and optimizes follow up planning.

Special Session 16

Taiwan Academy of Otology -
Precision Audiology:
From Whole Exome Diagnostics to Gene Therapy and AI Prognosis—A Taiwan Perspective

SS 16-4

Preclinical Gene Therapy for Hereditary Hearing Loss: Lessons from SLC26A4 and PJVK Models

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Background:
Hereditary hearing loss accounts for over half of congenital sensorineural hearing impairment cases. Gene therapy offers a promising strategy to address the underlying genetic causes of deafness. Mutations in PJVK and SLC26A4 represent important etiologies of hereditary hearing loss through distinct mechanisms affecting sensory hair cells, spiral ganglion neurons, and cochlear ion homeostasis. We investigated the therapeutic potential of adeno-associated virus (AAV)–mediated gene therapy in mouse models of these disorders.
Methods:
For PJVK-related deafness (DFNB59), a knock-in mouse model carrying the Pjvk p.G292R mutation was treated with a synthetic Anc80L65 AAV vector delivering the human PJVK transgene via neonatal round window membrane injection. Audiological, histological, and behavioral analyses were performed to assess auditory and vestibular outcomes.
For SLC26A4-related hearing loss (DFNB4/Pendred syndrome), we used a clinically relevant Slc26a4 L236P mutant mouse model that recapitulates progressive hearing loss and enlarged endolymphatic sac. An Anc80L65 vector carrying human SLC26A4 was delivered to evaluate therapeutic windows and functional recovery.
Results:
In the PJVK model, gene delivery resulted in robust transduction of cochlear hair cells and spiral ganglion neurons, restoring neuronal density and improving hearing thresholds and vestibular function.
In the SLC26A4 model, postnatal gene therapy significantly improved auditory brainstem response thresholds, preserved outer hair cells, partially restored endocochlear potential, and reduced endolymphatic sac enlargement, with durable benefits into adulthood.
Conclusion:
These findings demonstrate that AAV-mediated gene therapy can rescue key pathological features in multiple forms of hereditary hearing loss and support the feasibility of translating inner ear gene therapy toward clinical application.

Special Session 16

Taiwan Academy of Otology -
Precision Audiology:
From Whole Exome Diagnostics to Gene Therapy and AI Prognosis—A Taiwan Perspective

SS 16-5

Clinical Trial Site Experience: Advances in Gene Therapy for Otoferlin-Mediated Hearing Loss

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Pathogenic variants in the otoferlin (OTOF) gene are a significant cause of auditory neuropathy and severe-to-profound sensorineural hearing loss, particularly in pediatric populations. While cochlear implantation has been the standard intervention, recent advancements in gene therapy offer a promising alternative. This presentation will share the National Taiwan University Hospital's (NTUH) comprehensive experience as a clinical trial site for OTOF gene therapy, focusing on the AK-OTOF-101 trial. I will detail our approach, including the establishment of a robust clinical trial infrastructure, the minimally invasive surgical delivery method, and the essential role of multidisciplinary teamwork involving experienced audiologists and genetic counselors. Preliminary results from our site, which initiated its first gene therapy in December 2023, are promising, demonstrating the potential for hearing restoration in affected individuals. I will also discuss the unique challenges encountered, such as patient recruitment, long-term follow-up, and the critical need for ongoing patient and parent counseling regarding the balance between gene therapy and conventional treatments like cochlear implants as a backup. Our experience highlights the collaborative effort required to advance gene therapy for hearing loss and offers insights for future clinical endeavors in this rapidly evolving field.

Special Session 17

Beijing Society of Audiology - Digital Hearing Healthcare: Technology Innovations, Implementation, and Future Directions

SS 17-1

Reimagining Hearing Care: How Artificial Intelligence and Digital Therapeutics Are Transforming Rehabilitation Pathways

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Digital transformation is reshaping audiological rehabilitation by enabling more precise, scalable, and continuous models of care. This presentation highlights how artificial intelligence (AI) enhances rehabilitation pathways for hearing and balance disorders by supporting accurate symptom triage, guiding referral decisions, and delivering personalized intervention through predictive analytics and adaptive algorithms. AI-driven tools—including conversational agents and real-time monitoring—facilitate dynamic adjustment of treatment strategies and extend clinical oversight beyond traditional settings. Complementing this, digital therapeutics (DTx) leverage structured, evidence-based web and mobile platforms to deliver clinician-guided self-management programs ranging from brief single-session interventions to multi-week protocols. When combined, AI and DTx create highly individualized rehabilitation experiences, improve engagement through targeted nudging, monitor outcomes continuously, and offer scalable solutions for patients with limited access to specialty care. This talk synthesizes current evidence, implementation considerations, and future directions for integrating AI-enabled decision support and digital therapeutics into global audiologic practice, with implications for clinical workflows, workforce training, and equitable access.

Special Session 17

Beijing Society of Audiology - Digital Hearing Healthcare: Technology Innovations, Implementation, and Future Directions

SS 17-2

Towards Next-generation Brain-inspired Hearing Technology

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Modern hearing assistive devices often fall short in challenging real-world environments, such as crowded restaurants, where background noise and overlapping conversations make speech comprehension extremely difficult. While individuals with normal hearing can effectively focus on a desired speaker and filter out interfering sounds, current algorithms in hearing aids do not effectively isolate and amplify the intended voice in such situations. This challenge is compounded by the limited computing power of these devices, preventing the deployment of advanced speech enhancement technologies.

In this talk, I will present our latest research in brain-inspired hearing technologies aimed at overcoming these limitations. First, I will introduce energy-efficient neuromorphic speech processing algorithms powered by spiking neural networks, which mimic the brain's neural structure and processing mechanisms. Our proposed neuromorphic solutions can outperform state-of-the-art deep learning methods in both speech quality and energy efficiency, making them highly suitable for resource-constrained hearing aids. Second, I will discuss neural-steered speech enhancement technologies that pave the way for intelligent, adaptive hearing devices. By employing a real-time auditory attention decoding model, we utilize EEG signals to identify the listener's focus of attention. Leveraging these decoded neural indicators, our target speaker extraction model can isolate and enhance the desired voice from noisy environments, significantly reducing the effort required by hearing aid users to follow conversations in complex acoustic settings. Together, these innovations represent a promising leap toward hearing assistive devices that can seamlessly adapt to dynamic listening environments, ultimately improving the quality of life for individuals with hearing loss.

Special Session 17

Beijing Society of Audiology -
Digital Hearing Healthcare: Technology Innovations, Implementation, and Future Directions

SS 17-3

Using artificial intelligence for training and suggesting aural rehabilitation activities

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Access to hearing services in low- and middle-income countries is limited by the number of trained personnel, and artificial intelligence could offer a transformative solution by enabling fast generation of healthcare training videos in different languages and aural rehabilitation activities. In this two-part talk, the processes, issues and challenges in using AI to meet these needs will be discussed.
The first part of the talk will discuss the process used to generate appropriate videos to train hearing care workers and educate parents. Four steps were used to generate the videos using AI and evaluate in our study: (1) Videos were generated using pre-existing university level education materials and catered to individuals without training in hearing care; (2) Individuals without experience using AI to generate videos were provided written instructions to generate a video; (3) The video was translated into Chinese and Spanish; and (4) The videos were evaluated by audiologists who are native speakers for informativeness, accuracy of content, clarity of content, general translation accuracy, translation accuracy of technical terms, cultural appropriateness, and naturalness of avatar. Comments regarding the last three steps were collected from participants to inform future development and asses the content and feasibility of these videos for training hearing care workers.

In the second part of the talk, the pros and cons, issues and challenges in using AI to come up with aural rehabilitation activities will be reviewed. Speech and hearing students generated aural rehabilitation activities using AI and commented on the appropriateness of the activities for a pediatric case. Their findings were summarized and will be shared.

Special Session 17

Beijing Society of Audiology - Digital Hearing Healthcare: Technology Innovations, Implementation, and Future Directions

SS 17-4

Toward Scalable Hearing Evaluation: A Sparse Auditory Representation Based on Atomic Speech

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Objective: Conventional hearing evaluation methods predominantly rely on continuous speech signals, which contain high levels of redundancy that often mask subtle deficits in central auditory processing. Furthermore, existing tests are frequently device-specific or population-limited, making it difficult to scale assessments across diverse groups such as normal-hearing (NH) individuals, the elderly, and cochlear-implant (CI) users. This study proposes a scalable and perceptually grounded framework based on "Atomic Speech," a sparse auditory representation designed to isolate central spectro-temporal integration efficiency from peripheral audibility by quantifying the minimum information rate required for speech understanding.

Design: The Atomic Speech framework defines speech as a collection of discrete, spectro-temporally compact Gabor atoms, specifically realized as Gaussian-enveloped tones (GET). The signal processing model decomposes input speech through a 32-channel filter bank and employs a deterministic undersampling strategy. Within each temporal frame, an n-of-m maxima selection (typically 4-of-32) identifies the most salient energy peaks, which are then resynthesized as isolated atoms. This framework offers unprecedented flexibility, allowing independent manipulation of atom rates, spectral density, and binaural configurations to probe the limits of the "auditory speech mode." A specialized application of this model, the GET vocoder, was developed to simulate the pulsatile nature of modern CI coding strategies like the Advanced Combination Encoder (ACE). By directly mapping individual electric pulses to acoustic Gabor atoms, the framework serves as a high-fidelity interface between neuroprosthetic encoding and acoustic perception. Behavioral measures include the Atom-Rate Reception Threshold (ARRT) and the Dichotic Integration Index (DII), which quantifies the central cost of integrating complementary information partitioned across the two ears.

Results: Experimental results with NH listeners reveal that speech remains highly intelligible at a total atom rate as low as under 80 pps, demonstrating that the human auditory system can reconstruct linguistic meaning from extremely sparse spectro-temporal cues. However, this efficiency is significantly compromised under dichotic conditions, where atoms are randomly assigned to opposite ears. The framework successfully dissociated the effects of aging from peripheral hearing loss: older adults required significantly higher atom rates and exhibited a larger binaural integration cost (DII), suggesting that the model is uniquely sensitive to age-related central spectro-temporal integration deficits.
Furthermore, the GET-based CI simulation demonstrated superior predictive power compared to traditional sine-wave or noise vocoders. In a battery of speech-in-noise and phoneme recognition tasks, the GET model accurately replicated the perceptual patterns, speech reception thresholds, and phoneme confusion matrices of experienced CI users. This success is attributed to the framework's ability to faithfully replicate all signal processing stages of the real prosthesis, including amplitude compression and temporal quantization, which continuous-carrier models often omit. Objective evaluations using the Extended Short-Time Objective Intelligibility (ESTOI) metric further validated these findings, showing high correlation with subjective perceptual trends across various sparse configurations.

Conclusions: The proposed Atomic Speech framework provides a versatile and scalable tool for hearing evaluation. By treating speech as a combination of discrete atoms rather than a continuous wave, it enables a "stress test" of the auditory system that is applicable across different listeners and devices. The flexibility of the sparse representation allows for the early detection of subclinical central deficits in aging populations and provides a robust scientific foundation for predicting neuroprosthetic performance. This approach paves the way for future digital hearing healthcare applications, including remote large-scale screening, personalized rehabilitation, and data-driven optimization of auditory prosthesis parameters.

Innovation Session 01

IN 01-1

Innovating objective diagnostic hearing assessment with SOFI by MindAffect: Rapid, sedation-free diagnostic audiograms within 10 minutes

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Ceo, Mindaffect, Netherlands

Authors: Mark Van Kesteren/ Timothé Guyonnet-Hencke - MindAffect B.V., The Netherlands

Background: Unaddressed hearing loss affects over 1.6 billion people worldwide, disproportionately impacting populations unable to reliably complete subjective hearing tests—such as infants, elderly adults, and individuals with cognitive or physical impairments. These diagnostic gaps contribute to delayed intervention and long-term cognitive and social consequences.

Objective: To present Sofi®, a novel, non-invasive hearing assessment technology designed by the FDA as a Breakthrough Device pending 510k certification, using cortical auditory evoked potentials (CAEPs) and artificial intelligence (AI) to deliver rapid, objective measurements without the need for patient response or sedation.

Methods: Sofi® uses a semi rigid 8-channel EEG headset to capture brain responses while the patient listens passively to brief sound stimuli (chirps) and watches a silent video. The system's proprietary Rapid-CAEP® stimulation protocol and advanced signal processing allow accurate detection of late latency auditory brain responses on awake subjects. AI-driven analysis interprets auditory evoked responses in real time, compensating for movement and environmental noise. The result is an automated multi frequency air- or bone-conduction measurement generated within minutes on awake patients.

Results: Preliminary trials conducted at the University of Oldenburg in 2023 demonstrated that Sofi® achieves hearing threshold estimations within 7 dB of standard pure-tone audiometry in under 10 minutes. The system received the 2024 WCA Innovation Award for its clinical potential. Regulatory certification is in progress. Sofi has been granted Breakthrough Device Designation by the FDA in December 2025.

Conclusion: Sofi® represents a significant step forward in accessible hearing care, enabling reliable, objective measurements in populations historically underserved by conventional methods. Its speed and ease of use make it a promising tool across clinical and community settings.

Innovation Session 01

IN 01-2

Audiso: Building an Ecosystem for Intelligent Hearing Screening and Tele-consultation via Kiosks

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As global populations age rapidly, hearing loss has emerged as a significant public health challenge, with early detection and intervention being critical to preventing secondary issues such as cognitive decline and social isolation. However, traditional hearing diagnostics often require expensive equipment and on-site professional operation, creating accessibility barriers in medically underserved regions.This paper presents Audizo (WithHearing), an intelligent kiosk-based hearing screening system designed to bridge these gaps. Developed by Audiso Co., Ltd., Audiso integrates automated pure-tone audiometry (PTA), AI-driven eardrum image analysis, and standardized self-reported questionnaires (RHHI-K) into a single, user-friendly platform. The system employs a proprietary algorithm for real-time ambient noise monitoring and automatic threshold detection, ensuring clinical-grade reliability (IEC 60645-1 Type 3/4) even in non-clinical environments.Beyond simple screening, Audiso establishes a comprehensive hearing healthcare ecosystem by connecting kiosk-generated data with Electronic Medical Records (EMR) and Personal Health Records (PHR) for seamless tele-consultation and remote hearing aid fitting. Featuring a "Silver UX" optimized for the elderly, Audizo serves as a proactive healthcare hub in community centers, military units, and schools. This ecosystem-based approach not only decentralizes hearing care but also provides a scalable, data-driven platform for life-cycle hearing management.Keywords: Hearing Screening, Kiosk, Artificial Intelligence, Tele-consultation, Hearing Healthcare Ecosystem, Pure-tone Audiometry.

Innovation Session 01

IN 01-3

From hearing rehabilitation to cognitive protection: AI-driven acoustic stimulation as a digital therapeutic

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CEO, Voinosis Inc., Korea

Grace Jung Eun, Min Dong Hun, Yu Si Hyun, Lee heonui, Eun Yi Kim
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[Abstract] In recent years, the intersection of auditory rehabilitation and cognitive health has gained significant attention in the field of audiology. This abstract presents HAHA, a pioneering product developed by Voinosis, which leverages artificial intelligence (AI) to offer acoustic stimulation as a digital therapeutic for patients with cognitive impairments. HAHA is designed to enhance cognitive function through carefully curated auditory stimuli that engage neural pathways associated with hearing and cognition.

The program employs an individualized approach, utilizing AI algorithms to tailor auditory experiences based on patient-specific profiles and needs. Preliminary studies indicate that consistent engagement with HAHA not only improves auditory processing but also contributes to cognitive preservation and enhancement. By integrating sound therapy with cognitive rehabilitation, HAHA represents a novel paradigm in the management of cognitive decline, suggesting that auditory stimulation can serve as a protective factor for cognitive health.

This presentation will explore the development, implementation, and efficacy of HAHA, highlighting its potential to transform therapeutic practices in audiology. As we move from traditional hearing rehabilitation methods to innovative, AI-driven solutions, HAHA stands at the forefront of redefining the role of auditory stimulation in cognitive protection.

Best Oral Presentation 01

Tinnitus and Hyperacusis
BOP 01-1

Rare Mutations in the PRKRA Gene Linked to Mild Cognitive Impairment and Tinnitus

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Background: Tinnitus and high-frequency hearing loss (HFHL) frequently co-occur with cognitive decline in older adults, yet the genetic correlation between these traits remains unclear. The goal of this study is to elucidate the synaptic genes that are strongly associated with mild cognitive impairment (MCI), tinnitus and its comorbidities (hyperacusis, hearing loss and depressive symptoms) using rare variant analysis.

Methods: A cohort of 294 adults with chronic tinnitus from five European clinical centers underwent auditory and cognitive assessment in an interventional randomized controlled trial (NCT04663828). Whole Genome Sequencing data from 75 patients with MCI at baseline were analyzed to identify synaptic genes with a burden of rare mutations. In silico protein modelling was conducted on candidate genes and their respective variants to assess their consequence on the protein.

Results: Tinnitus patients with MCI were significantly older and exhibited greater HFHL compared to non-MCI individuals. Rare loss-of-function (LoF) variants in PRKRA were enriched in 15% of MCI cases that presented with mild-to-moderate tinnitus. These variants resulted in mutant PACT protein (PRKRA gene) lacking the dsRBM3 domain, which was predicted to show increased binding affinity to the protein kinase PKR. Among carriers of variants in the MCI gene burden set, particularly PRKRA, cognitive performance strongly correlated with tinnitus handicap scores, but not with hyperacusis or HFHL thresholds. This association was independent of APOE ε4 genotype. These findings support that LoF variants in PRKRA interfere with tinnitus-brain networks and cognitive function by vertical pleiotropy.

Conclusions: Rare PRKRA mutations are linked to tinnitus and MCI, but not to HFHL or hyperacusis. These findings suggest a shared pathogenic mechanism involving dysregulated stress response via PKR activation that underlines both tinnitus-brain networks and cognitive decline in non-Alzheimer's dementia.

Funding: EU Horizon 2020 Grant #848261; American Tinnitus Association (Grant #1329287)

Keywords: Tinnitus disorder, Cognitive decline, Hearing loss

Best Oral Presentation 01

Vertigo and Balance Disorders
BOP 01-2

ROBOTIC INSERTION OF COCHLEAR IMPLANTS HELPS PRESERVE VESTIBULAR FUNCTION IN CHILDREN

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Objectives
To analyze the impact of robotic-assisted electrode insertion (RobOtol®) on vestibular function in a pediatric population receiving cochlear implantation.
Methods
This single-center retrospective study included 80 ears from pediatric patients who underwent cochlear implantation: 42 in the robotic-assisted group (2021–2024) and 38 in the manual group (2015–2020). All surgeries were performed by the same surgeon. Vestibular function was assessed pre- and postoperatively using objective tests, including cervical vestibular evoked myogenic potentials (cVEMP) and video head impulse test (vHIT). Subpopulations were defined based on the availability of complete vestibular data: 68 ears were included in the cVEMP analysis and 74 in the vHIT analysis. Statistical analysis was performed using Fisher's exact test and Wilcoxon rank-sum test.
Results
In the robotic group (N=36), 100% of the sample preserved saccular function (cVEMP), compared to 85% (N=27/32) in the manual group, with a statistically significant association favoring robotic insertion (p=0.02). vHIT analysis revealed no statistically significant differences between groups in canal function preservation; 92% (N=36/39) of the robotic group and 100% (N=35/35) of the manual group maintained normal canal responses postoperatively. Delta-gain analysis for vHIT showed no significant changes for any canal (anterior: p=0.75; lateral: p=0.06; posterior: p=0.92).
Conclusions
Robotic-assisted electrode insertion appears to protect saccular function more effectively than manual techniques in pediatric cochlear implantation. No significant differences were found in canal function preservation. Further studies are needed to confirm these findings and explore the role of robotic systems in reducing surgical trauma.

Keywords: Robotol, Pediatric Cochlear implant, Vestibular function

Best Oral Presentation 01

Global Audiology and Public Health
BOP 01-3

Economic Evaluation of Hearing Rehabilitation Strategies Among Older Adults in Korea: Comparative Cost-Effectiveness of Hearing Aids and Low-Cost Hearing Technologies

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[Purpose]
With the rapid aging of South Korea's population, hearing loss has become increasingly prevalent, yet access to affordable rehabilitation remains limited. This study compared the economic value of hearing rehabilitation options among older adults, including hearing aids, personal sound amplification products (PSAPs), and smartphone-based hearing assistive applications.

[Methods]
A Markov state-transition model simulated lifetime costs and health outcomes for individuals aged 50 years or older with at least mild hearing loss. Analyses were conducted from a societal perspective, incorporating both deterministic and probabilistic sensitivity analyses to address uncertainty.

[Results]
All interventions were found to be cost-effective relative to no intervention, with incremental cost-effectiveness ratios (ICERs) below South Korea's willingness-to-pay threshold, defined as per-capita gross domestic product (USD 31,721 in 2020). Hearing aids yielded the greatest QALY gains, whereas PSAPs and smartphone-based applications offered cost advantages with reasonable effectiveness. Probabilistic analyses confirmed consistent cost-effectiveness across model assumptions.

[Conclusion]
These findings suggest that integrating low-cost assistive technologies alongside hearing aids could expand access to auditory rehabilitation and reduce the economic burden of untreated hearing loss in the aging Korean population. The results provide an evidence base for policymakers to design accessible and efficient hearing-care subsidy programs.

Keywords: Hearing rehabilitation, Cost effectiveness, Elderly

Best Oral Presentation 01

Global Audiology and Public Health
BOP 01-4

Population Hearing Health Care (PopHHC): Advancing Global Collaboration in Population-Based Hearing Research

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Purpose:
The Population Hearing Health Care (PopHHC) working group was established in 2014 to advance population-based approaches in hearing health research, education, and policy. Since 2021, PopHHC has received support from the U.S. National Institutes of Health to convene annual scientific meetings that strengthen interdisciplinary collaboration. The purpose of this session is to introduce PopHHC's mission, summarize its recent progress, and invite engagement from the international audiology community to broaden global participation.
Methods:
PopHHC activities are structured around three aims. Aim 1: Hearing Health Research seeks to expand shared resources, including databases, metrics, and analytic tools, to enhance connections among population hearing health researchers worldwide. This is achieved through invited expert panels, mentoring sessions, and collaborative workshops. Aim 2: Research Across Disciplines promotes collaboration with experts in related fields such as public health, gerontology, primary care, pediatrics, and nursing by supporting cross-disciplinary participation through invited talks and structured discussions, with a focus on diverse global perspectives. Aim 3: Training Future Researchers focuses on developing a diverse next generation of population hearing health investigators through mentoring, competitive travel awards, and accessible virtual participation, ensuring that trainees from various regions and backgrounds are actively included in all sessions.
Results:
Since 2021, PopHHC annual meetings have drawn increasing participation from researchers, clinicians, and trainees across multiple disciplines and countries. Outcomes include the establishment of new interdisciplinary partnerships, collaborative grant proposals, and expanded representation of early-career and underrepresented scholars.
Conclusion:
This session will share lessons learned from PopHHC's first decade and explore strategies to strengthen global engagement. Attendees will be invited to provide input on future directions to enhance population-level approaches to hearing health research and policy worldwide.

Keywords: Population hearing health, Global audiology, Interdisciplinary research

Best Oral Presentation 01

Future E-Health, Innovative Technology and Therapies
BOP 01-5

Automating hearing assessments for all: ATHENA project

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Automatic speech recognition (ASR) technology has the potential to revolutionise hearing screening, as clinical care has limited resources and older adult populations continue to increase in number. Nevertheless, current ASR systems are designed to optimally work decoding speech from native-speakers, healthy, and relatively young adults. Through the ATHENA (Automating hearing assessments for all) project, we coupled two open source ASR systems (Kaldi-NL and Whisper) to four traditional and widely used speech audiometry tests: speech in quiet, speech in noise, speech in speech masker, and vocal emotion recognition. The ASR systems are used to automate the scoring of the speech audiometry tests. First, the performance of the ASR systems is evaluated per speech audiometry test, as the impact of decoding errors in the test results, allowing for the identification of what the ASR customisation should include to improve the system's usability for a large number of user groups. Examples of such user groups include children, older adults (of varying cognitive status), non-native speakers, and hearing-impaired individuals. As a second step, we explore the respective ASR customisation, including the post-processing of the output transcript (e.g, removing utterances or non-test related words), limiting the ASR lexicon per test (to words related to or included in the test speech material), fine-tuning and data augmentation. Finally, the coupled systems (speech audiometry test and customised ASR) are evaluated with respect to system robustness, reliability, and accessibility for clinical and non-clinical use.

Keywords: Speech audiometry, Automatic speech recognition, Inclusive technology

Best Oral Presentation 01

Future E-Health, Innovative Technology and Therapies
BOP 01-6

Automated Question and Answering Based Speech-in-Noise Test Using Large Language Models

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This study developed and evaluated a self-supervised conversational sentence-in-noise test using machine learning and compared its validity (detecting hearing loss) and reliability (consistency across two runs) with those of a standard clinical test.

Two tests were used. 1) the new Conversational Hearing Assessment Test (CHAT), designed to evaluate hearing by measuring participants' ability to understand and respond to simple questions. 500 statements-question pairs were generated using ChatGPT and converted to speech with a text-to-speech model. Generated stimuli were mixed with background noise and presented to the participants. They were then asked to answer the question. Their spoken responses were transcribed with automatic speech recognition, and ChatGPT evaluated the answer. 2) the Adaptive Sentence List (ASL) test, a clinical test, in which sentences were mixed with noise and participants verbally repeated the presented sentence. Their response was scored by the researcher to determine whether they repeated the word correctly or not. Both tests measured speech reception thresholds using an adaptive up–down procedure. Reliability was assessed with Bland–Altman analyses, and limits of agreement between two runs of the same test were reported. Validity was evaluated using the ROC curve (AUC and Youden index) to classify participants as normal hearing or hearing impaired. 40 native speakers were recruited (20 normal hearing, 20 hearing impaired).

For reliability, two runs of the ASL test had limits-of-agreement of ±3.1 dB, while this was ±3.6 dB for the CHAT. For validity, the ASL test reached an AUC of 0.93 and Youden index of 0.71, while CHAT had an AUC of 0.97 and Youden index of 0.89. These findings indicate that CHAT achieved validity and reliability comparable to the ASL test, demonstrating its potential as an ecologically valid, accurate and reliable test. Moreover, because CHAT operates without a human supervisor, it can be performed online and remotely.

Keywords: Conversational hearing test, Speech-in-noise, Artificial intelligence

Best Oral Presentation 01

Others
BOP 01-7

AUDITORY SENSORY GATING IN MISOPHONIA: A NEUROPHYSIOLOGICAL EVALUATION

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Purpose of the Study

Misophonia is characterized by strong emotional and physiological responses to specific everyday sounds, such as chewing or breathing. While behavioral manifestations have been documented, its underlying neural mechanisms remain unclear. Auditory sensory gating, a pre-attentive inhibitory process that filters redundant auditory information, provides an objective measure of cortical inhibitory function. This study aimed to examine auditory sensory gating in individuals with and without misophonia using cortical auditory evoked potentials (CAEPs).

Methods

Thirty adults (aged 18–35 years) participated in the study, including 15 individuals with misophonia and 15 age- and gender-matched controls. Inclusion was based on the criteria from Schröder et al. (2013) and the MisoQuest Questionnaire (Siepsiak et al, 2020). Sensory gating was assessed using a conditioning–testing (S1–S2) paradigm, consisting of paired 250 Hz tone bursts (50 ms duration, 500 ms interstimulus interval, and 7 s interpair interval). CAEPs were recorded at the Cz electrode site using a four-channel Intelligent Hearing Systems SmartEP module. P1, N1, and P2 peak latencies and amplitudes were analyzed for S1 and S2 stimuli, and gating ratios (S2/S1 × 100) were computed. The relationship between gating indices and Revised Amsterdam Misophonia Scale (RAMISO-S) scores was evaluated.

Results

Individuals with misophonia exhibited significantly reduced N1–P2 amplitude suppression ($p < .05$) compared to controls, indicating attenuated sensory gating and diminished cortical inhibition. Higher RAMISO-S scores were associated with poorer gating efficiency, suggesting that greater symptom severity relates to impaired auditory regulation.

Conclusions

The findings demonstrate distinct neurophysiological alterations in individuals with misophonia, characterized by impaired auditory sensory gating. These deficits may serve as potential electrophysiological markers of abnormal cortical inhibitory processing. The results enhance our understanding of misophonia's neural basis and support the integration of electrophysiological measures into diagnostic and therapeutic frameworks.

Keywords: Misophonia · Sensory Gating, Sensory Gating, Cortical Auditory Evoked Potentials

Best Oral Presentation 01

Others

BOP 01-8

Subcortical–Cortical Electrophysiological Interrelationships

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Background: Age-related changes at lower levels of auditory processing may cascade to higher levels along the auditory pathway. This study investigates electrophysiological interrelationships between subcortical and cortical responses along the hierarchical auditory pathway in the aging auditory system and examines whether amplitude-based and latency-based interrelationships reflect distinct neural mechanisms across successive stages.

Methods: Participants included 30 young normal-hearing adults (YNH), 26 older adults with normal hearing (ONH), and 26 older adults with age-related hearing loss (OHL). Auditory middle latency responses (AMLRs) and late latency responses (ALLRs) were recorded using the speech syllable /ba/ and 500 Hz tone bursts at 110 dB peSPL. Correlations (r) between the Pa of the AMLR and the N1–P2–N2 of the ALLR were analyzed for latency and amplitude.

Results: Significant amplitude-based correlations were observed in the ONH and OHL groups, but not in the YNH group. In older listeners, larger Pa amplitudes were associated with increased N1, P2, and N2 amplitudes, independent of hearing status, suggesting that lower-level processing is linked to later cortical responses. In contrast, YNH listeners showed no amplitude-based interrelationships, except for the correlation between Pa and N1 amplitudes. Latency-based correlations were significant across all groups, with prolonged Pa latencies associated with delayed N1, P2, and N2 latencies regardless of age or hearing status.

Discussion and Conclusion: Findings demonstrate electrophysiological interrelationships between subcortical and cortical responses in the aging auditory system. With advancing age, neural information may be overloaded at higher stations due to weakened filtering and increased central gain, reflecting loss of inhibitory control. In the young auditory system, higher cortical responses may rely less on early sensory encoding. Across all groups, subcortical timing delays carried over to cortical responses, indicating that earlier transmission timing may shape processing speed at later stages. Amplitude and latency appear to reflect distinct neural mechanisms.

Keywords: Exogenous auditory evoked potentials, Aging auditory system, Electrophysiological interrelationships

Best Oral Presentation 02

Auditory Screening and Diagnosis
BOP 02-1

Development and Standardization of a New Test for the Evaluation of the Development of Sound Localization Abilities in Children Using the Immersion 360° System

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Purpose
Sound localization is a critical component of auditory perception and plays a central role in environmental awareness, safety, and social communication. Despite its importance, standardized clinical protocols for evaluating spatial hearing in children are scarce. This study aimed to develop and validate a simple test to assess horizontal sound localization in children across a wide age range, using the Immersion 360° system. We also aim at gathering normative developmental data to facilitate future assessments in hearing-impaired populations.
Methods
A total of 88 participants were recruited: 50 normal-hearing children aged 2.08–12.92 years and 12 normal-hearing adults. A subset of 26 hearing-impaired children with varying hearing assistive technologies were also tested for feasibility and exploratory comparisons. Localization accuracy was measured during a 27-trial loudspeaker identification task spanning 180° of the frontal plane.
Results
Localization accuracy improved significantly with age. An exponential decay model predicted 75% of adult-level performance by 3.39 years and 90% by 5.62 years. The test demonstrated high reliability (Cronbach's $\alpha = 0.896$), with fast completion times (~2 minutes). Hearing-impaired children, particularly cochlear implant users, showed poorer localization performance. The test was well tolerated across age groups, though younger children (2–3 years) exhibited greater variability and non-completion.
Conclusion
This protocol offers a rapid, reliable, and developmentally appropriate method for assessing sound localization in children. It holds promise for clinical application in both normal-hearing and hearing-impaired populations and may inform early intervention strategies.

Keywords: Sound localization, Development, Children

Best Oral Presentation 02

Auditory Screening and Diagnosis
BOP 02-2

Refining Bone-Conduction ABR in Infants: Establishing Normative Thresholds and Interaural Attenuation for NB CE-Chirp Stimuli

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Background:
Accurate frequency-specific bone-conduction (BC) auditory brainstem response (ABR) testing in infants is essential for differentiating conductive from sensorineural hearing loss and ensuring early, precise intervention. However, clinical interpretation of BC-ABR depends on two interrelated factors: reliable normative data and a clear understanding of interaural attenuation (IAA). This study aimed to refine BC-ABR threshold accuracy by determining normative data for NB CE-Chirp LS stimuli and quantifying IAA across age groups and frequencies in infants and toddlers with normal hearing.

Methods:
BC-ABR thresholds were obtained from 69 normal-hearing infants and toddlers (1–36 months) using octave-band NB CE-Chirp LS stimuli (0.5–4 kHz) delivered via a RadioEar B-81 oscillator. Recordings were made from the ipsilateral channel while contralateral white-noise masking ensured monaural stimulation. In a subset of 51 participants, IAA was assessed by comparing thresholds obtained with the oscillator placed on the ipsilateral versus contralateral mastoid under identical masking. A mixed linear model evaluated effects of age and frequency on BC-ABR thresholds and IAA values.

Results:
BC-ABR thresholds were stable across age groups but varied significantly with frequency ($p < 0.001$), being lowest at 1 kHz. Median thresholds were 5 dB nHL at 0.5 kHz, –5 dB at 1 kHz, 5 dB at 2 kHz, and 0 dB at 4 kHz. Median IAA values increased with frequency and decreased with age. Among infants <3 months, median values were 5 dB at 0.5 kHz, 10 dB at 1 kHz, and 20 dB at 2–4 kHz.

Conclusions:
This investigation establishes the first combined framework of BC-ABR normative thresholds and IAA values for NB CE-Chirp stimuli in infants and toddlers, providing evidence-based guidance for effective masking and accurate interpretation in early hearing assessment.

Keywords: BC ABR Thresholds, NB CE-Chirp LS, BC ABR Interaural Attenuation

Best Oral Presentation 02

Hearing Disorders
BOP 02-3

Concurrent Alterations in Brain Hemispheric Asymmetry of Structural and Functional Networks in Single-Sided Deafness

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Brain asymmetry of structure and function, which is critical for high-level cognitive abilities, is influenced by the information received and processed in the two hemispheres. Single-sided deafness (SSD) is a prevalent clinical condition, representing an extreme case of partial sensory deprivation. However, how unilateral hearing loss affects brain hemispheric asymmetry remains poorly understood. To address this issue, we recruited 35 postlingual-onset long-term SSD patients (19/16 left/right SSD) and 18 normal hearing controls, collected their structural (diffusion tensor imaging) and resting-state functional magnetic resonance imaging data. Deterministic fiber tractography and functional connectivity analysis were performed to construct structural and functional networks. Then, graph-theoretical analysis were applied to examine plastic alterations in their topological asymmetry across multiscale hierarchical networks (i.e, global, modular, and nodal networks). Our results revealed a rightward shift in hemispheric asymmetry for both structural and functional networks after unilateral hearing deprivation, particularly in patients with right SSD, which was related to an increase in topological properties of the right hemisphere (RH), suggesting improved connection efficiency of the RH. Moreover, in-depth modular and nodal analyses revealed that reorganized global asymmetry was driven mainly by altered asymmetry in sensory and multisensory integration areas (i.e, the temporal lobe, the occipital lobe, and subcortical nuclei). Together, these findings indicate that SSD induces concurrent reorganization in brain asymmetry of both structural and functional networks. Furthermore, these findings suggest that more efficient utilization of the nondominant RH may be an important compensatory pattern after partial sensory deprivation.

Keywords: Single-sided deafness, Hemispheric asymmetry, Plastic network reorganization

Best Oral Presentation 02

Auditory Processing
BOP 02-4

Excitotoxicity induces a dual process of synaptic loss and functional adaptation of remaining auditory nerve fibers

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Understanding hearing loss requires moving beyond traditional associations between synaptic degeneration and impaired auditory thresholds. We recently showed a more complex scenario in the Mongolian gerbil cochlea following kainate-induced excitotoxicity. Acute kainate application produces an immediate and profound reduction in compound action potential (CAP) amplitude, paralleled by a drastic 80% synaptic ribbon loss across cochlear frequency regions. Despite this persistent synaptopathy, longitudinal electrophysiological assessments showed that CAP thresholds and amplitudes recovered fully within weeks, with some animals exhibiting supranormal amplitudes relative to pre-injury baselines. This paradoxical functional recovery correlated with a robust phenotypic shift in the remaining auditory nerve fibers. Single-unit recordings 20 weeks post-injury revealed significantly improved response thresholds and increased spontaneous firing rates, especially among fibers previously classified as low-spontaneous rate (low-SR). High-SR fibers became disproportionately predominant following excitotoxic insult. Rate-intensity functions and peristimulus time histograms demonstrated altered coding properties, with enhanced sensitivity and synchronicity, suggesting an adaptive hyperresponsiveness within the neural population.

Such neural hyperresponsiveness may underlie persistent suprathreshold auditory deficits, including poor speech comprehension in noise, the development of tinnitus, and hyperacusis. These findings underscore that cochlear synaptopathy—the "hidden hearing loss" phenomenon—can affect central auditory processing in ways not reflected by standard audiometry, raising new diagnostic and therapeutic challenges. Recognizing this dual process of synaptic loss and functional adaptation is essential for effective management of patients with normal thresholds but persistent auditory complaints and supports the need for advanced clinical measures that address both perceptual and neurobiological sequelae of acquired hearing injury.

Keywords: Sound coding, Synaptopathy, Auditory nerve

Best Oral Presentation 02

Auditory Processing
BOP 02-5

ASSESSMENT OF AUDITORY SENSORY GATING IN CHILDREN WITH AUDITORY PROCESSING DISORDER (APD) USING AUDITORY BRAINSTEM RESPONSE (ABR) WITH A COGNITIVE TASK

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Background: Auditory Processing Disorder (APD) is commonly associated with difficulty understanding speech in noise, potentially due to deficits in auditory sensory gating: the brain's ability to suppress unwanted auditory input such as background noise and competing speech. Sensory gating ability is often evaluated using a paired-click paradigm during electroencephalography (EEG) to measure suppression of event-related potentials such as the P50 component. However, this approach only assesses cortical sensory gating. To investigate sensory gating at the subcortical level, particularly within the brainstem, recent studies have proposed the use of Auditory Brainstem Response (ABR) recordings conducted concurrently with a Stroop task. Considering the brainstem's crucial role in speech-in-noise processing and sound localization, this study aimed to examine sensory gating ability at the brainstem level in children with APD using this novel ABR-Stroop paradigm.

Method: Seventy-nine children participated and were classified into two groups: typically developing (TD) children and children with APD. Participants completed an ABR test concurrently with a counting Stroop task that included neutral and incongruent conditions. Four parameters were measured: response time, percentage of correct responses, and ABR wave V amplitude and latency. Stroop interference (behavioral) and cognitive interference (neural) were derived by subtracting values from the neutral condition from those of the incongruent condition for each measure.

Results: Significant group differences were found in Stroop interference for percentage of correct responses and cognitive interference for wave V amplitude, with medium and large effect sizes, respectively. The APD group showed more negative Stroop interference values and more positive cognitive interference values, indicating greater susceptibility to cognitive interference and reduced suppression effects at the brainstem level.

Conclusion: These findings suggest that children with APD exhibit diminished inhibitory control of sensory gating at the subcortical level, which may contribute to their difficulties understanding speech in noisy environments.

Keywords: Auditory Sensory Gating, Auditory Processing disorder, Auditory Brainstem Response

Best Oral Presentation 02

Auditory Rehabilitation and Speech Perception
BOP 02-6

Consonant production in Cantonese-Mandarin bilingual children with cochlear implants: Effects of hearing age, age at implantation, and language exposure

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Purpose: With the increasing number of Cantonese–Mandarin bilingual children receiving cochlear implants (CIs) in Guangzhou, understanding speech development in bilingual contexts is essential. This study investigated consonant production accuracy and error patterns in bilingual CI children, compared with three hearing age matched control groups, and examined factors influencing their speech outcomes.

Method: Single-word productions in Mandarin and Cantonese were elicited via picture-naming tasks from Cantonese–Mandarin bilingual CI children (n = 19, mean hearing age = 49.8 months, mean implantation age = 20.1 months), Mandarin monolingual CI children (n = 22), Mandarin monolingual NH children (n = 20), and bilingual NH children (n = 20). Samples were phonetically transcribed in PRAAT and analysed for Percent Consonants Correct–Revised (PCC-r, overall and by manner class) in word-initial and word-final positions, including error patterns and cross-linguistic correlations. Mixed-effects logistic regression in R assessed group differences and the effects of hearing age, language exposure, and age at implantation.

Results: Bilingual children with CIs demonstrated statistically significantly lower initial and final consonant accuracy in Mandarin compared with their NH peers but did not differ significantly from their monolingual CI peers. In Cantonese, initial and final consonant accuracy did not differ significantly from bilingual NH peers. Longer hearing age and greater language exposure significantly predicted higher Mandarin consonant accuracy, whereas only hearing age significantly predicted in Cantonese accuracy. Age at implantation did not have a significant effect in any models. Furthermore, distinct error patterns were observed across groups, reflecting language-specific differences in consonant production.

Conclusion: These findings suggest that consonant development in bilingual children with early CI implantation is influenced by both cross-linguistic interactions and differences in hearing experience, such as hearing age and language exposure. The observed error patterns reveal language-specific challenges, highlighting the importance of targeted, bilingual-focused speech interventions.

Keywords: Cochlear implants, Bilingual children, Consonant production

Best Oral Presentation 02

Auditory Rehabilitation and Speech Perception
BOP 02-7

Generalization of Perceptual Learning in Noise: The Critical Role of Stimulus Variability During Training

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Objectives:In daily life, we experience more communication conditions with random background noise than with fixed ones. If we can discover which training method (fixed or random babble) is better to help people to be more sensitive to speech information in random background conditions, then we can apply that noise training method in clinical use.This study investigated whether auditory training with fixed or random multi-talker babble noise improves Vowel–Consonant–Vowel (VCV) syllable recognition, and if learning generalises from fixed to random noise conditions. It also examined whether performance improvements reflect genuine perceptual learning or changes in response criterion.

Method:Thirty normal-hearing adults were assigned to fixed babble noise training, random babble noise training, or a control group (no training). All participants completed pre- and post-tests involving VCV identification in random babble noise at -30 dB SNR. Training groups underwent three daily sessions (1,920 trials total) with either a consistent (fixed) or varying (random) babble segment. Stimuli included eight consonants (/b, d, f, g, k, m, n, p/) in an VCV context. A "Don't know" response option was provided. Data were analysed using ANCOVA and ANOVA.

Results:All groups showed significant pre- to post-test improvement in correct responses ($p < 0.05$). The random group improved most (18.36%), significantly outperforming both fixed (8.75%) and control (5.08%) groups ($p < 0.05$). The fixed group showed no significant advantage over controls, indicating no generalisation to random noise. Reduction in "Don't know" responses was largest for the random group (46.70%). Analysis confirmed improvements reflected perceptual learning, not response bias changes.

Conclusion:Training with random babble noise significantly enhances VCV identification in noise, whereas fixed-noise training does not generalise to novel noise. Variable noise during training appears critical for improving speech perception in realistic listening conditions. These findings support the use of random babble in auditory training paradigms.

Keywords: Vowel–Consonant–Vowel, Auditory training, Babble noise

Best Oral Presentation 02

Auditory Screening and Diagnosis
BOP 02-8

THE DIAGNOSTIC VALUE OF WIDEBAND TYMPANOMETRY IN THE PERIOPERATIVE MANAGEMENT OF ADENOID HYPERTROPHY

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BACKGROUND. Adenoid hypertrophy, a prevalent pediatric condition, frequently causes otitis media with effusion (OME), often undiagnosed due to subtle symptoms. Although 226 Hz tympanometry is the gold standard for diagnosing OME, its limited sensitivity in early-stage cases impedes timely intervention.
OBJECTIVE. To evaluate wideband tympanometry (WBT) as a diagnostic tool for assessing middle ear function in children with adenoid hypertrophy throughout the perioperative period.
MATERIALS. In a prospective study (January 2024–September 2025) at the National Medical Research Center for Otorhinolaryngology, Russia, we enrolled 120 children (median age 6 years [IQR 5–7]). The study group (n=60, 120 ears) had grade II–III adenoid hypertrophy with OME; the control group (n=60, 120 ears) had isolated adenoid hypertrophy. All patients underwent standardized diagnostic evaluation including otomicroscopy, age-appropriate audiometry, 226 Hz tympanometry and wideband tympanometry. Data were analyzed using Mann-Whitney U-tests and Spearman's correlation ($p<0.05$).
RESULTS. Wideband absorbance was significantly reduced in the study group compared to control group ($p<0.05$). The study identified distinct tympanometric patterns differentiating OME from eustachian tube dysfunction, with the latter demonstrating significantly greater differences between absorbance values at peak pressure and ambient pressure (18,50 [13,38; 23,00]), compared to both OME patients (0,00 [0,00; 6,00]) and control group (1,00 [0,00; 4,50]) ($p<0,05$). A characteristic 2500 Hz peak identified in OME patients, and a significant inverse correlation between wideband absorbance and the air-bone gap ($r = -0.505$, $p < 0.01$), further substantiate the method's diagnostic value. Its distinct clinical advantage lies in unique postoperative utility, enabling dynamic assessment of middle ear function and tympanostomy tube patency—unattainable with 226 Hz tympanometry.
CONCLUSIONS. Integrating WBT into the audiological assessment of adenoid hypertrophy enhances diagnostic accuracy for OME, enables objective evaluation of treatment efficacy, and facilitates monitoring of postoperative middle ear recovery.

Keywords: Adenoid hypertrophy, Otitis media with effusion, Wideband tympanometry

Best Oral Presentation 02

Hearing Disorders
BOP 02-9

Impact of Air Pollution and Rising Temperature from Climate Change on Incidence and Gene Expression in Children with Hearing Disabilities

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Objective: This study aimed to estimate the projected impact of rising temperature and air pollution on the incidence and gene expression profiles associated with hearing disabilities in children under different climate change scenarios based on the Intergovernmental Panel on Climate Change (IPCC) Shared Socioeconomic Pathways (SSPs).
Methods: A total of 2,430 children with clinically confirmed hearing disabilities from the Indonesian Pediatric Health Cohort and Asian institutions were included. Historical exposure to temperature, fine particulate matter (PM2.5), and relative humidity (RH) was estimated for each participant using a radial basis function model. Future temperature and air pollution projections were obtained from global climate model (GCM) outputs under four IPCC pathways. Gene expression and DNA methylation profiles were analyzed from peripheral blood and inner ear epithelial cell samples to assess molecular responses to environmental exposure.
Results: A 1°C increase in 1-year, 5-year, and 10-year average temperatures was associated with 1.004-fold (95% CI: 1.003–1.005), 1.004-fold (95% CI: 1.002–1.005), and 1.005-fold (95% CI: 1.004–1.006) increases in the odds of hearing disability. Each 10 $\mu g/m^3$ increase in PM2.5 exposure was associated with a 1.013-fold (95% CI: 1.009–1.017) increase in risk. A nonlinear association was observed between temperature projections under SSP126, SSP245, SSP370, and SSP585, with the highest increases predicted in 2050 at 31.2%, 27.4%, 28.9%, and 26.8%, respectively. Gene expression analysis revealed upregulation of oxidative stress and inflammatory genes and downregulation of auditory and mitochondrial genes (Gjb2, Otof, Slc26a5, and Cox6b1) under combined heat and PM2.5 exposure. Extreme heat exposure was also associated with Horvath's, Hannum's, and PhenoAge acceleration.
Conclusion: Future increases in temperature and air pollution are associated with higher incidence of hearing disabilities in children, distinct gene expression changes, and accelerated biological aging. Children may be more vulnerable to hearing impairment under worsening climate conditions.

Keywords: Hearing disability, Climate change, Air pollution

Best Oral Presentation 03

Hearing Aids
BOP 03-1

Clinical Performance of Nuance Audio Hearing Glasses in Adults with Mild to Moderate Hearing Loss

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Background:
This clinical investigation evaluated the performance of the Nuance Audio hearing glasses, a novel OTC form factor for adults with perceived mild to moderate hearing loss. The study aimed to assess both objective improvements in hearing and self-reported benefit in daily communication settings.
Methods:
A prospective, within-subject design was employed with 20 participants. Outcome measures included speech understanding in noise using standardized laboratory tests and real-world listening preferences using Ecological Momentary Assessment (EMA).
Results:
• A statistically and clinically significant improvement in signal-to-noise ratio (SNR) was observed in aided conditions (mean improvement: 3.48 dB SNR, $p < 0.0001$).
• EMA real-world data showed that participants reported improved communication, particularly in noisy social environments.
Conclusion:
The Nuance Audio hearing glasses demonstrated clinically meaningful improvements in hearing performance and high user preference across various environments. These findings support the device's potential as an effective OTC solution, particularly for socially active adults with perceived mild to moderate hearing loss.

Keywords: Adult rehabilitation, Novel OTC form factor, Signal to noise ratio

Best Oral Presentation 03

Hearing Aids
BOP 03-2

Are Over-the-Counter Hearing Aids User-Friendly?

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This presentation will examine adults' readiness to use over-the-counter (OTC) hearing aids by integrating new quantitative and qualitative evidence and translating findings into concrete clinical actions. We first report results from a structured skills assessment (n=82; 66% new hearing aid users) showing that education is a strong predictor of OTC device management (participants with less than a college degree performed ~45% lower than those with a master's degree or higher). We then detail the error profile - 68% failed at least one step - with the most challenging tasks being manual volume adjustment, smartphone pairing, and wax-guard replacement; new users also struggled more with donning devices. Next, we synthesize interviews from a companion sample (n=78), organizing results into six domains: setup/operational barriers, support preferences, usability expectations and confidence, perceived device performance, shifts in knowledge/understanding, and user-centered design suggestions. Clinical implications will focus on practical supports (concise task-focused instructions, brief coaching for pairing/volume/wax guard changes, expectation setting, and referral pathways for users with lower educational attainment or first-time users). We close with design and policy recommendations to reduce usability-driven inequities and promote confident, equitable OTC hearing aid adoption.

Keywords: OTC hearing aids, Usability, Age-related hearing loss

Best Oral Presentation 03

Aging and Cognition
BOP 03-3

Effect of hearing aids on cognitive function in elderly patients with hearing loss: A functional near-infrared spectroscopy study

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Age-related hearing loss has recently been recognized as a key modifiable risk factor for dementia, yet the neural mechanisms linking hearing restoration and cognitive preservation remain unclear. This study aimed to examine whether hearing aid (HA) use contributes to cognitive and neurophysiological changes over a 12-month period in elderly adults with age-related hearing loss.

A total of 94 participants enrolled in this longitudinal study, with 59 individuals choosing to use hearing aids (HA group) and 35 declining amplification (non-HA group). Functional near-infrared spectroscopy (fNIRS) with 48 channels targeting the frontal cortex was recorded during five cognitive tasks, including the word-list memory immediate recall task (J4).

After 12 months, the HA group showed a significant increase in oxyhemoglobin (HbO_2) levels across frontal regions, whereas the non-HA group demonstrated a significant reduction in HbO_2. Task-specific analyses revealed that J4 produced the clearest divergence between groups: the HA group exhibited both improved cognitive scores and increased hemodynamic responses, while the non-HA group showed no behavioral improvement and a marked decline in neural activation.

These findings suggest that hearing aid use may help maintain neural engagement during cognitively demanding tasks, preventing the down-regulation typically associated with auditory deprivation. In contrast, individuals who did not use hearing aids displayed reduced frontal activation, potentially reflecting diminished task audibility and decreased cognitive resource allocation.

In conclusion, one year of hearing aid use was associated with improved performance on immediate recall and increased frontal hemodynamic activity, whereas non-users exhibited declines in neural activity. The observed HbO_2 changes may serve as a biological marker of cognitive preservation facilitated by auditory rehabilitation. Continued longitudinal monitoring will be essential to clarify the causal relationship between hearing loss, neural activity, and cognitive decline.

Keywords: Hearing aids, FNIRS, Cognitive function

Best Oral Presentation 03

Auditory Implants
BOP 03-4

Benefit of an Individualized EAS Strategy

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Background
Patients with partial deafness present with varying degrees of residual low-frequency hearing and undergo cochlear implantation with electrode arrays reaching different cochlear regions. Postoperatively, three possible spatial relationships can occur between the position of electrode array and the acoustically stimulated cochlear region relevant for electric–acoustic stimulation (EAS):
Place-overlap – The characteristic frequency of most apical electrode contact falls below the EAS crossover frequency, resulting in overlap between electrically and acoustically stimulated regions (typically with longer or deeply inserted electrodes).
Place-meet – The most apical contact aligns with the EAS crossover frequency, providing an optimal match: acoustic stimulation for low frequencies and electric stimulation for mid-to-high frequencies.
Place-gap – The most apical contact lies above the crossover frequency, leaving a gap between electrically and acoustically stimulated regions (typically with shallow insertions).
Objective
This study aimed to evaluate the benefit of EAS in patients with a "place-gap" configuration, with particular focus on different crossover frequencies.

Methods
Eight patients with preserved low-frequency hearing and place-gap condition were included. Using OTOPLAN-based estimation of electrode position, a tonotopic fitting was performed to define the EAS crossover frequency, thereby creating a frequency gap between acoustic and electric stimulation. Subsequently, this gap was systematically reduced by extending the frequency range of electric stimulation, introducing a place–frequency mismatch. Different degrees of frequency gaps were tested to identify the optimal compromise between residual gap and mismatch. Speech discrimination with monosyllabic words in quiet and in noise was assessed across these conditions.

Results
Performance varied depending on the frequency gap. For each patient, an individualized "optimal gap" was identified, which yielded the highest speech discrimination scores.

Conclusion
The results suggest that individualized EAS fitting strategies—balancing residual frequency gap and place–frequency mismatch—can provide significant benefit for patients with partial deafness

Keywords: Cochlear implants, Electric-acoustic stimulation, Anatomy based fitting

Best Oral Presentation 03

Auditory Implants
BOP 03-5

Receptive and expressive language trajectory for children implanted younger than 9 months compared with children implanted between 9 and 24 months

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Objectives: Compare the receptive and expressive language trajectory (RLT and ELT) for infants who received a cochlear implant (CI) before 9 months with those implanted between 9 and 24 months of age. Explore other child-, device-, and environment-related factors on language development.

Methods. From an existing paediatric database, 403 children were identified who had received their first CI before 24 months of age and had completed at least two receptive and/or expressive language assessments. The slope of the line through all available language data were derived. Relationships between four age-at-implant groups (Group 1, under 9 months; Group 2, 9–12 months; Group 3, 12–18 months; Group 4, 18–24 months) and RLT/ELT were examined using correlation, linear regression, and ANOVA. Cognition and comorbidities were evaluated as covariates, and general linear modelling was used to assess their combined effects.

Results: Mean RLT and ELT for the whole cohort were 0.81 and 0.72, respectively. (1.0 would indicate normal language growth for typically developing hearing children.) Group 1 (CI under 9 months) mean RLT and ELT were 1.02 and 0.87, respectively. Implantation before 12 months was significantly associated with higher RLT ($r(401) = -.21$, $p < .001$) and ELT ($r(362) = -.14$, $p = .007$). Cognition independently predicted RLT and ELT, and coding of comorbid diagnoses was not significant once cognition was considered in the model.

Conclusion. Children implanted before 9 months showed greater receptive and expressive language advantages (than children implanted between 12 and 24 months); trajectories approximated age-expected growth. Cognition and comorbidity were significant factors at the univariate level for both RLT and ELT, whereas sex, relative socio-economic advantage, unilateral/bilateral implant and language background were not associated with outcomes in this cohort. These findings demonstrated measurable language benefits when implantation occurred earlier than current FDA recommendations, supporting the reconsideration of existing age-at-implant guidelines.

Keywords: Early cochlear implant, Receptive language, Expressive language

Best Oral Presentation 03

Auditory Implants
BOP 03-6

Effectiveness of individualized mapping procedures for cochlear implant recipients with hearing preservation

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Adult and pediatric cochlear implant (CI) recipients with hearing preservation experience significant improvements in speech recognition and spatial hearing abilities with an electric and acoustic stimulation (EAS) device as compared preoperative abilities, though individual outcomes vary widely. This variability may be due in part to individual differences in electrode array placement. Current default mapping procedures do not account for array placement, which results in most EAS users having frequency-to-place mismatches and/or electric-on-acoustic interference that could negatively influence outcomes. Individualizing the map settings with a place-based mapping procedure, which accounts for array placement, may support better outcomes. This study compared the speech recognition and spatial hearing of EAS users with different maps to investigate the performance benefit of individualized maps that account for array placement.

Adult and pediatric CI recipients with hearing preservation were randomized at activation to listen with a default or place-based map. Imaging was used to calculate the angular insertion depth of individual electrodes to estimate the cochlear place frequencies and identify electrodes within the region of functional acoustic hearing. Participants listened exclusively to their assigned map during the first 12 months post-activation. Monaural speech recognition was evaluated with CNC words in quiet. Spatial hearing was assessed with recorded sentences presented in spatially-separated multi-talker masker.

At the time of data review, participants with place-based maps had better monaural recognition and spatial hearing than participants with default maps. Most EAS users with default maps had at least one electrode contact within the region of functional acoustic hearing that may results in electric-on-acoustic interference.

Adult and pediatric EAS users may experience better performance when electric mismatches are minimal and electric-on-acoustic interference is limited, such as with place-based maps. Investigation is ongoing to determine whether these patterns of performance observed within the initial months of EAS use are maintained over time.

Keywords: Cochlear implant, Tonotopy, Image-guided

Best Oral Presentation 03

Psychoacoustics and Transitional Research
BOP 03-7

Neuroacoustic Modeling of Cochlear Fatigue: Bridging Biomechanics and Clinical Audiology

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Introduction: Noise-induced hearing loss (NIHL) remains a widespread sensory deficit, particularly among individuals exposed to chronic environmental noise. Traditional audiometric techniques often detect cochlear damage only after irreversible threshold shifts have occurred. This study introduces a novel Neuroacoustic simulation to estimate early mechanical fatigue of the basilar membrane (BM), utilizing harmonic oscillatory velocity (HOV) as a predictive biomarker of cochlear stress. Methods: The cochlea was modelled as a biomechanical oscillator, where each segment responds to specific frequencies (250 – 8 KHz). Using MATLAB, the instantaneous velocity profile was derived from the classical harmonic motion equation, accounting for amplitude, angular frequency, and phase over a 0–10 ms time window. For each frequency, both peak velocity and mean squared velocity were calculated, the latter serving as a proxy for mechanical fatigue and highlighting cochlear regions most susceptible to overloading. Results: Simulation results identified that frequencies between 3 kHz and 6 kHz, particularly at 4 kHz, imposed the highest mechanical fatigue on the BM. The 4 kHz region demonstrated pronounced oscillatory velocity and overdrive compared to adjacent frequencies. Temporal profiles and tonotopic fatigue mapping revealed significant biomechanical stress in basal cochlear regions, even in cases where traditional threshold shifts were absent. Conclusion: This computational approach offers an innovative and biologically plausible method for simulating early cochlear stress using HOV as a biomechanical marker. The model enables the detection of cochlear vulnerability prior to overt hearing loss and proposes a non-invasive, efficient tool for early risk assessment. Applications extend to both clinical audiology and public health policy regarding noise exposure, supporting proactive interventions to prevent NIHL.

Keywords: Basilar Membrane, Neuroacoustic, Noise-Induced Hearing Loss

Best Oral Presentation 03

Genetics and Implications
BOP 03-8

A directed evolution novel Adeno-Associated Virus mediated gene therapy restores hearing in OTOF mutation-related deafness, from animal models to patients

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Background: Mutations in the OTOF gene are among the most common causes of auditory neuropathy. Gene replacement therapy using adeno-associated virus (AAV) vectors has been extensively studied, with multiple human clinical trials conducted; however, efficacy remains an area for improvement.
Objectives: To evaluate gene therapy in 4-week-old humanized OtofQ829X/Q829X mice and adult cynomolgus macaques. Additionally, patients older than 1 year with confirmed OTOF mutations and click ABR thresholds >80 dBnHL were recruited for clinical assessment.
Methods: We designed an AAV2 capsid protein (Cap)–encoding library with a random nine–amino acid sequence insertion in the capsid to develop an in vivo directed evolution approach. The library was injected into mice, and sequencing of the cochleae for the viral genome revealed enrichment of peptide motifs. A novel dual-AAV-mediated gene therapy system was developed using an engineered inner hair cell–tropic AAV capsid, WM04. AAV-WM04-OTOF was injected via the round window membrane (RWM) in adult mice, monkeys, and human patients. Hearing recovery was assessed starting two weeks post-injection.
Results & Conclusions:
Preclinical Models: WM04-OTOF successfully reversed deafness in OtofQ829X/Q829X mice with a single RWM injection. Therapeutic doses caused no significant systemic toxicity or interference with normal hearing in mice or nonhuman primates.
Clinical Trial: A single-arm, single-center trial (ChiCTR2400091517) was initiated for DFNB9 patients with biallelic OTOF mutations. A total of 8 patients had been enrolled in this trial. The WM04-OTOF gene therapy system represents a promising therapeutic strategy for patients with DFNB9, with effective hearing restoration, minimal systemic toxicity, and robust preclinical and clinical evidence supporting translation to broader applications. This research lays the foundation for standardized and systematic clinical translation of gene therapy for DFNB9.

Keywords: OTOF, Gene therapy, Clinical trial

Oral Presentation 01

Genetics and Implications

OP 01-1

412 families' whole genome sequencing in early onset hearing loss: The French Reference Center's experience

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Background
Up to recent years, diagnosis of the genetic aetiology of early onset hearing loss (EOHL) relied on targeted gene panel analyses, with a diagnosis rate of about 50%. French clinical geneticists have now access to trio Whole Genome Sequencing (WGS) through the Plan France Medecine Genomique 2025 sequencing platforms for most patients presenting with EOHL

Methods/Results/Interpretation
Methods
Testing criteria for WGS differ according to the subgroup of EOHL indications. The strategy is genome-first for syndromic hearing loss (HL), WGS after normal array-CGH for HL associated with malformation(s) and WGS after normal GJB2/GBJ6 and HL gene panel for patients presenting with isolated HL (50% of positive results).
Results
From 2020 to 2024, 448 patients from 412 families assessed in the French Reference Center for genetic HL underwent whole genome sequencing on the SeqOIA platform. The diagnosis yield was 35%. Classe 4/5 variations were identifided in 109 different genes.
Interpretation
We present the diagnostic rate according to subgroups of the EOHL indication, along with the advantages and limitations of our strategy.

Keywords: Whole genome sequencing, Hearing loss, Diagnosis

Oral Presentation 01

Genetics and Implications
OP 01-2

Functional characterization of genetic variants using a minigene assay: Elucidating the pathogenic mechanisms of splicing defects in hearing loss genes

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Background
Next-generation sequencing (NGS) has become a routine diagnostic tool, particularly valuable in the evaluation of genetically heterogeneous disorders such as hereditary hearing loss (HL). However, NGS frequently identifies numerous variants of uncertain significance, making it challenging to distinguish pathogenic alleles from benign polymorphisms. Noncoding variants, especially intronic substitutions, are particularly difficult to interpret due to their potential impact on RNA splicing. Functional assays, such as the minigene assay, provide an effective means to assess the splicing consequences of such variants and clarify their pathogenic potential.

Methods
Ten variants identified in HL patients from the Genetic Outpatient Clinic at the Institute of Physiology and Pathology of Hearing were selected for functional validation using the minigene assay: EYA1 c.1475+1G>T, EYA4 c.1282-12T>A, GSDME c.991delT, GSDME c.1127A>G, MYO6 c.816+1G>A, MYO6 c.1984-1G>A, MYO6 c.3281-13A>G, MYO7A c.2829G>A, MYO15A c.9230-4A>T, and SLC26A4 c.1001+1G>A. Genomic fragments encompassing each variant were cloned into the pDEST-pCI-Neo-RHO expression vector using the Gateway system and transiently transfected into HEK293T cells. After 48h, total RNA was extracted, and transcript structure was analyzed by RT-PCR and Sanger sequencing.

Results
Aberrant splicing was observed for nine of the ten investigated variants. The most common effects included exon skipping and intron retention leading to premature termination codons. The MYO15A c.9230-4A>T variant did not alter splicing, suggesting a likely benign effect.

Conclusions
The minigene assay enabled direct assessment of the functional impact of variants predicted to affect splicing, confirming pathogenic mechanisms for nine of ten tested alleles. These results emphasize that not only canonical splice-site variants but also exonic and deep intronic changes can disrupt normal splicing. Splicing defects were identified in genes associated with both nonsyndromic (EYA4, GSDME, MYO6, MYO7A, MYO15A) and syndromic (EYA1, SLC26A4) forms of hearing loss.

Keywords: Hereditary hearing loss, Splice variants, Functional validation

Oral Presentation 01

Genetics and Implications
OP 01-3

Oral Presentation 01

Genetics and Implications
OP 01-4

Differential impact of genetic etiology on speech perception in noise and language in children who use hearing aids

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Nearly half of all congenital hearing losses have a genetic etiology. More than 150 genes associated with congenital hearing loss have been identified. Different genes are known to produce different audiological profiles based on the underlying anatomical or physiological consequences of each specific genetic mutation. Less is known about whether differences in hearing loss genes have functional consequences for the effectiveness of hearing aids in children with genetic hearing loss. We conducted Otoscope genetic testing on 76 children with hearing losses ranging from mild-to-severe levels that were part of the on-going Outcomes of Children with Hearing Loss Consortium studies. One-third of the sample did not test positive for a gene on the Otoscope panel. Nineteen children were positive for Stereocilin (STRC) gene mutation, and thirteen children were positive for Connexin 26 gene mutation (DFNB1). The remaining 20 children tested positive for 16 different genetic mutations associated with hearing loss. The children with STRC and DFNB1 mutations were compared on degree of hearing loss, aided Pediatric AZ-Bio sentence recognition at +6 dB signal-to-noise ratio, and on receptive vocabulary using the Peabody Picture Vocabulary Test (PPVT). There were no differences in audiometric pure tone average between children with STRC and children with DFNB1 mutations. However, children with STRC had higher percent correct (+15%) aided speech recognition in noise than the group of children with DFNB1. Furthermore, children with STRC gene mutation had higher receptive vocabulary scores than children with DFNB1 mutations. Different genetic etiologies appear to have distinct consequences for aided speech recognition in noise and receptive vocabulary. The implications for genetic testing of children with hearing loss and individualizing audiological management of children with hearing loss based on genetic etiology will be discussed.

Keywords: Genetics, Children, Hearing loss

Oral Presentation 01

Genetics and Implications
OP 01-5

Hearing Impairment and Vestibular Function in Patients with a Pathogenic Splice Variant in the LHX3 Gene

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Hearing Impairment and Vestibular Function in Patients with a Pathogenic Splice Variant in the LHX3 Gene

Background
In northern Sweden, we have identified a cohort of nine patients homozygous for the same mutation in the LHX3 gene. LHX3 encodes a LIM-homeodomain transcription factor crucial for the fetal development of various organs, including the pituitary gland, spinal motor neurons, and the inner ear. The LHX3 gene is expressed in the hair cells of both cochlear and vestibular organs, and mutations in the LHX3 gene is associated with hearing loss. However, there are no previous reports on balance function in patients with mutations in the LHX3 gene.
Aim
This study aims to evaluate hearing impairment and its progression over time in patients with homozygous mutations in the LHX3 gene and to investigate whether vestibular impairment is associated with this mutation.
Method
We conducted a retrospective analysis of hearing tests from birth to the present and performed vestibular testing on six patients.
Results
This study demonstrates for the first time that a mutation in the LHX3 gene affects the function of both cochlear and vestibular organs. Additionally, we show that hearing impairment in this cohort progresses over time.
Discussion
These clinical findings are important for understanding the role of LHX3 in inner ear development and have direct clinical implications for the treatment of patients with this syndrome.

Keywords: LHX3, Hearing, Vestibular function

Oral Presentation 01

Genetics and Implications
OP 01-6

Deciphering the genetic background of autosomal dominant hearing loss

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Introduction:
Autosomal dominant hearing loss (ADHL) is the second most common form of hereditary HL, typically manifesting after the first decade of life. It primarily affects high frequencies and worsens over time. Autosomal-dominant genes account for about 20% of prelingual non-syndromic deafness cases, with 63 genes identified to date.
Materials and Methods:
This study included 108 ADHL families. Targeted next-generation sequencing (NGS) of 237 HL-related genes was performed in all probands. In six large unsolved families, linkage analysis and whole genome sequencing (WGS) were conducted. Presence of the selected probably pathogenic variants and their segregation with HL within the family were confirmed by standard Sanger sequencing.
Results:
A genetic cause was identified in 52% (56/108) of families. Among 51 HL variants, 33% (17/51) were previously reported, while 67% (34/51) were novel. Variants included missense (32/51, 63%), splice site (10/51, 19%), frameshift (4/51, 8%), nonsense (4/51, 8%), and one CNV (1/51, 2%). The most frequently affected genes were MYO6 (n=11), TBC1D24 (n=6), WFS1 (n=6), GSDME (n=5), POU4F3 (n=5), and KCNQ4 (n=4). Variants in NLRP3, LMX1A, FGFR3, CD164, GRHL2, TMC1, COCH, ATP2B2, and CEACAM16 were found in single families. Linkage analysis and WGS identified non-coding variants in EYA4 and ATP11A and novel candidate genes.
Conclusions:
Our custom multigene panel demonstrated good diagnostic performance. Given the frequent discovery of novel variants, clinical assessment and segregation analysis are essential. Linkage analysis and WGS improve variant detection, particularly in non-coding regions, and help identify new HL genes.

Grant: 2016/22/E/NZ5/00470 National Science Centre, Poland.

Keywords: ADHL, Hearing loss, WGS

Oral Presentation 01

Genetics and Implications
OP 01-7

Myhre Syndrome Revealed by Temporal Bone CT: An Unusual Presentation Mimicking Juvenile Otosclerosis

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Myhre syndrome is an exceptionally rare genetic condition (<1/1,000,000) caused by mono-allelic pathogenic variants in SMAD4. Its phenotype typically includes short stature, characteristic facial dysmorphism, brachydactyly, thickened skin, skeletal abnormalities, pseudo-muscular hypertrophy, joint stiffness, hearing impairment, and variably expressed intellectual disability. Progressive respiratory, cardiac, and laryngo-tracheal complications contribute significantly to morbidity.

Case presentation:
We describe a young male patient referred for bilateral mixed hearing loss. Temporal bone computed tomography revealed marked demineralization of the otic capsule, initially leading to a diagnosis of juvenile otosclerosis. Clinical evaluation at our National Reference Center for Genetic Deafness revealed short stature (–2 SD), craniofacial dysmorphism, a pseudo-athletic habitus, thickened "leathery" skin, brachydactyly and clinodactyly, with no learning difficulties—features suggestive of Myhre syndrome.

A deafness gene panel performed at Lille University Hospital identified a de novo SMAD4 variant, c.1486C>T p.(Arg496Cys). This pathogenic variant is well-documented and represents one of the most frequent variants associated with Myhre syndrome (≈38% of cases). Hearing loss is common in Myhre syndrome (≈55–70%), typically bilateral and conductive or mixed, and usually emerges during adolescence, although radiological data remain scarce.

Results:
Audiological follow-up in our patient showed progressive deterioration, with severe bilateral mixed hearing loss at the 2025 assessment. Follow-up temporal bone CT revealed worsening peri-labyrinthine demineralization. The patient now benefits from multidisciplinary care, including genetics, otolaryngology, cardiology, pulmonology and rheumatology.

Conclusion:
This case illustrates an atypical diagnostic pathway in Myhre syndrome, triggered by massive peri-labyrinthine demineralization suggestive of juvenile otosclerosis. It highlights the importance of incorporating genetic testing in the evaluation of hearing loss, the essential role of imaging in differential diagnosis, and the value of early identification to enable tailored multidisciplinary management.

Keywords: Myrhe syndrome, SMAD4, Juvenile otosclerosis

Oral Presentation 02

Global Audiology and Public Health I
OP 02-1

Emergency preparedness for natural hazards: A role for the hearing healthcare sector

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People who are Deaf, deaf and hard-of-hearing face additional risks during natural hazards such as bushfires, floods, extreme heat and cyclones – particularly those related to accessing alerts, information and communication throughout an emergency. This study explores the potential impacts of these events on people who use hearing devices, by investigating how they use these devices for communication, and the consequences of device loss or damage during emergencies. The study comprised a cross-sectional survey of 124 people who self-identified as deaf, Deaf or hard-of-hearing, were 18 years or older, and lived in Australia. Survey results were analysed descriptively, and with multivariate regression. Findings show that over a third of respondents have a high level of reliance on their hearing devices for communication. This reliance influences their ability to communicate using spoken language without their hearing devices, including with emergency services. The study reveals the adverse impacts of losing or damaging a hearing device – events that are more likely during an emergency. Results show the level of dependence on power for charging batteries and on smartphones to control hearing devices – noting that power and telecommunications outages are common during natural hazards events. There are identified roles for individuals, hearing healthcare professionals, device manufacturers, deafness support organisations, and the emergency management sector in supporting effective emergency preparedness among deaf, Deaf and hard-of-hearing people. It is essential that individuals are supported to develop robust emergency plans that reflect their use of hearing devices.

Keywords: Emergencies, Hearing devices, Natural hazards

Oral Presentation 02

Global Audiology and Public Health I
OP 02-2

The Recent 5-year Implementation and Development of Person-centred Care in Hearing Rehabilitation in China

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Purpose:
This study reviewed person-centred care (PCC) implementation and development program in hearing rehabilitation in China in recent 5 years. It aimed to share the PCC practice and experience of transforming hearing healthcare from a biomedical to a biopsychosocial model on a national scale.

Method:
A China PCC program in hearing rehabilitation has been conducted from 2020 to 2025. A key opinion leader group was the key force driving it. The group set up the strategies and plan, met monthly online reviewing and updating the status. The key strategy was to synergize PCC insights internationally, adapt it to China situation, and integrate PCC knowledge/skills/tools into clinical practice through communication and counseling. The implementation framework covered awareness, educational/training, research, and clinical practice. It has undergone development process of introducing concept, developing knowledge/skills/tool resource package, reaching consensus, training, clinical use and validation, evaluating impact, and making guideline and standard.

Result:
During 2020-2021, PCC concept was introduced and localized. PCC resource package was developed for improving awareness and training. During 2022-2025, a PCC community of 3000 stakeholders was formulated; six intensive PCC training seminars were conducted for 1000 professionals; more than 10 PCC tools were adapted and developed; around 300 hearing centers practiced PCC; 12 universities joined PCC education program. In 2022, the consensus was reached with 8 PCC articles; Totally 22 papers were published and two issues of PCC Magazine were nationally circulated; The PCC Chinese book was published as the guideline in 2023. The impact analysis indicated that PCC is effective and transforming hearing care model. The requirement of PCC service was regulated in national standard in 2024.

Conclusion:
It is feasible to implement PCC nationwide. PCC is essential for China hearing care. Ongoing development follows with continuous implementation. Integrating PCC knowledge/skills/tools into clinical counseling practice is the key.

Keywords: Person-centred care, Hearing rehabilitation, Communication and counseling

Oral Presentation 02

Global Audiology and Public Health I
OP 02-3

WHO Learning on TAP Initiative: New Training Modules for Frontline Health Workers to Deliver Hearing Aids & Assistive Products

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BACKGROUND & AIM

Over 430 million people worldwide require hearing rehabilitation, yet access to hearing-assistive technology remains extremely limited, especially in low- and middle-income countries (LMICs). Barriers include both device shortages and a lack of trained personnel able to assess, fit, and maintain hearing-assistive products.

To address this gap, the World Health Organization's Learning on TAP (Training in Assistive Products) initiative developed blended, competency-based learning modules for frontline and community health workers. Created with World Wide Hearing Foundation International, these modules cover:

- Foundations and screening for hearing assistive products
- Provision of behind-the-ear preprogrammed hearing aids for adults
- Provision of behind-the-ear programmable hearing aids for children
- Provision of personal remote microphone systems

The goal is to enable safe, effective, and context-appropriate delivery of hearing-assistive services in LMICs.

MATERIALS AND METHODS

In partnership with WHO experts and international reviewers, content was developed through:

Instructional design: learner profiles, competencies, and blended learning milestones aligned with WHO service-delivery models.

Content development & validation: detailed guidance on screening, fitting, programming, counselling, and follow-up; multi-disciplinary peer review and field testing in LMICs.

Implementation resources: job aids, videos, forms, and adaptation tools tailored for low-resource settings.

RESULTS

By late 2025, four TAP modules on hearing-assistive products were finalized and released on WHO's GATE platform (https://www.gate-tap.org/course-list/assistive-technology/). Achievements include competency-based frameworks, field-tested content reflecting LMIC realities, and early pilot results showing improved learner confidence and practical skills in hearing-aid fitting, programming, and maintenance.

CONCLUSION

Learning on TAP (Training in Assistive Products) demonstrates how WHO and partners like World Wide Hearing can co-create scalable, standardized training that expands global hearing-care capacity—empowering frontline health workers to extend services to those previously unreached. Scaling knowledge is scaling access — and each trained health worker brings us one step closer to closing the global hearing-care gap.

Keywords: Hearing Aids, Hearing Assistive Products, Training, Task-Sharing, Community Health Workers, LMICs

Oral Presentation 02

Global Audiology and Public Health I
OP 02-4

Ear Portal: Using asynchronous tele-audiology to improve access to Ear, Nose and Throat services for children with otitis media in an urban area

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Background: Diagnosis and treatment of chronic otitis media (OM) often requires tertiary Audiology and Ear, Nose and Throat (ENT) consultation. In Australia, the median waiting time for a routine ENT appointment is 370 days. Tele-audiology models of care for remote areas have been widely adapted across the world however, this study aimed to provide a model of care to support children living in urban areas who also faced long waiting times to receive care for OM.

Method: Children referred to a tertiary ENT Department were invited to a face-to-face assessment by a research audiologist, who completed a comprehensive medical history and audiological assessment. Parents or caregivers were asked to complete the Otitis Media-6 (OM-6), Hearing & Talking Scale (HATS), Parent-evaluated Listening and Understanding Measure (PLUM), Strengths and Difficulties Questionnaire (SDQ) and The Auditory Process Domain Questionnaire (APDQ). Results were reviewed by the Ear Portal multidisciplinary team (MDT), which included an ENT registrar, ENT nurse and audiologist to develop a care plan. Family and staff resources were recorded to compare the cost of Ear Portal compared to standard hospital care.

Results: Between 2020-2023 a total of 250 children were enrolled in the Ear Portal project. Children in the Ear Portal waited significantly shorter (<30 days) than children in the control group (>400 days). Language and quality of life scores were significantly better for children who were seen sooner. The Ear Portal was 43.8% less expensive for initial assessment and 43.4% less expensive for follow up appointments.

Conclusion: The Ear Portal project established a novel model of care for urban children with OM in Australia, reducing long waiting times and improving health and developmental outcomes. Programs such as Ear Portal may act as an adjacent service run by audiologists in tertiary-care settings, and provide a cost-benefit for patients and providers.

Keywords: Otitis media, Paediatric audiology, Telehealth

Oral Presentation 02

Global Audiology and Public Health I
OP 02-5

Benefits of a Spanish-language hearing loss self-management program: Results from a randomized controlled trial

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Objectives: To assess the effects of culturally and linguistically appropriate Spanish-language patient education materials about hearing loss self-management among Hispanic adults. We hypothesized that participants receiving these materials would demonstrate benefits in self-efficacy for managing hearing loss compared to those receiving standard-of-care.

Method: A randomized controlled trial was conducted with Spanish-speaking adults ≥50 years with at least mild hearing loss or self-reported hearing difficulties. Participants were randomized to receive either culturally and linguistically appropriate Spanish-language materials (Programa de Audiología y Soluciones Auditivas [Audisol]) or standard-of-care materials (Spanish-language handouts from the American Speech-Language-Hearing Association). Self-efficacy was measured using the Partners in Health Scale–Audiology version (PIH-A) and the Self-Efficacy to Manage Chronic Disease Scale (SEMCD-S). Within-group changes were estimated using dependent t-tests and generalized linear modeling.

Results: Forty-nine adults were enrolled, with 38 completing both a baseline and outcome assessment. Significant within-group PIH-A improvements were observed for both the Audisol group ($t(17)=3.45$, $p=.003$, Cohen's $d=.813$) and the standard-of-care group ($t(17)=2.29$, $p=.035$, $d=.540$). No significant within-group SEMCD-S changes were found. The fitted model showed no significant main effect of group on PIH-A or SEMCD-S.

Conclusions: Both Audisol and standard-of-care Spanish-language materials improved hearing loss-specific self-management among Hispanic adults in our sample. Findings emphasize the importance of culturally and linguistically appropriate resources in addressing disparities in hearing healthcare for Hispanic adults. Future studies should incorporate larger samples, extended follow-up, and multicomponent interventions to assess sustained impacts.

Keywords: Hearing loss, Hispanic/Latino, Patient education

Oral Presentation 02

Global Audiology and Public Health I
OP 02-6

The CONtroll of VENtilation TUbes (ConVenTu): A randomized clinical non-inferiority trial comparing otolaryngology surveillance to observation in general practice. Audiological results and complication data

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Ventilation tube (VT) insertion is a widespread intervention and is one of the most frequent ambulatory surgeries in childhood. Follow-up of these patients often spans several years and requires significant resources to maintain. The CONtrol of VENtilation TUbes (ConVenTu) trial, a randomized controlled non-inferiority trial involving six Norwegian hospitals, was performed to determine whether general practitioners (GPs) could provide an alternative to otorhinolaryngology (ENT) follow-up. The primary end-point results of which have recently been published in JAMA-otolaryngology.

Materials and methods: Children 3-10 years of age determined to need VT insertion by a physician at one of the participating hospitals were included. Those with relevant comorbidities or a hearing loss exceeding 50dB in one ear were excluded. Audiometric data, tympanometric data, and consent were collected at the patients' initial outpatient assessment prior to inclusion. Patients were randomized into GP or ENT follow-up after VT insertion on the day of their operation. Patients followed by ENT were controlled in six-month intervals while those followed by their GP were told to take contact as needed, and to book a control appointment at 18 months. All patients received a final appointment at their respective ENT departments 2-years postoperatively to collect audiometric and complication data. The difference between group PTA means measured at inclusion and two-years after insertion was the primary outcome, with 5dB as the non-inferiority margin.

Results: 305 patients were included in the baseline analysis. 145 in each group completed 2-year audiometric control. The difference in PTA means between groups (0.16dB [1-sided 97.5% CI lower bound, -1.52 dB]) was well within the 5dB non-inferiority margin. The total number of complications between groups did not differ significantly OR 0.67 (0.39-1.15).

Conclusions: The GP observation group had non-inferior audiometric and complication outcomes when compared to those who underwent standard follow-up through an ENT department.

Keywords: Ventilation tubes, Otitis media with effusion, Pediatric otolaryngology

Oral Presentation 02

Global Audiology and Public Health I
OP 02-7

Capacity Development in Pediatric Audiology in Peru: Integrating Hearing Aid Data into Training Evaluation

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In Peru, it is estimated that 2–4 children are born every day with congenital hearing loss, based on global prevalence rates of 1–3 per 1,000 live births (WHO, 2021) and national birth statistics (INEI, 2023). Yet the absence of universal neonatal hearing screening and a shortage of audiologists, with approximately 14 in the entire country, restricts early identification and intervention. To address this gap, Oír Para Crecer established a decentralized pediatric audiology model through partnerships with local communities to provide audiology services. Common challenges are to monitor the quality of the services and training impact. This work describes a pilot training approach that combines subjective training evaluations with the analysis of pediatric hearing aid (HA) data to monitor outcomes and identify training needs.

806 pediatric HA sessions from Phonak Target software obtained from April 2024 through October 2025, were reviewed to examine programming patterns, fitting practices, and device use. 8 individuals in 6 provinces were trained to provide pediatric audiology services. Post-training satisfaction surveys were completed. Findings were discussed with the training coordinator to identify priority areas.

Among children fitted, 56% presented with profound hearing loss and validated pediatric fitting rationale were applied in 99% of cases. Daily wearing time data were available for 331 sessions, with a median of 8 hours per day—below the recommended 10 hours. Survey responses indicated high satisfaction ratings.

Findings highlighted specific training needs, including strategies to reduce loss to follow-up and improve daily device use. Despite frequent changes in staff, pediatric hearing aid fitting knowledge has been cascaded among health professionals and implemented into practice as demonstrated in the HA data. Combining subjective training evaluations with objective HA data provided a practical and targeted method for monitoring pediatric audiology services in decentralized contexts where professional capacity is limited.

Keywords: Pediatrics, Hearing aids, Training

Oral Presentation 02

Global Audiology and Public Health I
OP 02-8

Expanding the Functional Profile of Hearing Disability: Evidence for Including Balance and Mobility Categories in the ICF Core Sets for Hearing Loss

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Background: The International Classification of Functioning, Disability and Health (ICF) Core Sets for Hearing Loss (CSHL) provide a standardized framework for categorizing broader aspects of hearing disability. However, balance- and mobility-related disability remains uncategorized. This study aimed to quantify these disabilities and examine their relationship with hearing disability to provide evidence for expanding the ICF-CSHL. Methods: A cross-sectional study was conducted with 72 adults (mean age = 59 ± 8.3 years), stratified into adults with normal hearing (n = 18), adults with aided HL (n = 29), and adults with unaided HL (n = 25). Participants completed two self-report measures: (1) the HEAR-COMMAND Tool, a validated ICF-based questionnaire assessing hearing disability; and (2) the Balance and Mobility Scale (BMS), a novel 13-item instrument designed to parallel the structure and scoring of the HEAR-COMMAND Tool, allowing direct comparison and evaluating balance- and mobility-related categories not currently represented in the ICF-CSHL. Results: The BMS demonstrated excellent internal consistency ($\alpha = 0.90$). Balance- and mobility-related disabilities were highly prevalent, including walking fatigue (73.6%), challenges with complex movements (72.2%), difficulties transitioning between positions (70.8%), leg stiffness (68.1%), standing instability (61.1%), and difficulty walking long distances (50%). BMS total scores were strongly associated with HEAR-COMMAND domain scores, explaining substantial variance in both the hearing-specific domain ($\beta = 0.50$, $p < .001$, $R^2 = 40\%$) and non-hearing domain ($\beta = 0.63$, $p < .001$, $R^2 = 48\%$). Adults with unaided HL reported significantly greater balance- and mobility-related disability than adults with normal hearing. While hearing aid use improved hearing-specific scores, aided users continued to report persistent functional challenges on the BMS and in non-hearing domains. Conclusion: Balance- and mobility-related challenges matter among adults with HL. Incorporating balance and mobility categories into the ICF-CSHL could facilitate more comprehensive assessment and targeted rehabilitation strategies for individuals with HL.

Keywords: Hearing Loss, Balance and Mobility Function, International Classification of Functioning Disability and Health

Oral Presentation 02

Global Audiology and Public Health I
OP 02-9

Global disparities in hearing care services and infrastructure: Findings from an international provider survey

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Objective:
Access to audiological services and support for individuals with hearing loss varies widely across low-middle income countries (LMICs) and high-income countries (HICs). This study examines disparities in the availability of audiological services across World Bank income groups.
Design:
An international cross-sectional survey was developed and distributed by the Global Otolaryngology Head and Neck Surgery Initiative. The survey evaluated the availability of audiology and support services across countries. Multiple responses from one country were combined into one entry. Statistical significance between groups was assessed using chi-squared tests, and p-values of <0.05 were measured.
Study Sample: A total of 135 responses were received from 47 countries (30 LMICs and 17 HICs).
Results:
Significant disparities were identified across most service categories. HICs reported greater availability of newborn hearing screening, diagnostic tests, pediatric and adult hearing assessments, vestibular services, and hearing technologies compared to LMICs. Notably, advanced diagnostic tools and hearing devices such as cochlear implants were substantially more accessible in HICs.
Conclusions:
Substantial differences were observed in audiological and rehabilitative services across HICs and LMICs. Efforts to bridge significant gaps are essential for achieving equitable hearing health care worldwide.

Keywords: Hearing health care, Audiology infrastructure, Audiology service delivery

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-1

Long-term efficacy of dexamethasone treatment via tympanic antrum catheterization for intractable Meniere's disease

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Objective: To explore the long-term efficacy and safety of dexamethasone treatment via tympanic antrum catheterization (DTAC) in intractable Meniere's disease (MD).
Methods: We conducted a retrospective analysis of the clinical data of 86 MD patients treated with DTAC. Seventy patients who underwent endolymphatic sac decompression (ESD) and 70 patients who received intratympanic steroids (ITS) during the same period were assigned to control groups. All patients completed a follow-up period exceeding two years. Vertigo control, hearing level, tinnitus, aural fullness, and functional level were assessed and compared across the groups.
Results: The vertigo control rate of the DTAC group was 77.9% (67/86), with a complete control rate of 58.1% (50/86). The vertigo control rate of the DTAC group was comparable to that of the ESD group and significantly higher than that of the ITS group. The DTAC group demonstrated a hearing preservation rate of 88.4% (76/86), a tinnitus improvement rate of 54.7% (47/86), and an aural fullness improvement rate of 55.8% (48/86), with all three parameters being significantly superior to those in the other two groups. The functional level improvement rate in the DTAC group was 76.7% (66/86), which was comparable to the ESD group but significantly higher than the ITS group. No adverse reactions or complications occurred in the DTAC group.
Conclusion: Dexamethasone treatment via tympanic antrum catheterization represents an effective and safe therapeutic approach for intractable Meniere's disease. It demonstrates significant value in controlling vertigo attacks and alleviating symptoms of tinnitus and aural fullness.

Keywords: Meniere's disease, Vertigo, Dexamethasone

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-2

Functional Balance in Deaf School-Aged Children

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BACKGROUND: Balance deficits are common in children with deafness, affecting general well-being and holistic development. The extent to which children with deafness experience this condition is relatively unknown and underexplored in research and clinical practice. OBJECTIVE: To evaluate functional balance by quantifying symptoms of imbalance, balance-related handicap and measuring balance performance in school-aged children with deafness and children (CWD) with normal hearing (NH) aged 9 to 17 years. METHODS: A descriptive, case-controlled study was conducted with 155 children; 97 CWD and 58 NH (mean age 14 years). The PVSQ was used to quantify balance symptoms, DHI-CA to quantify dizziness-related handicap, and the EQ-5D-Y proxy version questionnaire to determine HRQoL. Physical outcome measures included visual acuity, the Mini-Balance Evaluation Systems Test (Mini-BESTest) and the Modified Clinical Test of Sensory Interaction in Balance (m-CTSIB). RESULTS: CWD presented with greater symptoms of imbalance on the PVSQ, greater imbalance-related handicap on the DHI-CA and reduced HRQoL when compared to NH peers. CWD showed reduced balance scores on the Mini-BESTest and m-CTSIB ($p=<0.001$) and had reduced visual acuity when compared with NH children. CONCLUSION: CWD have reduced functional balance when compared with their NH peers. This has implications for global health and overall quality of life. Thus, balance assessment needs to be prioritized in the management of CWD.

Keywords: Paediatric, Balance, Deafness

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-3

Cognitive Load and Gaze Stability: Exploring the Limits of the Vestibulo-Ocular Reflex Under Dual-Task Conditions

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Background: Cognitive load has been shown to impact postural control, but its effect on vestibulo-ocular reflex (VOR) function remains unclear. This study investigated whether mental effort influences VOR gain during video head impulse testing (vHIT) in healthy adults.

Method: A total of 36 participants (mean age: 22.3 ± 4.7 years) completed horizontal vHIT tests under two conditions: single-task (rest) and dual-task (serial subtraction by 7s). VOR gain, overt/covert saccades, and subjective effort ratings were recorded for each condition. A within-subject design and paired-sample t-tests were used to compare outcomes.

Results: showed no significant difference in VOR gain between resting and cognitive load conditions (mean gain: 0.96 vs. 0.94; $p = 0.18$). No notable increase in compensatory saccades was observed. However, participants reported significantly higher cognitive effort ($p < 0.001$) and mild instability during dual tasking.

Conclusion: These findings suggest that VOR function remains stable under moderate cognitive demand in young, healthy adults—contrasting with the cognitive vulnerability seen in postural systems. This reinforces the clinical reliability of vHIT even during mentally active states. However, subjective discomfort under cognitive load may still impact test experience or interpretation in older or neurologically vulnerable populations. Future research should explore task complexity and age effects to guide dual-task vestibular assessment.

Keywords: Cognitive load, Vestibulo-ocular reflex, Video head impulse test

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-4

Topographic Brain Mapping of Motion Sickness Using Electroencephalography and Virtual Reality

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Abstract
Motion sickness is a complex set of symptoms that occur under various travel conditions. This study was conducted to elucidate the brain activation patterns caused by motion sickness.
The study was conducted 47 participants (study group: 23, control group: 24). Real travel videos were used in the study to simulate real-life travel conditions and induce motion sickness. The stimulus videos were selected from real travel videos available on the YouTube virtual reality (VR) platform. The study was planned in five stages to provide five different travel experiences in a single session. The videos were presented using VR headsets. Continuous EEG recordings were obtained throughout the session.
Comparative analysis was performed between groups by correlating objective data with self-report questionnaires. Furthermore, statistical analyses were conducted on EEG frequency bands most associated with motion sickness in the literature (theta [4.0–7.0 Hz], alpha [7.0–13.0 Hz], and beta oscillation [13–20 Hz]). Statistically significant differences were observed in the alpha band among the participants.
In participants with high sensitivity to motion sickness, alpha waves emerged in the occipital region ($p = 0.0017$), whereas in adaptive and non-motion sick individuals, increased activation in the central region in the alpha band was detected. This activation corresponds with the mu rhythm, which is indicative of adaptive capability and information processing skills. The presence of occipital alpha waves in individuals with high sensitivity to motion sickness while their eyes are open aligns with the inhibition hypothesis and is interpreted as an indicator of their coping efforts.

Keywords: Motion sickness, Electroencephalography, Virtual Reality

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-5

The clinical relevance of the skull vibration-induced nystagmus test in Minor syndrome

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The skull vibration-induced nystagmus (SVIN) test is a simple bedside maneuver that has become an established clinical marker of vestibular asymmetry. When bone-conducted vibration is applied to the mastoid, patients with unilateral vestibular loss exhibit an immediate, reproducible, and directionally consistent nystagmus, whereas healthy individuals do not.
Objective:
To determine the optimal stimulus frequency and stimulation site for eliciting SVIN in Minor syndrome (MS).
Methods:
The vibratory stimulation was applied in all participants successively to the vertex and the right and left mastoid processes using the Minishaker 4810 [Bruel and Kjaer, Naerum Denmark]. Forty patients with MS (27 unilateral, 13 bilateral) were evaluated using bone-conducted vibrations (10–800 Hz) delivered to each mastoid and the vertex. Eighteen patients Severe unilateral vestibular deficit (SUVD) and 11 controls served as comparison groups. The induced nystagmus were recorded by 3-D videonystagmography. SVIN parameters were compared across groups and correlated with conventional vestibular tests (caloric, head-shaking, video head impulse, and cVEMP). Statistical analysis was performed using GraphPad Prism software (GraphPad, Inc, La Jolla, CA, USA).
Results:
In MS, SVIN beat toward the affected side in 92 % of patients, with responses extending to higher frequencies (up to 700–800 Hz) and maximal amplitudes around 500 Hz. Vertex stimulation produced significantly larger slow-phase velocities than mastoid stimulation ($p = 0.04$). In SUVD, the optimal frequency was 100 Hz, and SVIN beat toward the healthy ear, with mastoid stimulation being more efficient than vertex ($p < 0.01$). SVIN sensitivity in MS equaled that of cVEMP and exceeded caloric, head-shaking, and video head impulse tests ($p < 0.001$).
Conclusion:
At a time when rapid, non-invasive, and low-cost diagnostic strategies are increasingly valued, SVINT deserves a special attention, unmasking peripheral vestibular asymmetry in MS, and revealing a true vestibular Weber test.

Keywords: Skull vibration, nystagmus, Minor syndrome

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-6

Synergistic Effects of Noisy Galvanic Vestibular Stimulation with Rehabilitation on Cognitive Function in Unilateral Peripheral Vestibulopathy: A Dual-Task Study

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Background: Unilateral peripheral vestibulopathy (UPV) impairs balance and cognition, particularly in dual-task conditions, due to extensive vestibulocortical connections. While conventional vestibular rehabilitation (CVR) improves balance, its impact on cognitive function in real-life scenarios remains unclear. Noisy galvanic vestibular stimulation (nGVS) has been shown to enhance the processing of vestibular inputs and mitigate cognitive decline, suggesting its potential as an adjunctive approach to vestibular rehabilitation. This study examined the combined effects of nGVS with either CVR or virtual reality (VR)-based rehabilitation on cognitive performance in patients with UPV under single- and dual-task paradigms. Methods: In a randomized controlled trial, 52 UPV patients (mean age 40.23 ± 7.63 years) were assigned to CVR, CVR+nGVS, VR, or VR+nGVS groups. Interventions included four weeks of CVR or VR, with nGVS groups receiving three 20-minutes sessions. Cognitive domains (reaction time, verbal fluency, working memory, visuospatial memory, attention) were assessed pre- and post-intervention in single- and dual-task conditions (stance on hard/soft surfaces, eyes open/closed). Results: All groups improved in single-task cognitive performance; however, nGVS-enhanced groups (CVR+nGVS, VR+nGVS) showed significantly greater gains in dual-task conditions, particularly on soft surfaces ($p<0.001$). VR+nGVS outperformed CVR and VR in verbal fluency, memory span, and visuospatial tasks ($p<0.05$) with larger effect sizes. No significant differences were observed between CVR and VR alone. Conclusions: Combining nGVS with CVR or VR synergistically enhances cognitive and balance outcomes in UVP patients, especially in changing dual-task scenarios. CVR and VR are comparably effective, suggesting flexibility in rehabilitation approaches. These findings highlight nGVS as a promising adjunct for UPV rehabilitation.

Keywords: Vestibulopathy, Vestibular rehabilitation, Dual-task condition

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-7

7-Tesla sodium magnetic resonance imaging of the inner ears in Ménière's Disease: An exploratory study

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Background
The endolymphatic space (ES) undergoes hydropic expansion in Ménière's Disease (MD). It was hypothesised that the lower sodium (23Na) concentration in the endolymph relative to the surrounding perilymph would result in a differential reduction in 23Na-MRI signal in inner ears with endolymphatic hydrops (EH). This proof of principle study explored the feasibility of 7-Tesla (7T) 23Na-MRI to lateralise EH ears in unilateral MD.

Methods
This prospective study imaged participants with unilateral definite MD and severe vestibulo-cochlear EH with 7T 23Na-MRI. Two blinded independent observers qualitatively graded the visibility and anatomical compatibility of inner ear 23Na MRI signal intensity (NaSI), before and after registering to 3D T2 weighted (T2w) MRI. Grade asymmetry determined the certainty of endolymphatic hydrops (EH) laterality. The internal auditory meatus (IAM), cochlea and vestibule were segmented and NaSI was quantified. The vestibule and cochlea median NaSI were scaled to the adjacent IAM median NaSI and compared between the two ears.

Results
In 4 unilateral MD participants (mean age 60.3 years, 2 men), both observers correctly predicted EH laterality in 1/4 before and in 3/4 participants after fusion to 3D T2w MRI. In these 3 participants, the median inner ear NaSI scaled to that of the ipsilateral IAM NaSI was 1.2-2.8 times higher in the normal cochlea and 1.9-2.9 times higher in the vestibule as compared to the EH ear. Intraclass correlation coefficient for inner ear median NaSI was 0.70.

Conclusion
This exploratory study revealed the potential for severe EH to be qualitatively and quantitatively lateralised with 7T ^{23}Na MRI in patients with unilateral definite MD. These technically promising results provide a proof of principle that sodium MRI may have a role in the evaluation of Ménière's disease without the requirement for gadolinium administration, and they form the basis for further evaluation.

Keywords: Ménière's disease, Magnetic resonance Imaging, Sodium Imaging

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-8

Dynamic Head Tilt Enhances the Diagnostic Accuracy of Subjective Visual Vertical and Horizontal in Detecting Peripheral Vestibular Disorders

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Purpose: Subjective Visual Vertical (SVV) and Subjective Visual Horizontal (SVH) are non-invasive tests used to assess otolithic function and otolith-mediated spatial orientation. However, the conventional static head position often fails to detect subtle vestibular dysfunction. This study investigates whether dynamic head-tilt conditions improve diagnostic accuracy in identifying peripheral vestibular disorders (PVD). Methods: Fifty-eight adults (31 suspected PVD; 27 healthy controls) underwent SVV and SVH testing using the Synapsys VNG-Ulmer system. Both static (0°) and dynamic (±45°) head-tilt conditions were evaluated with a customised laser-guided headlight device to ensure precise alignment of the head position and tilt, and to minimise inter-subject variability. Normative reference values were established from healthy adults, and diagnostic performance was analysed using receiver operating characteristic (ROC) curves. Results: Static SVV and SVH showed limited ability to distinguish patients with PVD from healthy controls, suggesting that static assessments alone provide insufficient diagnostic (AUC ≤ 0.58; sensitivity < 50%). In contrast, dynamic head-tilt conditions markedly enhanced diagnostic accuracy. For SVV, right-tilt absolute deviation achieved an AUC of 0.711, while left-tilt reached 0.734, with sensitivities as high as 88.5%. Dynamic SVH yielded even stronger performance, particularly for left-tilt absolute deviation (AUC = 0.773; sensitivity = 76.9%; specificity = 67.9%; $p < 0.0001$). However, mean-deviation metrics across both tests remained diagnostically weak (AUC ≈ 0.5), reflecting poor discriminatory capacity. Conclusion: Incorporating dynamic head tilts significantly enhances the diagnostic value of SVV and SVH by amplifying perceptual asymmetries that are not detectable under static conditions. Dynamic SVV and SVH should therefore be prioritised when assessing patients suspected of PVD, serving as effective complementary tools alongside primary vestibular function tests. The customised headlight-tilt method further improves testing precision and reproducibility.

Keywords: Dynamic head tilt, Subjective Visual Vertical, Subjective Visual Horizontal

Oral Presentation 03

Vertigo and Balance Disorders
OP 03-9

Long-Term Efficacy of Transtympanic Dexamethasone Phosphate 4 mg in Adults with Refractory Unilateral Ménière's Disease: An 84-Month Follow-Up Study

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Objective: To evaluate the long-term efficacy (84-month follow-up) of dexamethasone phosphate 4 mg (DX) transtympanic administration in adults with refractory unilateral Ménière's disease.
Methods: 37 patients underwent tympanostomy and daily for 30 days transtympanic administration of DX. The endolymphatic hydrops (EH) via neuroimaging (days 1, 7, 30-45); auditory function via pure-tone threshold audiometry; frequency and severity of vertigo attacks using Visual Analogue Scale (VAS), Dizziness Handicap Inventory (DHI) (days 1, 8, 30; months 6, 12, 24, 84) were assessed.
Results: Neuroimaging revealed EH in 100% of cases (37/37) before treatment and on day 7 (3/3) in all structures. By days 30-45, a reduction in EH severity was observed in 89% of cases (33/37): significant EH in cochlea was diagnosed in 57% (21/37) before treatment versus 24% (9/37) after; vestibule - 62% (23/37) vs. 41% (15/37), semicircular canals - 70% (25/37) vs. 49% (18/37), respectively. A vertigo attack reduction was noted in 100% of cases (37/37): VAS intensity decreased from 7.8 ± 0.6 to 2.6 ± 0.3 at 24 months, and 2.4 ± 0.3 at 84 months; DHI scores - 54.6 ± 2.4, 23.4 ± 0.6, and 20.0 ± 0.8; vertigo attack frequency - 15.2 ± 1.8, 3.6 ± 0.8, and 3.2 ± 0.6, respectively. The complete remission period after treatment was 12.8 ± 1.4 months. In 16% of cases (6/37), vertigo attacks persisted, requiring destructive surgery.
In 32% of cases (12/37), a hearing threshold improvement (18 ± 9 dB) was observed within the first 24 months; in 11% (4/37), this auditory improvement persisted throughout the entire follow-up period.
Adverse events included diffuse external otitis in 11% of cases (4/37), a persistent tympanic membrane perforation in 3% (1/37).
Conclusion: Transtympanic administration of DX daily for 1 month is an effective and safe treatment for refractory Ménière's disease.

Keywords: Ménière's disease, Dexamethasone, Transtympanic administration

Oral Presentation 04

Aging and Cognition
OP 04-1

Developing a Core Outcome Set for Co-existing Dementia and Hearing Loss

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Background
Hearing loss (HL) and dementia frequently co-occur, affecting communication, cognition, and well-being. Robust trials are needed to identify effective interventions, yet clarity is lacking on which outcomes matter most. Core Outcome Sets (COSs) are recommended for all trials and established across many conditions. Following Core Outcome Measures in Effectiveness Trials (COMET) guidance, this research aims to develop a COS for dementia and HL intervention trials to standardise outcomes and enable comparisons. The first step, a systematic review, identified outcomes and instruments from studies to create a long list for stakeholder-led prioritisation.

Methods
Pre-registered with PROSPERO, seven databases and trial registries were searched without date restrictions. Non-pharmacological intervention studies involving adults with dementia and HL and/or their carers were included. Two reviewers independently completed screening and data extraction.

Results
Of 26 studies, 21 implemented hearing aids as the intervention for co-existing dementia and HL. In total, 101 outcome domains were identified, measured using 153 instruments. Categorised using Dodd's Taxonomy, cognitive function outcomes reported in 58% of studies were most common, followed by hearing function or improvement-related outcomes (54%) and quality-of-life outcomes (42%). Other key domains included caregiver burden and neuropsychiatric symptoms.

Conclusion
This review identified a long list of outcome domains and instruments in published/ongoing studies assessing interventions for co-existing dementia and HL. Large variability was evident in the reporting of outcomes and instruments, highlighting the need for a COS.

Next steps
Focus groups with individuals living with dementia and HL, caregivers, clinicians and researchers are underway to identify outcomes grounded in lived and professional experience. These will be integrated with the long list developed during the review. An international Delphi survey will then invite stakeholders to prioritise and refine this list, ensuring the final COS reflects what matters and provides a mechanism to compare intervention effectiveness for this population.

Keywords: Dementia, Hearing loss, Outcome measures

Oral Presentation 04

Aging and Cognition
OP 04-2

The Impact of Age on Attention Network Connectivity: A Comparative Study of Middle-Aged vs. Older Adults During Attentional Tasks

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Aging is associated with declines in attention networks, which can significantly impact cognitive performance. Understanding the Dorsal Attention Network (DAN), Ventral Attention Network (VAN), and Default Mode Network (DMN) is essential, as they are key attention networks actively engaged during various attentional tasks. The Attention Network Task (ANT), used for studying alerting, orienting, and executive attention, was used to study these network interplays. Behavioral evaluations have shown that all three networks are impaired in older adults. However, traditional behavioral assessments often overlook the underlying neural interactions that help elucidate these age-related changes, making it crucial to explore these connections further.

This study analyzed source-level EEG functional connectivity using 32-channel EEG data from twenty middle-aged (18–55 years) and older adults (60+ years) during the ANT task developed by Fan et al, 2002. Connectivity was assessed during alerting (double-cue) and executive function (incongruent trials) conditions, focusing on theta and alpha frequency bandwidths.

Behavioral results indicated expected age-related declines among older adults, but neural coordination insights were revealed through task-based connectivity analysis. Task-based connectivity elucidates how network interactions adapt in response to cognitive demands, providing mechanistic insights. Key findings revealed age-related impairments primarily in the theta band. During alerting, older adults exhibited markedly reduced theta-band connectivity within the DAN, suggesting diminished top-down orienting and arousal mechanisms critical for alerting attention. Additional alpha band disruptions in VAN and DMN pointed to compromised integration of stimulus-driven and internally directed attention. For executive function, connectivity reductions were most pronounced in theta-band VAN and DMN, reflecting disrupted conflict monitoring and resolution, with secondary alterations in alpha DAN connectivity indicating impaired top-down control.

These findings point to altered coordination between goal-directed (DAN) and stimulus-driven (VAN) networks in aging, resulting in compensatory or maladaptive network reorganization, affecting attention allocation and conflict resolution.

Keywords: Attention network test, Functional connectivity, Aging

Oral Presentation 04

Aging and Cognition
OP 04-3

Hearing Loss, Hearing Aids, and Cognitive Change in Older Adults: Evidence from the Canadian Longitudinal Study on Aging

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Background: Age-related hearing loss is highly prevalent among older adults and represents a potentially modifiable risk factor for cognitive decline. Reduced auditory input and the resulting social and cognitive strain may accelerate neurocognitive aging. Hearing aids are the primary form of rehabilitation, yet their long-term cognitive benefit remains uncertain.

Objective: To examine longitudinal associations between objective hearing thresholds and cognitive change over approximately three and six years, and to determine whether hearing-aid use moderates this relationship.

Methods: Data were drawn from the Canadian Longitudinal Study on Aging (CLSA), a large national cohort collecting repeated health, sensory, and cognitive assessments every three years. This analysis included participants with complete audiometric and cognitive data at baseline, Follow-Up 1 (~3 years), and Follow-Up 2 (~6 years). Hearing was assessed via pure-tone audiometry (0.5–4 kHz); the Better-Ear Pure-Tone Average (PTA, dB HL) was analyzed as a continuous variable. Global cognition was indexed by a standardized composite score (M = 100, SD = 15) integrating memory, executive function, and processing-speed tests. Linear regression models predicted cognitive change from baseline PTA, hearing-aid use, and their interaction, adjusting for age, sex, education, income, chronic conditions, and culture.

Results: At three years, greater hearing loss (higher PTA) predicted larger cognitive decline ($\beta = -0.049$, $p = 0.0039$), with roughly a 0.5-point reduction per 10 dB worsening. A significant PTA × Hearing-Aid Use interaction ($\beta = +0.150$, $p = 0.0066$) indicated less decline among hearing-aid users. At six years, hearing loss remained predictive ($\beta = -0.043$, $p = 0.016$), but the interaction was no longer significant. Age was the strongest predictor ($p < 0.001$).

Conclusions: Hearing loss consistently predicted cognitive decline. Hearing-aid use conferred short-term cognitive benefit, but this effect diminished by six years. Early hearing intervention may help sustain cognition, though long-term protection likely requires broader health strategies.

Keywords: Cognitive aging, Hearing aids, Hearing loss

Oral Presentation 04

Aging and Cognition
OP 04-4

Cohort Profile: the Chinese Hearing Solution for Improvement of Cognition in Elders (CHOICE) study

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The Chinese Hearing Solution for Improvement of Cognition in Elders (CHOICE) cohort was established in 2021 as a prospective, population-based study to investigate the associations between hearing impairment and functional outcomes, with a particular focus on cognitive decline, in older adults. Utilizing Shanghai's routine health examination infrastructure, the study recruited community-dwelling adults aged over 60 years. Baseline assessments included sociodemographic characteristics, lifestyle factors, hearing-related symptoms, medical history, cognitive function, and comprehensive audiometric evaluation, along with routine laboratory tests and biological samples for biomarker and omics analyses. Rigorous quality assurance and control procedures were implemented throughout data collection to ensure reliability and reproducibility. Follow-up assessments are conducted every 2–3 years alongside routine health examinations to track longitudinal changes in hearing, cognition, and related health outcomes. By July 2025, 23,030 individuals had completed baseline assessments. Three waves of follow-up have been initiated across study communities, with 8,143 participants completing at least one wave. By integrating epidemiologic, audiometric, and omics data, the CHOICE cohort seeks to elucidate the associations and underlying mechanisms linking hearing impairment with cognitive decline, informing evidence-based strategies for early intervention and healthy aging.

Keywords: Age-related hearing loss, Cognition, Cohort

Oral Presentation 04

Aging and Cognition
OP 04-5

The Australian Home Care Study: Prevalence and Impact of Hearing, Vision and Cognitive Impairment Among Vulnerable Older Australians

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Background: Home care services enable older people to maintain independence and remain in their own homes as they age. Hearing, vision, and cognitive impairments are prevalent among older people, but due to multi-morbidity and mobility difficulties, people receiving home care services may be less likely to have these needs addressed. This can negatively impact their quality of life, functional ability and mental well-being, in addition to increasing the likelihood of transition into residential aged care.

Objectives: To estimate the prevalence of hearing, vision and cognitive impairments in Australia's home care population and model the impact of comorbid sensory and cognitive impairments on quality of life, mental well-being and functional ability.

Methods: A cross-sectional survey (n=369). Hearing was assessed from 0.5kHz-8kHz using the HearX hearTest, visual acuity with Peek Acuity, contrast sensitivity with the Spaeth/Richman Contrast Sensitivity test and cognition using the Montreal Cognitive Assessment (normal, hearing and vision impaired versions).

Results: Initial data for 192 participants showed that 96.4% (95% CI: 93.8, 99.0) of participants had hearing loss, with an average 3FAHL (0.5kHz, 1kHz and 2kHz) of 36.45 ± 17.11 dB HL. Of these participants, 71% reported self-perceived hearing difficulties, 66% reported a formal diagnosis of hearing loss, and 51% reported owning a hearing aid/s or cochlear implant.

Failure rates for vision and cognitive screenings were 68.8% (95% CI: 62.3, 75.4) and 58.9% (95% CI: 51.9, 65.9) respectively. Comorbidities were also observed, with 21.4% of participants having hearing and vision loss, 12.5% having hearing and cognitive impairment, and 45.8% exhibiting hearing, vision and cognitive deficits.

Conclusion: Hearing loss is common, underdiagnosed and undertreated amongst home care populations. The likelihood of comorbid hearing, vision and/or cognitive impairments must be taken into consideration when addressing the hearing needs of this population.

Keywords: Hearing loss, Vision loss, Cognitive Impairment

Oral Presentation 04

Aging and Cognition
OP 04-6

Quantifying Central Auditory Aging: Correlation of LLR Responses to Cognitive Biomarkers

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Purpose: Aging is characterized by a decline in central auditory processing (CAP) and cognitive efficiency, which impacts communication despite normal peripheral hearing. The P1-N1-P2 complex of the Late Latency Response (LLR) reflects early, pre-attentive sensory registration and cortical resource allocation. This study aimed to characterize age-related LLR changes and determine how these changes correlate with a multi-domain cognitive battery in neurotypical older adults.

Methods: We recruited 60 participants divided into two groups: 30 Young Adults (YA, aged 20-30) and 30 Neurotypical Older Adults (NOA, aged 60-70), having hearing thresholds within 25 dBHL. LLRs were elicited using the speech stimulus /da/ presented at 70 dBSPL. Amplitude and latency of the P1, N1, and P2 peaks were analysed. Cognitive assessment included a battery targeting executive function and working memory: Design Memory, Mazes, Generative Naming, and Symbol Trails.

Results: The NOA group exhibited significant LLR differences compared to the YA group. Specifically, N1 and P2 latencies were significantly prolonged in the NOA cohort ($p < 0.01$), indicating slowed central auditory processing. The N1-P2 peak-to-peak amplitude was also significantly reduced ($p < 0.05$), reflecting decreased synchronous neural activity. Regression analysis showed that the prolonged P2 latency was the strongest physiological predictor of slower completion times on the Symbol Trails test ($R2 = 0.51$, $p < 0.001$). Poorer Generative Naming scores were significantly associated with both N1 latency and P2 latency.

Conclusion: Age-related slowing and reduced amplitude of the P1-N1-P2 complex serve as objective, non-invasive physiological indicators directly reflecting the decline in cortical processing efficiency. LLRs using speech stimuli are valuable for tracking the trajectory of healthy cognitive aging. The strong correlation with visual-executive tasks like Symbol Trails highlights that auditory central slowing is intertwined with general cognitive aging, providing a vital biomarker for tracking the trajectory of healthy cognitive aging.

Keywords: Auditory Cognition, Cortical aging, Late Latency Response

Oral Presentation 04

Aging and Cognition
OP 04-7

Duration-Dependent Effects and Mediation Pathway of Auditory Training on Cognition in Mild Cognitive Impairment: A Secondary Analysis of a Randomized Controlled Trial

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This study is a secondary analysis of randomised controlled trial (RCT) aimed at determining the optimal duration of auditory training (AT) for cognitive improvement, mediation and the multivariate relationship between central auditory processing (CAP) and cognition in older adults with mild cognitive impairment (MCI). The study involved 38 participants (mean age 68 ± 4.67 years) randomized into AT group (n = 19; 24 sessions over 8 weeks) and control group (n = 19). AT targeted temporal processing, specifically Frequency Modulation Detection Limen (FMDL) and Adaptive Threshold of Temporal Resolution (ATTR). Cognitive and auditory assessments were conducted at baseline, after 12 sessions (week 4), and after 24 sessions (week 8). Linear Mixed Model analysis revealed that basic attentional processes, i.e, alerting and orienting scores in attention network task (ANT) improved after 12 sessions, with continued gains at 24 sessions. Higher-order executive functions, such as conflict resolution, required 24 sessions for significant improvement. Working memory (digit span test) showed consistent gains at both time points, while the Trail Making Test (TMT) showed no improvement. PLS-SEM Mediation analysis indicated that CAP partially mediated cognitive improvements, accounting for 38.1% of training effect. Notably, FMDL, modulation detection test (MDT), and right ear performance of dichotic digit test emerged as significant mediators. Canonical correlation analysis demonstrated strong associations between temporal processing, right ear dichotic performance and cognitive domains. Right ear measures mediated and showed stronger correlations with cognitive functions than left ear measures, likely due to more efficient left-hemisphere access and age-related callosal decline in MCI. In summary, working memory and attention required at least 12 sessions, while executive function required 24 or more sessions. The partial mediation by temporal processing supports theories that link sensory and cognitive functions. The findings underscore the importance of targeting specific auditory processes to enhance cognitive outcomes and mitigate decline.

Keywords: Auditory training, Mediation analysis, Canonical correlation

Oral Presentation 04

Aging and Cognition
OP 04-8

A Web-based, Gamified, Auditory-Cognitive Dual-Task Training for Older Adults with Age-related Hearing Loss: A Pilot Randomized Controlled Trial

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This study assessed feasibility, acceptability, and preliminary efficacy of a web-based gamified auditory-cognitive dual-task training (ACDT) for improving everyday listening abilities in community-dwelling older adults with age-related hearing loss (ARHL).

We conducted a prospective, single-blinded, two-arm parallel pilot randomized controlled trial with individual semi-structured interviews. Sixty older adults with mild to moderate ARHL, and normal cognitive function were recruited and randomly allocated to either the ACDT group (n=30) or a waitlist control group (n=30). Participants in the ACDT group received a 12-week training comprising five 60-minute sessions weekly, integrating auditory training (speech-in-noise, rapid speech, competing speaker) with cognitive training (executive function, memory, attention, perceptual-motor). The difficulty levels were automatically adjusted based on the participant's performance on the preceding activity. Feasibility and acceptability were assessed. Hearing abilities, cognition, social isolation and loneliness were measured at baseline, week 6, and week 12.

ACDT demonstrated high feasibility and acceptability. Adherence was excellent (mean 95% sessions completed). Participants reported the training was user-friendly, manageable, and easily integrated into routines, increasing ARHL awareness and reducing cognitive decline concerns. Quantitative analysis revealed that visual cognition measured by MoCA-HK ($p = 0.017$, $Z = 1.83$) and Trail Making Test B ($p=0.0018$, Cohen's $d = 0.63$) were significantly increased from baseline to week 12. A significant improvement in hearing ability measured by PTA in the ACDT group at week 12 ($F (2, 117.0) = 4.470$, $p = 0.013$, Cohen's $d = 0.17$). A significant group difference favored ACDT for 5-min recall ($F (1, 81.2) = 3.997$, $p = 0.049$, Cohen's $d = 0.38$). No significant changes in loneliness or social isolation were found.

Web-based gamified ACDT is feasible, highly acceptable, and shows promising preliminary efficacy for improving everyday listening abilities in older adults with ARHL. This scalable intervention warrants further investigation in a definitive randomized controlled trial.

Keywords: Auditory-Cognitive training, Age-related hearing loss, Pilot Randomized Controlled Trial

Oral Presentation 05

Global Audiology and Public Health II
OP 05-1

STAKEHOLDER'S NEEDS AND READINESS TOWARDS IMPLEMENTATION OF TELE-PRACTICE FOR IDENTIFICATION AND REHABILITATION OF CHILDREN WITH HEARING AND SPEECH-LANGUAGE DISORDERS IN THE PUBLIC HEALTH SECTOR OF SOUTH INDIA

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Purpose of the study:
Tele-practice has gained recognition as an evidence-based practice for delivering audiology and speech-language services, especially in resource-limited settings in the past two decades. However, its integration into routine clinical adoption remains inconsistent. Implementation science facilitates stakeholder engagement, needs assessment, and planning. The objective of the study is to assess the needs related to audiology and speech-language pathology services for children under six years of age and readiness for a tele-practice-based model of care for diagnostic and rehabilitation services among stakeholders within the public sector in Tamil Nadu, South India.

Method:
A mixed-method, cross-sectional study design was used. The study was conducted in two rural districts of Tamil Nadu. The qualitative guides and survey tool were developed. Qualitative data were collected through focus group discussions and semi-structured interviews with 50 health care providers and 61 parents of children with disabilities. A community survey was conducted with 1722 parents of children with no known disabilities.

Analysis:
Qualitative data were analyzed using a hybrid deductive-inductive approach. Thematic analysis was done using NVivo software, and the community survey responses were analyzed using a percentage analysis.

Results:
The results were categorised according to the constructs of Bowen's feasibility framework: the demand/need for tele-practice, the acceptability of tele-practice, the integration and practicality of tele-practice. Findings indicated significant gaps in existing service delivery, with shortages of trained professionals, lack of supervision, and inconsistent availability of resources. HCPs showed interest in adopting tele-practice but highlighted the need for capacity building. Parents perceived tele-practice as beneficial but preferred a hybrid approach that combines remote services with periodic in-person visits. They emphasized the importance of community awareness and training in phone-based screening prior to implementation.

Conclusion:
The study provided foundational insights for designing a context-sensitive, stakeholder-informed tele-practice model for hearing and speech-language services for children

Keywords: Needs and Readiness, Public Health, Tele-practice

Oral Presentation 05

Global Audiology and Public Health II
OP 05-2

Is Noise-Induced Hearing Loss Increasing Among Youth? A Generational Analysis of the National Swedish audiogram register

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Background: In 2015, the World Health Organization (WHO) estimated that 1.1 billion young people were at potential risk of hearing loss from voluntary recreational noise exposure and unsafe listening practices. Our aim was to study, using a generation-based design, whether hearing loss with a noise-induced profile had increased in Sweden.

Material and Methods: This study was based on data from a national aggregation of all hearing tests registered in the "Auditbase" computer system used within the Swedish national health system since 1993. 158,048 pure tone audiograms from 2000–2019 fulfilled the inclusion criteria, being air-conducted audiograms with complete frequency coverage. Audiograms were categorized by sex, birth decade (1950s, 1960s, 1970s, 1980s and 1990s) and age. Generational comparisons were made for the pure tone average (PTA) at 3,4 and 6 kHz and for a modified Klockhoff classification for high-frequency hearing loss (HFHL). Statistical analyses included odds ratios for HFHL, and one-way ANOVA with Tukey's HSD test for mean differences in PTA (3,4,6kHz).

Results: Men born in the 1990s aged 18–27 had 12% higher odds of HFHL and poorer PTA (3,4,6kHz) compared to those born in the 1980s ($p<0.0017$). Men born in the 1970s aged 38-47 had 26% lower odds and better PTA (3,4,6kHz) than those born in the 1960s ($p<0.0001$). Men born in the 1960s aged 48-57 also had 26% lower odds and better PTA (3,4,6kHz) than those born in the 1950s ($p<0.0001$). Similar but less pronounced patterns were seen for women.

Conclusions: High-frequency hearing loss appears to be increasing among younger male generations in Sweden, potentially confirming WHO concerns about recreational noise exposure. This national register study provides the first evidence of this trend in Sweden. The findings align with the international concerns and underscore the need for renewed public-health strategies to prevent noise-induced hearing loss in young adults.

Keywords: High-frequency hearing loss (HFHL), Noise-induced hearing loss (NIHL), Youth hearing health

Oral Presentation 05

Global Audiology and Public Health II
OP 05-3

Audiology in Extreme and Recreational Sports: Mapping the Evidence through a Scoping Review

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Risk-taking behaviors are often perceived as socially unacceptable and reckless due to their potential negative consequences. However, high-risk contact sports and recreational activities are widely accepted because they offer thrill and excitement. Participants in these activities are typically sensation seekers who thrive on heightened stimulation.

Extreme sports and recreational contact activities, such as rock climbing, skydiving, skiing, scuba diving, white-water rafting, rifle shooting, rugby, and bungee jumping, pose significant safety risks and increase the likelihood of injury. While most individuals recognize common risks like head injuries or fractures, few are aware of hearing-related risks, such as middle ear trauma caused by inadequate pressure equalization during diving or aggressive physical contact in sports.

Previous research examining individuals engaged in high-risk recreational or sporting activities revealed limited awareness of potential hearing-related consequences. Globally, there has been little emphasis on ear health and hearing awareness within these contexts.

Methods

A scoping review was conducted to establish the current baseline of knowledge in this area and to guide future research priorities. Searches were performed across four databases using relevant keywords to identify peer-reviewed studies published between 2000 and 2025.

Results

Of the 25 studies identified as relevant, most were unrelated to recreational noise exposure. Only one study focused on skydiving, one on hearing loss associated with chronic alcoholism, and one on hearing loss linked to diving.

Implications

Further research and education are needed to inform recreational and extreme sports enthusiasts about hearing-related risks. While numerous studies address recreational noise exposure, targeted awareness campaigns and educational initiatives for audiologists and the general public are essential to mitigate these risks.

Keywords: Noise exposure, Extreme sports, Audiological risks

Oral Presentation 05

Global Audiology and Public Health II
OP 05-4

Hearing aid Uptake and it's Predictors in the China Health and Retirement Longitudinal Study

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Background: Hearing aid uptake in high income regions is relatively low, leaving many hard of hearing individuals with significant hearing disability. The hearing aid uptake rate is known to be lower in low- and middle-income countries, but data is limited, and rates vary. The current study aimed to utilise the China Health and Retirement Longitudinal Study (CHARLS), a population-based dataset, to identify uptake rates in the Chinese populations and its predictors.

Methods: An analysis of the data collected as part of the CHARLS study was conducted. This dataset targeted Chinese individuals over 45 years of age. The CHARLS collected information of self-reported hearing loss, hearing aids use, and a variety of demographic and health data. We assessed the prevalence and incidence of hearing aid uptake and modelled the characteristics of hearing aid users longitudinally.

Results: Prevalence of hearing aid uptake was 4.2% for those reporting "poor hearing", and 0.9% for those reporting "fair to poor hearing". The incidence of hearing aid uptake was 1.8 per 1000 individuals per year. Significant predictors of hearing aid uptake were self-reported poor hearing (OR = 5.6; 95% CI: 3.5-8.9), age (OR = 1.0; 95% CI: 1.0-1.1), male gender (OR = 1.6; 95% CI: 1.1-2.4), and urban residence (OR = 1.5; 95% CI: 1.0-2.1).

Conclusion: Relatively low hearing aid uptake rates were seen in this study of the Chinese population. The poorer uptake in females, younger individuals, and those in rural areas suggest key groups for targeted intervention.

Keywords: Hearing aid, Uptake, China

Oral Presentation 05

Global Audiology and Public Health II
OP 05-5

The Untapped Frontier: Why Preventing Occupational Hearing Loss is Audiology's Next Revolution

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Background: While audiology has excelled at managing hearing loss, we have largely delegated prevention to occupational health and safety, missing our discipline's most impactful opportunity. Globally, 16% of disabling hearing loss is occupational, yet audiologists remain conspicuously absent from workplace intervention. This study challenges our profession to reclaim prevention as a fundamental and urgent core audiology practice.

Methods: We surveyed 532 UK workers across manufacturing, construction, healthcare, education, entertainment, and other sectors where ear protection is advised, offered, or required. Through systematic behavioural analysis, we mapped real-world barriers preventing effective hearing conservation; barriers that traditional safety approaches fundamentally misunderstand.

Key Findings: We found that workers do not necessarily lack awareness, but they face five interconnected barrier domains requiring audiological solutions: (1) Physical discomfort: Poor fit, pressure, heat, and ear pain from ill-fitted devices; (2) Communication impairment: Inability to hear colleagues, warning signals, or instructions while protected, which is a critical safety paradox; (3) Practical barriers: Inaccessibility, inconvenience between zones, and incompatibility with other personal protective equipment; (4) Perceptual factors: Risk underestimation, social stigma, and habitual non-use; (5) Hygiene concerns: Infection fears from shared equipment and inadequate cleaning protocols.

The Audiological Opportunity: Workers specifically identified custom-fitted devices and comfort as primary compliance facilitators, both of which require audiological expertise. Training quality varied dramatically across sectors, revealing opportunities for audiologist-led education. Workers need communication-preserving protection, individualised fitting, behavioural counselling, and ongoing support; these needs reflect precisely the skillset audiologists possess but rarely deploy preventatively.

Implications: Every prevented case eliminates decades of amplification, rehabilitation, and reduced quality of life. Our findings demonstrate that effective workplace hearing conservation requires audiological expertise in custom fitting, acoustic optimisation, behavioural intervention, and communication preservation. This represents audiology's untapped frontier, showing that preventing occupational hearing loss is not merely an opportunity but may be our profession's next revolution.

Keywords: Preventative audiology, Occupational hearing loss, Behavioural barriers

Oral Presentation 05

Global Audiology and Public Health II
OP 05-6

External Relations Workstream of the World Hearing Forum

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The World Hearing Forum (WHF) of the World Health Organization is a global network of stakeholders promoting ear and hearing care worldwide. Its purpose is "to advocate for ear and hearing care at global, regional, national and local levels" and it has a number of workstreams to facilitate its goals. Since its inception in 2018 the WHF has focused substantially on its core ear and hearing care membership, successfully building relationships and networks globally and supporting these groups to advocate for ear and hearing care. Recognising the need to extend beyond this sector to promote the integration and inclusion of ear and hearing care in health care policy, the WHF established the External Relations Workstream in 2023. This presentation describes the role and importance of this workstream. It highlights the importance of embracing a broader group of new partners with related interests, such as other health professional organizations, disability groups and NGOs, to enhance global advocacy for primary ear and hearing care and prevention of hearing loss. We will illustrate how this can be achieved through inter-disciplinary and cross-sectoral collaborations, such as webinars, conference presentations and new approaches to inter-professional education. These actions will build greater understanding and shared knowledge across disciplines and communities to ultimately ensure that ear and hearing care needs are addressed in national health plans to proactively improve the health and wellness of those living with hearing loss.
We acknowledge the contribution of all members of the External Relations Workstream.

Keywords: World Hearing Forum, Cross-sectoral collaboration, Global advocacy

Oral Presentation 05

Global Audiology and Public Health II
OP 05-7

Healthcare and human rights

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The Universal Declaration of Human Rights (1948) defines that "everyone has the right to a standard of living adequate for the health and well-being of himself and of his family…medical care…social services…and the right to security in the event of…sickness…". Human rights should be an essential principle in the healthcare field. This review paper will demonstrate important human rights factors for us as professionals. The author conducted a review on human rights in general, and on human rights and healthcare. A review on human rights and hearing implants was also conducted. This paper will review the literature on human rights in general, and human rights in healthcare specifically. The review will consider the impact on hearing, as defined n the WHO World Report in Hearing (2021). Finally, the review will consider a document on a human rights based approach to healthcare, showing how these rights can be considered in our cochlear implant world. Human rights has an impact on healthcare. We as health professionals can consider these in our daily practise, providing each patient with the rights and dignity they deserve. We can also see the impact we could have on lobbying reimbursement and other parties to support human rights for all of our patients.

Keywords: Healthcare, Human Rights, Hearing

Oral Presentation 05

Global Audiology and Public Health II
OP 05-8

Audiology Technicians Training in Cameroon: Task sharing to strengthen Ear and Hearing Care services

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A format of ten-day intensive training for audiology technicians was the first of its kind in Cameroon, or any other country where the INGO Christian Blind Mission (CBM) is currently active. The training programme and curriculum was developed by Word Wide Hearing Foundation International, and delivered by two audiologists from Laval University, Canada, and John Hopkins, USA; supported by CBM's Senior Global Advisor for Ear and Hearing Care (EHC), CBM Cameroon Country Office, and Cameroon Baptist Convention Health Services (CBCHS).

Cameroon faces a critical shortage of audiology professionals given that this type of training is not available locally. Until now, there were only three audiology technicians within CBM's partner CBCHS hospitals, serving a client population of over five million persons. Many individuals with hearing difficulties struggle to access timely specialized care, often relying on limited resources or traveling great distances, even abroad, for basic hearing assessment. Since November 2024, BMZ (German Government) and CBM are funding the project "Strengthening EHC Capacities in Cameroon" to bridge current gaps in hearing care.

Within that project, a first capacity building programme was delivered by CBM in March 2025, where 22 nurses were trained as Primary EHC clinicians, using WHO resources in French and English. Thirteen of those PEHC clinicians were selected from three Cameroon regions (Central, Littoral and North-West), for audiology technicians training in August 2025. The aim was to equip participants with practical knowledge in audiology, hearing screening, diagnosis, management and referral of mild to complex ear and hearing conditions, earmould making, hearing aids fitting and counselling. Trainees engaged in comprehensive theory and practical exercises, including supervised consultations at three local hospitals for newborn, children and adult populations.

Our communication will expand on how task sharing within National Health Services can contribute towards strengthening EHC services in LMICs, alongside key local stakeholders.

Keywords: Audiology Technicians Training, EHC Task sharing, Cameroon

Oral Presentation 05

Global Audiology and Public Health II
OP 05-9

Prevalence, disparities and associated factors in hearing loss and hearing device uptake across diverse populations: A systematic review

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Introduction: Hearing loss (HL) affects over 1.5 billion people worldwide, yet significant disparities exist across racial, ethnic, and linguistic populations. As global migration increases and communities become more diverse, understanding hearing health inequalities and their drivers is essential for developing equitable and culturally responsive healthcare services.
Objectives: We aimed to systematically identify evidence on the prevalence of HL and hearing device uptake among children and adults from diverse racial, ethnic, or linguistic backgrounds, within their country of residence and to review factors associated with HL and device uptake that contribute to any inequalities.
Method: A literature search for peer-reviewed studies from 2000 to August 2025 in five electronic databases was conducted (PROSPERO: CRD42024609811). Population-based studies examining HL prevalence and hearing device uptake that included diverse ethnic, racial or linguistic groups as a variable were included in the review.
Results: Of 10,274 records screened, 56 studies were included for the review. Race, ethnicity, or linguistic categorisation of the participants varied across study settings and on sample distribution. The most common clustering was based on race and ethnicity. Studies conducted in the US (n= 35) mainly reported that the non-Hispanic White majority has a higher prevalence of HL in both children and adults. On the contrary, studies from other regions like Brazil, China, South Africa, and the UK (n= 6) reported a higher burden of HL among minority groups. All studies (n=22) examining hearing device uptake highlighted a lower proportion and odds among adults from minority backgrounds. Socioeconomic barriers, healthcare access limitations, and cultural factors were identified as key contributors to these disparities.
Conclusion: Hearing health disparities may be influenced by region-specific socioeconomic disadvantages and linguistic barriers to healthcare access. It is important to understand the regional variations in HL prevalence and device uptake among diverse groups for tailoring public health interventions.

Keywords: Hearing loss, Hearing devices, Minority health

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-1

Exploring Attention Network Connectivity in Tinnitus through the Dual Mechanisms of Cognitive Control Framework – An ERP study

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Tinnitus is commonly accompanied by attentional deficits and cognitive fatigue. Understanding the neural mechanisms underlying these cognitive challenges is essential. The Dual Mechanisms of Cognitive Control (DMCC) theory suggests that cognitive control involves distinct yet interactive processes that could elucidate how tinnitus affects attention. This study aims to investigate the functional connectivity of attention networks in individuals with chronic tinnitus, contributing to our understanding of how altered cognitive control mechanisms may manifest in this population.

Thirty individuals with chronic tinnitus and age-matched controls performed a classical Go/NoGo task while a 32-channel EEG was used to record brain activity simultaneously. EEG was preprocessed, and source-level functional connectivity between the default mode (DMN), dorsal attention (DAN), and ventral attention (VAN) networks was computed using the weighted Phase Lag Index (wPLI) across theta (4–8 Hz) and alpha (8–12 Hz) bands. Graph theory metrics quantified local and global network organization.

Tinnitus participants showed reduced VAN connectivity, especially interhemispheric links among the inferior frontal gyrus (IFG), temporoparietal junction (TPJ), and insula in both bands, suggesting weakened reactive attention. DAN connectivity increased during distractor processing but decreased for targets, indicating impaired proactive control. DMN connectivity remained stable during distractors but dropped significantly during target processing, signifying disrupted network re-engagement. Graph theory results revealed tinnitus-related reductions in mean degree and clustering in VAN and DMN, with elevated DAN connectivity suggesting compensatory hyperactivity. Local efficiency was reduced in theta and elevated in alpha, while global efficiency remained comparable, reflecting adaptive but imbalanced reorganization.

Together, these findings demonstrate that tinnitus disrupts the balance between proactive (DAN) and reactive (VAN) attention systems, impairing goal maintenance and promoting maladaptive stimulus-driven responses. Tinnitus reflects disrupted interaction among attention networks rather than auditory dysfunction alone.

Keywords: Tinnitus, Attention networks, Functional connectivity

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-2

Redefining Tinnitus Care: The results of the DEFINE (Digital thErapy For Improved tiNnitus carE) Randomised Controlled Trial of Smartphone-Delivered CBT

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Introduction:
Cognitive behavioural therapy (CBT) is an evidence-based treatment for tinnitus recommended in many national and international guidelines, yet access to trained therapists remains limited worldwide. Smartphone-delivered CBT offers a scalable, accessible alternative. This study—the first randomised controlled trial globally to directly compare these approaches—evaluated whether smartphone-delivered CBT for tinnitus is non-inferior to one-to-one therapist-delivered CBT in reducing tinnitus severity and improving quality of life.

Methods:
A decentralised, randomised controlled non-inferiority trial was conducted across the UK, with fully remote recruitment, intervention delivery, and data collection. Adults with bothersome tinnitus were randomised 1:1 to receive either smartphone-delivered CBT or therapist-delivered CBT via video conferencing. The primary outcome was change in Tinnitus Functional Index (TFI) score at six months, with a prespecified non-inferiority margin of 13 points. Secondary outcomes included tinnitus severity at three and twelve months, health-related quality of life (HRQoL), and app usability and satisfaction.

Results:
A total of 198 participants were included in the analysis (intervention n = 98; control n = 100). Non-inferiority was demonstrated for smartphone-delivered CBT compared with therapist-delivered CBT. In the per-protocol population, the adjusted mean reduction in TFI score at six months was –15.34 (95% CI –19.62 to –11.06) for the control group and –14.93 (95% CI –20.08 to –9.77) for the intervention group, with a between-group difference of 0.41 (95% CI –5.49 to 4.66). The smartphone-delivered programme was rated highly usable (System Usability Scale score 75, SD 17). No significant differences in HRQoL were observed between groups.

Conclusions:
Smartphone-delivered CBT for tinnitus was non-inferior to therapist-delivered CBT in reducing tinnitus severity at six months. These findings provide the first large-scale evidence supporting smartphone-delivered CBT as a clinically effective and scalable intervention for managing bothersome tinnitus worldwide.

Keywords: Tinnitus, Cognitive Behavioural Therapy, Audiology

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-3

Electric Solutions: Using High-Definition Transcranial Direct Current Stimulation (HD-tDCS) for Tinnitus relief

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Background:
Tinnitus - the phantom perception of sound in the absence of external noise, affects approximately 20% of Australians and can be debilitating. Tinnitus mechanisms are not well understood, complicating treatment development.
Neuromodulation is an intervention technique that alters neural activity in a target area; HD-tDCS is a novel, non-invasive neuromodulation technique. This study used HD-tDCS to stimulate different areas of the brain - LTA (left temporal area), DLPFC (dorsolateral prefrontal cortex) and both together - thought to be responsible for the generation and maintenance of tinnitus.

Objectives:
- To examine whether stimulation sites differentially affect tinnitus loudness and annoyance perception.
- To assess whether multiple sessions of neuromodulation will produce transient or long-term changes in tinnitus perception.

Methods:
In this double-blinded, randomised controlled trial, 57 participants with chronic tinnitus (>6 months) underwent 6 targeted, stimulation sessions (active or sham) across 2-3 weeks: dual-site DPFC and LTA, single-site DLPFC or single-site LTA. Follow-ups were conducted at 1,3 and 6 months.
Outcome measures used were tinnitus loudness and annoyance scales and TFI (Tinnitus Functional Index) scores.

Results:
Compared to sham, significant reductions in tinnitus perception were observed in DLPFC and dual-site cohorts at the 1-month follow-up. However, these effects diminished by 6 months. TFI scores showed greater improvements in DLPFC stimulation, with some participants achieving clinically significant reductions. Across groups, tinnitus pitch showed a gradual decrease over 6 months.

Conclusion:
HD-tDCS provided transient relief from tinnitus perception. Future research should focus on strategies to sustain improvements, such as booster sessions or combined interventions.

Keywords: Tinnitus, Neurostimulation, HD-tDCS

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-4

A Combined Therapeutic Strategy for Tinnitus: Evaluating the Efficacy of Word-in-Noise Training and Tinnitus Retraining Therapy

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Objective: Chronic tinnitus is a heterogeneous auditory condition that often co-occurs with difficulties in speech perception, especially in noisy environments. Given the variable response to single-mode treatments, a combined therapeutic approach may offer broader clinical benefits. This randomized controlled trial investigated the efficacy of integrating Word-in-Noise Training (WINT), designed to enhance speech-in-noise perception, with Tinnitus Retraining Therapy (TRT), a sound-based and counseling approach for tinnitus management.
Methods: Twenty adults with subjective, non-pulsatile tinnitus and documented SPIN deficits were randomly assigned to two treatment arms: TRT alone (n = 10) and combined TRT + WINT (n = 10). Both interventions were delivered weekly for eight consecutive weeks. Outcomes were assessed using the Tinnitus Functional Index (TFI), Visual Analog Scales for tinnitus loudness and annoyance (VAS-L, VAS-A), the Quick Speech-in-Noise (QSIN) test, and the Short Form-12 (SF-12) quality of life questionnaire at baseline, post-therapy, and three-month follow-up.
Results: Both groups showed significant reductions in tinnitus severity and annoyance after treatment ($P < .001$). However, participants who received the combined therapy exhibited greater improvements in TFI (-20.6 ± 11.0 vs. -11.8 ± 4.0; $P = .029$), VAS-A (-4.1 ± 1.5 vs. -2.4 ± 1.2; $P = .017$), and QSIN performance ($P < .001$). Improvements remained stable at follow-up, with significant group-by-time interactions observed for TFI and VAS-A. Correlation analyses indicated that better speech-in-noise perception was associated with reduced tinnitus annoyance and improved quality of life.
Conclusion: The findings highlight that tinnitus management should not focus solely on perceptual or emotional tinnitus components, but rather target the broader auditory dysfunctions—especially impaired speech-in-noise perception—that amplify tinnitus distress. Integrating WINT with TRT thus redefines tinnitus treatment as a dual-domain intervention addressing both auditory and cognitive-emotional components.

Keywords: Tinnitus, Tinnitus retraining therapy, Word in noise training

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-5

Bimodal Therapy for Tinnitus: The Influence of Cardiorespiratory Coupling on Treatment Effectiveness

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Abstract:
Tinnitus remains a challenging problem in audiology, significantly reducing patients' quality of life. Modern research indicates a link between tinnitus and disorders of the autonomic nervous system (ANS), including cardiorespiratory coupling - the relationship between heart rate and respiration, which reflects the state of the ANS. Studying this aspect could improve the effectiveness of therapy, especially when using bimodal stimulation.
Materials and Methods:
The study involved 84 patients (age 28-57 years) complaining of tinnitus, divided into two groups. The first group (n=42) received combined therapy: transcutaneous vagus nerve stimulation (tVNS, 25 Hz, 5 mA) and individualized sound therapy. The second group (n=42) received only pharmacological treatment. All patients underwent audiometry, heart rate variability (HRV) analysis to assess cardiorespiratory coupling (parameters LF, HF, LF/HF), and questionnaire surveys (THI, VAS).
Results:
In the bimodal therapy group, positive dynamics were noted in 89.3% of patients (compared to 54.8% in the control group, $p<0.001$). The highest effectiveness was recorded in patients with sympathicotonia (LF/HF >2.0) - 96.4% showed improvement. In patients with parasympathicotonia (LF/HF <1.0), the results were lower (35.7%), highlighting the role of cardiorespiratory coupling in predicting treatment outcomes.
Conclusions:
Bimodal stimulation demonstrates high effectiveness in treating tinnitus, especially in patients with sympathicotonia. Cardiorespiratory coupling, as a marker of autonomic balance, can serve as a criterion for individualizing therapy. Further research should be aimed at optimizing protocols for patients with parasympathicotonia.

Keywords: Tinnitus, Bimodal stimulation, Cardiorespiratory coupling

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-6

Neural Dynamics in Tinnitus: Differential Effects of Hearing Status on Temporal Brain Activity Variability

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Tinnitus, characterized by phantom sound perception, exhibits heterogeneous pathophysiology influenced by hearing status. This study investigated dynamic neural activity patterns in 82 participants: 29 healthy controls (HC), 21 tinnitus patients with normal hearing (G1), and 32 tinnitus patients with hearing impairment (G2). Using resting-state fMRI, we computed dynamic amplitude of low-frequency fluctuation (d-ALFF) and dynamic regional homogeneity (d-ReHo) through sliding-window analyses, measuring temporal variability via coefficient of variation. One-way ANOVAs (covarying age/sex) revealed six d-ALFF clusters showing group differences (voxel $p<0.01$, cluster $p<0.05$ GRF-corrected). Post-hoc analyses demonstrated that G1 exhibited significantly increased d-ALFF variability versus HC and G2 in cerebellar, fusiform, and occipital regions. Conversely, both patient groups showed reduced d-ALFF variability in frontal clusters versus HC. Negative correlations emerged in G2 between fusiform d-ALFF and tinnitus distress/anxiety, while G1 showed positive correlations between temporal d-ALFF and depression. d-ReHo analysis identified reduced variability in the right anterior cingulate in both patient groups versus HC. These findings highlight distinct neural dynamics: tinnitus with normal hearing involves hypervariability in sensory processing regions, while hearing-impaired tinnitus shows distinct clinical correlations. Reduced activity variability in the superior and middle frontal gyri and reduced temporal synchrony in the anterior cingulate suggest a common tinnitus mechanism irrespective of hearing status.

Keywords: Tinnitus, Dynamic fMRI, Neuroplasticity

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-7

Economic and Social Burden of Tinnitus in France (2021-2022)

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Objective: This study aimed to quantify the extensive economic burden and social impact of tinnitus on individuals and the healthcare system in France, including costs associated with management, therapeutic wandering, and productivity loss.
Methods: A comprehensive survey (approx. 137 questions) was conducted in 2021-2022, involving 1,563 adult respondents (mean age 55 ± 14.2 years) who reported tinnitus experience. An initial representative IFOP survey (n=1,000) was used to extrapolate national prevalence. The survey assessed professional status, socio-economic factors, daily life impact, and annual costs for medical care, equipment, and non-reimbursed treatments.
Results: Extrapolation suggests approximately 16 million people in France suffer from tinnitus, with 30% (4.9 million) reporting high discomfort (Average Tinnitus Annoyance: 5.0/10). The impact is significant, with 47% reporting effects on speech intelligibility and 42% on sleep. Professional consequences include 16% of respondents taking sick leave attributed to tinnitus (median: 15 days/year) and 11.4% making job changes. The average annual economic burden per patient was substantial: out-of-pocket expenses were estimated at €1,079.85 annually. Nationally, the total economic burden (healthcare costs, loss of productivity, and sick leaves) was projected to reach €17.34 billion, or 0.6 % of the French Gross Domestic Product (GDP).
Conclusion: Tinnitus imposes a significant, previously underappreciated economic and social burden in France, affecting both the healthcare system and individual productivity. These findings underscore the urgent need for effective, standardized management strategies and increased public health awareness to mitigate the high costs associated with this condition.

Keywords: Tinnitus Burden, Health Economics, France

Oral Presentation 06

Tinnitus and Hyperacusis
OP 06-8

Neural and Behavioral Markers of Hyperacusis in Autism Spectrum Disorder

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Hyperacusis is a debilitating auditory disorder that affects the majority (50-70%) of autistic people and that negatively impacts their mental health, socialization, employment opportunities, and education. Despite the profound impact of hyperacusis on quality of life, the neural basis of hyperacusis in autism spectrum disorder (ASD) is unknown, its clinical quantification remains largely subjective, and there are no effective treatments. Therefore, our study aimed to identify neural and behavioral markers of hyperacusis in ASD that would elucidate its underlying neural mechanisms, and which have the potential to lead to the development of objective diagnostic tools. Our overarching hypothesis is that the neurobiological mechanisms underlying hyperacusis in ASD reflect excess gain in the central nervous system. We hypothesized that individuals with ASD would exhibit subtle signs of peripheral auditory dysfunction and compensatory sound-evoked neural gain in the brainstem and cortex. Behaviorally, we expected autistic individuals to exhibit greater sensitivity to sound and poorer subjective hearing abilities than their non-autistic peers. To date, we have tested 61 autistic and non-autistic young adults (aged 18-35 years) with clinically normal hearing. Results indicated that autistic individuals experienced more severe hyperacusis symptoms ($p < 0.01$) and greater listening-related fatigue ($p < 0.001$) than non-autistic individuals. Moreover, auditory brainstem response (ABR) Wave I amplitudes were significantly reduced at high stimulus intensities in participants with hyperacusis ($p = 0.029$), whereas responses from central auditory generators (i.e, Waves III-V amplitudes) did not differ based on hyperacusis or ASD status (ps > 0.05). These findings indicate that the significant sensory and auditory processing challenges reported by autistic individuals may be related, in part, to subtle peripheral hearing deficits that lead to upstream compensation in central neural gain. This further suggests that hyperacusis may be a transdiagnostic disorder with shared mechanisms across autistic and neurotypical populations.

Keywords: Hyperacusis, Autism, Electrophysiology

Oral Presentation 07

Global Audiology and Public Health III
OP 07-1

12-month follow-up of hearing screening outcomes among older Korean Americans: The K-HEARS Screen Study

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Health screening can motivate healthier behaviors, but its impact on hearing care—especially whether screening prompts help-seeking or hearing-aid adoption—remains unclear. The K-HEARS Screen study followed 513 community-dwelling Korean American adults aged 60 and older in the Baltimore–Washington area, the largest KA cohort with audiometric data to date. Participants completed tablet-based audiometric screening and were followed for more than 12 months to assess subsequent hearing care actions at 6 and 12 months. At baseline, 55.6% (285/513) had audiometric hearing loss (better-ear pure-tone average >25 dB HL), and 7.6% (39/513) reported current use of a hearing aid or other device. Six months post-screening, 90.4% (464/513) completed follow-up. Among participants with hearing loss, 14.9% (38/255) saw a hearing specialist; of those, 76.3% (29/38) were advised to obtain a hearing aid, and 7.1% (18/255) newly obtained a device. Overall, 10.1% (47/464) of respondents took any action based on their screening results by six months. At 12 months, 85.0% (436/513) completed follow-up. Among participants with hearing loss, 22.3% (54/242) saw a specialist; of those, 70.4% (38/54) were advised to obtain a hearing aid, and 9.1% (22/242) newly obtained a device. Overall, 14.4% (63/436) reported taking action by 12 months. These findings show that community-based hearing screening can open doors to care and prompt a meaningful minority to seek services and adopt devices over time. However, for most older Korean Americans with hearing loss, screening alone is not enough. Targeted, culturally and linguistically tailored, public health–driven strategies—such as patient navigation, education, and facilitated referrals—are needed to translate screening into sustained hearing health improvements.

Keywords: Health screening, Korean American, Community-based

Oral Presentation 07

Global Audiology and Public Health III
OP 07-2

Systematically Together Overcoming Racism Model

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Institutional racism in health refers to systemic inequities within healthcare structures that disadvantage racialised populations, including Indigenous peoples. These inequities are sustained through policies, practices, and resource distribution that overlook cultural and historical contexts as well as different values in health and healthcare. Professional bodies significantly influence these structures through education, accreditation, ethics, and standards of care. By promoting anti-racist policies, inclusive curricula, and culturally safe practices, they can drive reform and advance health equity. Moving beyond symbolic gestures, professional bodies must enact structural change. Achieving equity requires leadership, accountability, and sustained commitment.
Systematically Together Overcoming Racism Model (STORM) is an Indigenous-led, rights-based initiative addressing racism in ear and hearing health through a mixed-methods approach in collaboration with five professional bodies and organisations in Australia that cover the ar and hearing care sector. The study will: (i) conduct yarning circles with Indigenous health workers, adults, and communities to explore the extent, nature, and impacts of racism in the sector; (ii) use semi-structured interviews to identify best practices from up to six organisations outside the sector that have successfully implemented anti-racism strategies; (iii) co-design a contextually relevant framework with five organisations via 3–4 workshops and monthly community of practice meetings, adapting the Institutional Racism Matrix (IRM) to ear and hearing care; (iv) evaluate institutional racism using the IRM at baseline and 12 months post-implementation of the anti-racism toolkit; and (v) develop a comprehensive, co-designed toolkit to support organisations in identifying, addressing, and preventing racism in practice.
Here, we will discuss the study and highlight key outcomes to date.

Keywords: Institutional racism, Professional bodies, Accountability

Oral Presentation 07

Global Audiology and Public Health III
OP 07-3

Awareness and knowledge of speech, language, and hearing status among Bangladeshi citizens

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Background: Speech and hearing are crucial for daily activities. Reports indicate that deafness and hearing impairment are becoming increasingly prevalent worldwide, making them two of the most common sensory deficits in humans.
Purpose: To determine the level of awareness of speech, language, and hearing in Bangladesh.
Method: A survey was conducted using a self-designed questionnaire comprising 23 questions, which were categorized into two sections. The study included approximately 1,685 participants from eight divisions in Bangladesh. Among them, 52% identified as male, 45% as female, and 3% as other genders, with a majority hailing from the Dhaka division. The data were analyzed using SPSS version 16.0.
Result: In the survey, 7% reported hearing problems. About 44% would go to hospitals for testing, 33% would choose ENT clinics, and 8% would visit local practitioners. Additionally, 11% were unsure of the cause, while only 6% recommended hearing/audiology centres. The overall awareness level among the 1,685 samples regarding hearing is just 13.5%, while the awareness of speech is only 18.5%, indicating very low levels of understanding. Additionally, over 80% of the respondents are unaware of both hearing and speech-language.
Conclusion: There is a growing need for increased awareness of speech-language and hearing issues among the general population in Bangladesh, as cases related to speech and hearing difficulties are rising daily. It is essential to prioritize the future of our next generation, ensuring they have a healthy life with regard to their speech and hearing.

Keywords: Audiology, Speech-Language & Hearing, Bangladesh

Oral Presentation 07

Global Audiology and Public Health III
OP 07-4

What insights can health professionals provide on the delivery of otitis media services in the Far West of South Australia?

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Background:
Aboriginal and Torres Strait Islander children are significantly more prone to experiencing recurrent and persistent otitis media (OM). Despite several targeted programs existing to address this health inequity, high rates of OM persist. This suggests further insights into the coverage, efficiency and efficacy of programs are required. The PATHWAY project for Aboriginal and Torres Strait Islander Hearing Health aims to map the experiences journeys, waiting times and out of pocket healthcare expenditure for key stakeholders, including Aboriginal and Torres Strait Islander families, involved in OM services across rural and remote areas in the Far West of South Australia Here, we aim to understand what insights health professionals can provide on the delivery of OM services in the Far West of South Australia.

Methods: Indigenous and non-Indigenous researchers worked together at the Indigenous and Western Knowledge Interface in all phases of the research process. This study used yarning interviews, a culturally safe research method, to engage with health professionals across local and visiting health services within OM care pathways. Yarning transcripts from 18 participants were thematically analysed using reflexive thematic analysis and an interpretive-description framework.

Results: Six themes emerged from the analyses. These included The Pathway, Working Together, Gaps in Coverage, Community is at the Core, Resourcing and Future Ideas. These themes will be discussed in light of existing literature and the regional context.

Conclusion: This research has described the experiences and insights gained from yarning health professionals working in the OM care pathway in the far west of South Australia. The findings will now be presented to Aboriginal health and community organisations across the far west of South Australia, to inform policy change, quality improvement activities and improvements to service delivery within the region.

Keywords: Aboriginal and Torres Strait Islander Health, Otitis Media, Public Health

Oral Presentation 07

Global Audiology and Public Health III
OP 07-5

Hearing Protection Under Sociopolitical Pressure: Barriers to HPD Use Among Palestinian Workers in a Fragmented Regulatory Landscape

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Background: Noise-induced hearing loss (NIHL) is a leading occupational disorder, particularly in regions where enforcement of safety regulations is weak. In the Occupied Palestinian Territories, political fragmentation and limited governance impact effective hearing-conservation practices, yet little evidence exists on behavioural determinants of hearing-protection device (HPD) use in such contexts.

Purpose: This study employed the COM-B (Capability–Opportunity–Motivation of Behaviour) framework to identify behavioural and contextual factors influencing HPD use and to assess occupational noise levels across different industrial sectors in the Occupied Palestinian Territories. The protocol was pre-registered on the Open Science Framework (https://osf.io/ajgxz).

Methods: A cross-sectional study involving 154 workers (138 males; 18–60 years) from various industrial sectors across the West Bank and East Jerusalem included structured face-to-face interviews using a questionnaire developed in-house, alongside onsite noise measurements in eight representative workplaces. Primary analyses described HPD-use patterns and COM-B scores. Exploratory t-tests assessed whether COM-B scores were higher among workers (1) with formal vocational training and (2) employed in East Jerusalem versus the West Bank. Training status and workplace location were the independent variables, while COM-B score was the dependent variable.

Results: Over half (51.3%) of participants never used HPDs, and only 12.3% used them regularly. Key barriers included lack of habit (66.9%), discomfort (55.8%), and low motivation despite high-risk awareness (69.5%). Non-use was higher in the West Bank (57.4%) than East Jerusalem (28.1%). Two-thirds of measured sites exceeded 85 dB(A) (mean = 91.9 dB[A]). No significant COM-B differences by training or location ($p > 0.05$) were found, suggesting primarily behavioural determinants.

Conclusion: Despite unsafe occupational noise levels, HPD use remains low, underscoring the need for interventions that strengthen motivation, habit formation, and accessibility. Findings show how sociopolitical fragmentation and weak regulation undermine workers' hearing health, reflecting broader public health challenges in developing nations with similar structural and resource limitations.

Keywords: Occupational noise, Hearing conservation, Behaviour change

Oral Presentation 07

Global Audiology and Public Health III
OP 07-6

A global view on hearing aid wearing time in adults

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Healthcare and reimbursement systems differ widely across countries, as do the training and availability of clinicians. This is true for hearing care as well. Diverse cultural, economic, and political factors influence access to hearing rehabilitation. Yet, hearing aids are worn across continents and in most countries worldwide. Consequently, they may capture information related to the auditory ecology of populations, i.e, how listening needs and demands differ according to country- or continent-specific acoustic environments. After all, hearing aids continuously monitor and analyse the acoustic environment they are in, and log corresponding device settings.
In this cross-sectional, retrospective study, we analysed real-world hearing aid data from more than 5 million individuals globally. We aimed to better understand their average daily wearing time, program usage, and how these trends vary across countries and continents. Drawing on data from more than 100 countries, we observed clear country- and region-specific differences in daily hearing aid usage time and how that time is distributed across programs. In some regions, e.g, noise-reduction programs account for a larger share of daily use, while in others, speech-in-quiet programs occupy a substantial portion of the acoustic day. These regional differences reflect diverse auditory environments and user needs, illustrating how context shapes device use and offering actionable insights for clinical practice and policy planning.

Keywords: Hearing aid usage, Real-world data, Global usage patterns

Oral Presentation 07

Global Audiology and Public Health III
OP 07-7

Hearing Aid Clinics in Rural India

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Background: Access to hearing services in rural areas remains limited, particularly in low- and middle-income countries. In 2016, the Devdaya Charitable Trust and De Montfort University launched a collaborative project to deliver audiological clinics and hearing aid fittings to rural communities in Gujarat, India.

The project was developed to provide audiology services, including hearing assessments and hearing aid provision, to underserved populations, while offering experiential learning for audiology students.

Methods: Each visit comprised a team of six students and two senior audiologists, who conducted three-day clinics. Patients were pre-screened by a local ENT doctor and attended the clinic with informed consent. Participants underwent a medical history review and hearing assessment using Pure Tone Audiometry. Hearing aids were provided based on clinical need, with patients receiving one or two devices as appropriate, along with a three-month supply of batteries. All equipment and consumables were provided and transported by the University, and hearing aids were sourced from charitable donations.

Results: From 2016 to 2025, seven visits have been completed (with a three-year hiatus due to the pandemic). To date, 1,300 patients have been assessed, and 860 hearing aids fitted. The local population has highly valued the project and has provided transformative learning experiences for students and staff. Funding has been sustained and increased for future visits, highlighting the relevance and scalability of the project.

Conclusion: This initiative demonstrates a successful model for improving access to audiology services in rural, underserved areas. It highlights the dual benefit of providing essential clinical services while educating future audiologists about the real-world impact of their work. Such projects can be replicated to expand hearing care coverage and strengthen community health outcomes.

Keywords: Rural India, Hearing aids, Audiology clinic

Oral Presentation 07

Global Audiology and Public Health III
OP 07-8

Codeveloping sustainable audiology services in low and middle income settings. A case study in Cambodia

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Background: There is a scarcity of audiological training programs in low- and middle-income settings, limiting access to essential hearing assessment services.

Objective: To co-develop and implement a sustainable audiology training program combining on-site and tele-education at a charity hospital in Cambodia.

Methods: We designed a novel program to train local staff in pure tone audiometry, the foundation of adult hearing assessment. The model comprised of a short bespoke in-country training program and ongoing support through remote live education and quality assurance via an internet platform.

Results: Successfully trained seven local healthcare workers in Cambodia and established in-house audiology services where none previously existed. Trainees in Cambodia now exhibit highly proficient audiological skills, assessing over 1000 patients annually.

Conclusion: This low-cost model of on-site training followed by remote support proved effective in establishing sustainable audiological services. Critical success factors included local staff motivation and engagement, equipment availability, and flexible teaching approaches. The program demonstrates a replicable model for training healthcare workers in hearing assessments in resource-limited settings. An additional benefit was the internationalisation of higher education at home through cross-cultural collaboration.

Keywords: Global, Tele-education, Internationalisation

Oral Presentation 08

Auditory Implants I

OP 08-1

Event-related potentials and Task-related theta indices of auditory-cognitive coordination after early bilateral cochlear implantation

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Background: Cochlear implantation restores access to sound and enables spoken language development in children with severe to profound hearing loss, yet outcomes remain highly variable. Traditional predictors such as age at implantation and duration of device use explain only part of this variability. To clarify the neural mechanisms shaping auditory and cognitive development after early bilateral implantation, we integrated findings from three electrophysiological studies in the same pediatric cohort.
Methods Fifty-three participants took part: 25 cochlear implant (CI) users and 28 normal-hearing (NH) peers. The CI group had a mean age at implantation of 1.44 years, and the groups were matched on age (7–13 years), socioeconomic status, and estimated IQ. Visual evoked potentials (VEPs) measured sensory timing; auditory oddball tasks indexed automatic and controlled attention through Novelty P3 and Target P3 components; and a picture–word matching task examined semantic integration (N400) with task-related mid-frontal theta oscillations. All tasks included shared behavioral measures of speech-in-noise perception and verbal memory.
Results Early bilateral implantation preserved global cortical organization but left subtle inefficiencies in temporal coordination. CI users showed prolonged left-occipital N1 latency, reduced Novelty P3 amplitude, and weaker mid-frontal theta power, while Target P3 and N400 responses were largely typical. Faster N1 timing, larger P3 amplitudes, and stronger theta synchronization predicted better speech-in-noise and memory performance. Theta power mediated the link between CI status and working memory, highlighting temporal coordination as a bridge between sensory and cognitive systems.
Conclusions These integrated findings delineate a pathway from sensory timing through attentional control to higher-order integration that explains individual differences in everyday listening and cognitive performance. The combined neural and behavioral profile provides a feasible framework for precision rehabilitation, coupling O1 N1 latency, P3 components, and mid-frontal theta with measures of speech-in-noise perception and working memory to identify processing inefficiencies and monitor clinical progress

Keywords: Cochlear implant, Event Related Potentials and Neural coordination, Speech perception in noise

Oral Presentation 08

Auditory Implants I
OP 08-2

Neural correlates of speech coding strategies for cochlear implants compared to normal hearing

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Purpose/Objective: A major limitation in cochlear implant (CI) research is the inability to compare implant strategies of different manufacturers in the same patient, which means that research into their effectiveness requires many study participants. Using a computational model (digital twin) allows the analysis of different strategies in the same cochlea. Strategy settings can easily be changed to match previous clinical studies. The virtual implanted cochlea can also be compared to a virtual normal hearing (NH) system like the one developed by Bruce et al. (2018). This can provide additional insight in clinical findings of CI research and assist in the improvement of speech encoding.

Methods/Approach: To assess differences in loudness and frequency encoding between CI's and NH systems, the Leiden implanted cochlea model was used, which implements both the Advanced Combination Encoder (ACE) from Cochlear and HiRes Fidelity120 (F120) from Advanced Bionics. Digital stimuli of pure and complex tones at different loudness levels and of Mandarin Tones were used to create neurograms for NH, ACE and F120.

Results/Findings: Neurograms obtained with the models show large spectral resolution differences between the NH and CI implanted cochlea. The distance of the electrode array to the basilar membrane impacts spread of excitation patterns in this model. Differences in frequency encoding between speech strategies are reflected in spectral resolution and neural fiber activation patterns. Differences in loudness are reflected in neural firing rate and width of neural activation. ACE utilizes multiple contacts to increase loudness, whereas F120 achieves this by applying higher currents.

Conclusions/Implications: This model provides insight into the effect of two different CIs on neural activity when compared to NH, enabling objective visualization of the neural impact of these different systems. This model can assist in the improvement of existing or the development of new speech encoding strategies for CI users.

Keywords: Cochlear Implants, Speech Coding Strategies, Computational Model, Digital Twin

Oral Presentation 08

Auditory Implants I
OP 08-3

Heat Map Patterns: Predicting Array Position, Map Stabilization and Outcomes

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Department of Otolaryngology, University of Kansas Health System, United States of America Impedance telemetry is a valuable tool during cochlear implant programming that may be underutilized. The addition of heat map matrices with color coded grid visualization may provide insight into electrode placement and map stabilization and subsequently may predict hearing outcomes in patients.

Impedances, measured in kOhms, often change in the early stages of cochlear implant activation. There is a direct correlation of kOhms measured to the required electrical current needed to ensure audibility. A change in electrical stimulation can impact hearing outcomes, therefore the time to impedance stabilization is important.

The goal of this study was to determine how impedance heat map matrices can provide information to audiologists on electrode placement as well as evaluate the relationship between impedance stabilization and map level stabilization as a factor of patient demographics.

Our retrospective study identified 70 patients implanted with a Med El cochlear implant from 2023 to 2025 at our center. We identified and analyzed various demographics, mapping parameters, and objective measures to determine their relationship with impedance levels, impedance and map stabilization, and patient outcomes over time. We analyzed age, gender, etiology, implanted array, side of implantation, impedance kOhms, most comfortable (M) charge units, and angular insertion depth as well as speech outcome scores at each visit within the first year of implantation.

Quantitative analyses were ran to analyze heat map patterns and impedance matrix values by imaging classification group to evaluate common patterns. Average time to impedance stabilization was also calculated as a function of days. Lastly, impedance stabilization results were stratified based on demographic factors and patient outcome scores.

Our data highlights how impedance measures can be used to provide information on electrode array placement as well as provide insight on demographic factors that impact time to stabilization.

Keywords: Impedance, Stabilization, Outcome

Oral Presentation 08

Auditory Implants I
OP 08-4

Revisiting the 60/60 Referral Rule for Cochlear Implant Assessment for the Australian context

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Objective:
This study aimed to develop an Australian cochlear implant (CI) referral guideline, adapted from the United States (US) 60/60 rule, to align with local audiometric practices. The 60/60 rule (pure-tone average ≥60 dB HL and unaided word score ≤60%) is effective in the US, but Australia and other countries use different measures and candidacy criteria.
Methods:
A retrospective review was conducted of adults assessed for CI candidacy at a Western Australian clinic between 2007 and 2023. Data from 1,141 adults included unaided pure-tone averages (3FAHL: thresholds at 500, 1000, and 2000 Hz), phoneme scores, and unaided and aided word scores. CI candidacy was defined as an aided CNC phoneme score ≤55% in either ear. Variations of referral criteria were evaluated using sensitivity, specificity, and descriptive analyses.
Results:
Among CI candidates, 93% had a 3FAHL ≥60 dB HL and an unaided phoneme score ≤80%. The most effective criteria were: (1) 3FAHL ≥60 dB HL and unaided phoneme score ≤70% (sensitivity 87%, specificity 78%), and (2) unaided phoneme score ≤60% alone (sensitivity 85%, specificity 80%), in either ear.
Conclusion:
An Australian-adapted "60/70" guideline (3FAHL ≥60 dB HL and unaided phoneme score ≤70%) provides an optimal balance of sensitivity and specificity for CI referrals. This simple, evidence-based rule uses measures common in Australian practice and offers clinicians a practical tool for timely identification of CI candidates.

Keywords: Cochlear implants, Candidacy, Referral guidelines

Oral Presentation 08

Auditory Implants I
OP 08-5

Verbal versus Musical Short-Term Memory in Pediatric CI Users: A Comparison with Typical-Hearing Peers and Relation to Music Perception

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Background:Auditory short-term memory (STM) is critical for processing complex sounds and is hypothesized to be domain-specific (verbal vs. musical). While verbal STM is studied in pediatric CI users, musical STM remains largely unexplored.

Purpose:This study aimed to investigate the domain-specific nature of verbal and musical STM in pediatric CI users compared to typical-hearing (TH) peers, and its relationship with music perception.

Method:Participants included CI users (n=44; mean age=11.57, SD=2.25) and a TH control group (n=14; mean age=12.29, SD=2.39). To enhance child engagement, a suite of game-based tasks was developed to assess auditory sensory memory (Tone Pattern Detection; TP-Detect) and STM (Musical Pattern Comparison; MP-Comparison, and Verbal Pattern Comparison; VP-Comparison). The MP-Comparison and VP-Comparison tasks included easy and difficult conditions based on the perceptual salience of the stimuli change (e.g, contour violation). Music perception was assessed with the TR-CAMP (pitch direction discrimination (PDD) and timbre subtests).

Results:TH group significantly outperformed the CI group in detecting the transition to a regular pattern in the TP-Detect test ($p=0.0002$), the MP-Comparison test ($p=0.0492$), and in timbre test scores ($p=0.0011$). CI users performed significantly better on the VP-Comparison test than the MP-Comparison test ($p<0.001$); a difference not seen in the TH group ($p=0.0532$). Correlation analyses showed strong positive relationships between timbre test scores and both MP-Comparison scores ($r=0.616$, $p<0.0001$) and TP-Detect ($r=0.479$, $p=0.0009$). Age correlated significantly with timbre ($r=0.470$) and MP-Comparison scores ($r=0.320$) only in the CI group, while PDD performance improved with age in both groups (CI:$p<0.001$; TH:$p=0.003$).

Conclusion:These findings support a domain-specific dissociation between verbal and musical STM, as CI users showed significant musical memory deficits versus TH peers but comparable verbal STM. The strong correlation between timbre perception and musical STM suggests these skills can be closely linked, and assessing musical STM may be important for understanding variable music perception outcomes.

Keywords: Cochlear implant, Short-term memory, Music perception

Oral Presentation 08

Auditory Implants I
OP 08-6

Quantitative Modeling of Cochlear Implant Electrode Impedances for Research and Clinical Applications

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Motivation: Cochlear implant impedance telemetry provides valuable insights into the electrode-electrolyte interface and can support research and clinical decision-making. Possible applications include electrode array insertion depth estimation [1], residual hearing assessment [2], and objective fitting [3]. This study presents a method to estimate the electrical components of an impedance model using data acquired with standard clinical software. The approach is validated against an established method, and its potential is demonstrated by analyzing the correlation between far-field impedance and linear insertion depth.

Methods: An electrically equivalent circuit based on [4] was used to model the electrical properties of the inner ear. Electrode impedances were measured intraoperatively and postoperatively with varying pulse durations. A mathematical model describing the impedance as a function of the pulse duration was derived and fitted to the measurements. The return path was modeled as a resistive transmission line, and resistances were estimated from the voltage matrix. To validate the approach, results were compared with impedance subcomponents determined geometrically by extrapolating the off-diagonal matrix elements.

Results: The proposed approach showed strong agreement with the geometric method, with mean differences of 155Ω (near-field) and -107Ω (far-field) and relative mean errors of 4 and 18 respectively. The temporal changes of the components aligned with previous findings, providing insights into the dynamics of the electrode-electrolyte interface following implantation. Furthermore, a significant correlation was found between linear insertion depth and far-field subcomponent (Spearman's $\rho = 0.89$, $p < 0.001$).

Conclusion: The proposed method provides information into changes in the intracochlear environment and shows strong agreement with the geometric method. Additionally, the significant correlation between the far-field subcomponent and linear insertion depth suggests that the model could support impedance-based linear insertion depth estimation.

[1] Aebischer et al. (2021)
[2] Schraivogel et al. (2023)
[3] Zarowski et al. (2023)
[4] Vanpoucke et al. (2004)

Keywords: Impedance telemetry, Tissue response, Objective monitoring

Oral Presentation 08

Auditory Implants I
OP 08-7

ECAP N1P2 Latency May Reflect the Repolarisation Speed of Human Spiral Ganglion Cells

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Introduction
Spiral Ganglion Cells (SGCs) with greater numbers of potassium channels can recover from firing faster and hence capable of phase-locking to a higher frequency. Rodent studies using patch-clamp techniques reported that SGCs with higher Characteristic Frequencies (CF) have more potassium channels and it's reflected on the electrophysiological parameters recorded such as the stimulus to spike latency and action potential (AP) duration.
It is hypothesised that human SGCs with higher CFs also have shorter AP durations.
Method
Data Collection
Electrically evoked compound action potential (eCAP) data measured in different sites of cochlea from 11 Cochlear and 133 MED-EL users were shared.
Pre-processing
Raw eCAP recordings were fitted a curve to facilitate automatic N1, P2 labelling. The site of stimulating electrode was transformed into insertion angle based on the average values for the type of electrode (Landsberger et al, 2015) and later into CF based on the human SGC map (Stakhovskaya et al, 2007).
Results
A linear regression between the inverse of CF and N1P2 latency indicated a weak but significant linear relationship ($r = 0.3$, $p < 0.001$). A linear model controlling for the recording method and eCAP amplitude indicated a near significant ($p = 0.058$) negative coefficient of the log-transformed CF, despite the extra variance introduced while estimating the CF only using the electrode design and number. These findings are in line with the hypothesis of higher the CF, faster the repolarisation speed.
Discussion
The current analysis was limited by the precision of CF estimate. Further works, with attention to CF estimate, are needed to examine the hypothesis closer. This relationship, if proven, could be utilised to estimate the CFs of the stimulated SGC population.

Keywords: ECAP, Characteristic Frequency, Action potential

Oral Presentation 08

Auditory Implants I
OP 08-8

Predicting the feasibility of Matrix test in cochlear implant users using pure-tone audiometry and speech recognition in quiet

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Purpose: The adaptive Matrix test (AMT) is widely used to assess auditory performance in noise among cochlear implant (CI) recipients. However, when the speech-to-noise ratio (SNR) exceeds 15 dB, background noise may not significantly affect speech recognition, limiting the test's validity. This study aimed to determine whether aided pure-tone audiometry (PTA) and speech recognition in quiet could predict the feasibility of assessing auditory performance in noise with the AMT, and to establish reliable cut-off values.

Methods: Ninety-eight CI recipients (Advanced Bionics n=56; Cochlear n=42) were evaluated at least one year post-implantation or after a processor upgrade. Free-field auditory assessment of the implanted ear included: PTA, speech discrimination score (SDS) in quiet at 65 dB, and speech recognition threshold (SRT) in noise using the AMT in a diffuse sound field.

Results: The SRT in noise was measurable in 60 patients (61%) but not in 38 (39%). PTA <36 dB and SDS >41% each predicted a positive AMT response in 83% of cases. Combining both cut-off values increased the predictive accuracy to 92%.

Conclusion: Standardized pure-tone audiometry and speech recognition in quiet can effectively predict whether the AMT provides valid results in CI recipients. We propose that the AMT be performed in patients with PTA <36 dB. For those with PTA >36 dB, presenting a fixed SNR Matrix list may provide useful information on speech-in-noise perception. This practical approach should optimize the evaluation of auditory performance in clinical and research settings.

Keywords: Cochlear implant, Matrix test, speech perception in noise

Oral Presentation 08

Auditory Implants I
OP 08-9

Remotely versus conventionally programmed cochlear implantation: A systematic review and meta-analysis

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Background:
This systematic review and meta-analysis evaluated whether remote programming of cochlear implantation (CI) yields comparable speech perception outcomes to conventional in-person programming.
Methods:
We searched PubMed, Embase, Scopus, Web of Science, and Cochrane Library up to March 2025. Eligible studies were English-language, human-based, and directly compared remote or in-person programming after CI with reported speech recognition measures. Data were pooled using a random-effects model, and effect sizes were calculated using STATA 18 software.
Results:
Five studies were included. encompassing 180 CI users (90 remote programming and 90 in-person programming). Speech recognition performance did not differ significantly between remote and in-person programming for word lists (SMD = −0.07; p = 0.71) or sentence tests (SMD = −0.3; p = 0.29).
Conclusion:
Remote CI programming produces speech perception outcomes equivalent to those obtained through in-person sessions, supporting its use as a viable alternative for ongoing CI management. Future research should employ non-inferiority designs, assess long-term outcomes, and incorporate validated patient-reported measures to further inform the role of remote programming in equitable CI care delivery.

Keywords: Cochlear implant, Remote programming, Telehealth

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies Ⅰ

OP 09-1

Extending the scope of audiologists in ENT service provision – Advanced Audiology Practice in OME management

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Extended scope allied health practice is an emergent field over the past two decades. The expansion of professional scopes of practice and crossing traditional professional boundaries has been promoted to improve patient access to specialist health care as a response to global workforce shortages in medical specialists. These models of care provide a variety of benefits ranging from improved outcomes and engagement for patients, improved cost-effectiveness and resource utilisation for healthcare services, through to increased job satisfaction and retention for clinicians.

Audiology more recently has joined the ranks of allied health disciplines actively involved in the research and delivery of alternate innovative service models. As these advanced practice models become more widely implemented, there will need to be a corresponding shift in the Audiology profession's scopes of practice with implications for education, training and post-licensure accreditation.

This presentation will outline the emerging field of advanced audiology practice in the care of children with otitis media and present current research findings including clinical and service outcomes for advanced audiology practice services. Findings demonstrate that advanced practice audiologists improve access to ENT services (33% reduction in waitlists and 77% to 161% increased ENT capacity), provide safe and independent post-operative care for children after grommet surgery, can effectively and safely waitlist children directly to grommet surgical waitlists (91% confirmed ear disease intra-operatively) equivalent to standard ENT care, and have high patient reported satisfaction for interactions with these services.

The inclusion of advanced practice audiology within ENT services has wide ranging benefits for ENT specialists, patients, healthcare system, individual audiologists and the audiology profession overall. Moreover, interest in advanced audiology practice reflects a global desire within the audiology community to better utilise audiologist capabilities.

Keywords: Advanced practice, ENT services, Paediatric ear disease

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies Ⅰ

OP 09-2

Artificial Intelligence to Support Clinical Preparation and Documentation for Adults with Co-Occurring Hearing Loss and Post-Stroke Aphasia

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Purpose:
Co-occurring hearing loss and post-stroke aphasia present clinical challenges for evaluations and documenting outcomes across audiology and speech-language pathology (SLP). This interdisciplinary study explores how artificial-intelligence (AI) language models may assist clinicians in these dual-impairment cases (Aim 1) and outlines planned work comparing AI- and clinician-generated SOAP (Subjective, Objective, Assessment, Plan) notes in the electronic health record (EHR) environment (Aim 2).
Methods:
In collaboration with computer scientists and clinicians, Aim 1 engaged SLPs and audiologists in a structured concept-mapping exercise, where information needs for managing dual auditory-language impairments were identified and ranked by priority and feasibility for AI support. Clinician perspectives toward AI were assessed using a validated questionnaire. For Aim 2, EHR data from patients with co-occurring hearing loss and aphasia will be used to compare clinician- and AI-generated SOAP notes. The AI system employs a transformer-based language model—either fine-tuned, custom-trained, or commercially provisioned on clinical documentation—to generate contextually relevant SOAP notes. Documentation quality will be evaluated the Physician Documentation Quality Instrument and inter-rater reliability metrics.
Findings:
Preliminary qualitative findings and survey data (n=10) showed moderate but mixed acceptance of AI. Satisfaction was high for most respondents, with 75% reporting they were Very or Extremely satisfied and 12.5% reporting Not at all satisfied. Trust scores were variable. Slightly trusting was the most common response at 37.5%, followed by Not at all trusting at 25% and Moderately trusting at 25%. Only 12.5% reported high trust. Qualitative themes highlighted value for case review, audiometric history synthesis, and amplification or device management summaries, along with concerns about contextual loss and the impact on supervision and student learning.
Conclusion:
Early interdisciplinary findings suggest that AI tools hold promise to support preparation and documentation in complex audiologic-language cases while emphasizing the importance of clinician oversight, educational impact, and system integration.

Keywords: Artificial intelligence, Hearing loss, Clinical documentation

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies Ⅰ

OP 09-3

Sonological Engineering in NICUs: Designing Ethical AI-Driven Soundscapes for Neonatal Development and the Active Noise Cancelling Incubator

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An increasingly 24/7 connected and urbanised world has created a silent pandemic of noise-induced hearing loss. Ensuring survival to children born (extremely) preterm is crucial. The incubator is a closed medical device, modifying the internal climate, and thus providing an environment for the child, as safe, warm, and comfortable as possible. While sound outside the incubator is managed and has decreased over the years, managing the noise inside the incubator is still a challenge.

The Neonatal Intensive Care Unit (NICU) is a technologically advanced environment critical for the survival of premature and ill newborns. However, this space is often saturated with mechanical and human-generated noise that can affect infant development. This chapter introduces the interdisciplinary concept of sonological engineering in NICUs, integrating principles from acoustics, developmental neuroscience, medical ethics, and artificial intelligence. We explore the potential of sonological engineering to design therapeutic soundscapes, reduce harmful auditory stimuli, and personalize neonatal care using machine learning.

Using active noise cancelling in an incubator will eliminate unwanted sounds (i.e, from the respirator and heating) inside the incubator, and by adding sophisticated algorithms, normal human speech, neonatal intensive care unit music-based therapeutic interventions, and natural sounds will be sustained for the child in the pod. Applying different methods such as active noise cancelling, motion capture, sonological engineering. and sophisticated machine learning algorithms will be implemented in the development of the incubator.

Solving a complex problem like this, however, requires a de-disciplinary approach, where each discipline will realise its own shortcomings and boundaries, and in turn will allow for innovations and new avenues. Technical developments used for building the active noise cancellation-incubator have the potential to contribute to improved care solutions for patients, both infants and adults.

Keywords: Neonatology, Noise Cancelling Technology, Neuraldevelopment

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies Ⅰ

OP 09-4

Development and Efficacy of Virtual Reality Simulator in Training of Hearing Test for Audiologist

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Objectives: The immersive virtual reality (VR) simulator is advantageous because it is cost-effective, realistic, can be controlled directly by the user, and can be integrated into education and training in otorhinolaryngology. The present study explored the feasibility of incorporating VR pure-tone audiometry (PTA) into an audiologist training curriculum, and introduce newly developed VR speech audiometry (SA).

Methods: A total of 31 audiologists (16 skilled audiologists and 15 undergraduate students) participated in the study, using a developed VR PTA and SA application with a Meta Quest 2 device. A digital twin technique was applied for a realistic environment. In the VR SA, the anechoic room and speech materials such as Korean Speech Audiometry was implemented using Unity and Naver CLOVA AI platform. For the efficacy of the VR PTA, key components of the VR system and behavioral intention to use VR and traditional PTA was measured using a modified version of the Technology Acceptance Model survey. To identify the efficacy of VR simulator, VR PTA and the traditional PTA were compared, using a paired t-test and W test.

Results: The general characteristics of the participants were homogeneous. In the homogeneity test, no statistically significant differences were found between the ratings of VR PTA and traditional PTA. The comparison between VR PTA and traditional PTA revealed no significant differences between skilled audiologists and undergraduate students for all variables.

Conclusions: The VR PTA and traditional PTA had no differences in of VR system characteristics and behavioral intention to use. The efficacy of the VR PTA was validated, and previous experience with traditional PTA was not affected by adopting VR PTA. As the next step, the VR SA is under developing and briefly introduced in terms of its realism.

Keywords: Virtual reality, Pure-tone audiometry, Training program

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies Ⅰ

OP 09-5

Objective and Subjective Outcomes of Nuance Audio Glasses in Real-World Use among Adults with perceived Mild-to-Moderate Hearing Loss

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Purpose:
Nuance Audio Glasses integrate hearing assistance into everyday eyewear, combining open-ear sound delivery with directional beamforming to improve speech perception in noise. The second-generation model (Nuance Audio Glasses+) features enhanced acoustic performance and comfort. This clinical study evaluated speech-in-noise performance and real-world user outcomes following a two-week home trial among adults with perceived mild-to-moderate hearing loss.
Methods:
A prospective single-arm study enrolled adults with perceived mild-to-moderate hearing loss. Participants used the glasses, fitted with their prescription lenses, for two weeks in their daily environments. Speech-in-noise ability was assessed using the Oldenburg Sentence Test (OLSA) SNR-50 Matrix under aided and unaided conditions. Ecological Momentary Assessment (EMA) captured self-reported speech understanding, listening effort, and satisfaction during everyday listening situations. Standardized questionnaires—the International Outcome Inventory for Hearing Aids (IOI-HA), Abbreviated Profile of Hearing Aid Benefit (APHAB), and Device-Oriented Subjective Outcome (DOSO)—were completed after the trial period.
Results:
Preliminary analyses demonstrated improved speech-in-noise performance with Nuance Audio Glasses+ compared to the unaided condition, indicating enhanced speech intelligibility in challenging acoustic environments. Ecological and standardized self-report measures captured acceptance, comfort, and perceived communication benefit during real-world use.
Conclusion:
Initial findings suggest that Nuance Audio Glasses+ provide measurable improvement in speech understanding in noise for adults with perceived mild-to-moderate hearing loss. Combining auditory support with familiar eyewear may offer a discreet, lifestyle-compatible approach to early auditory rehabilitation and could encourage first-time users to engage with amplification technology.

Keywords: Hearing Glasses, Speech in noise, Real-world outcomes

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies Ⅰ

OP 09-6

Healthy Ears Adaptive Trial: Outcomes of a paediatric otolaryngology telehealth multidisciplinary review process for otitis media

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Background: Persistent otitis media with effusion (OME) affects 26.8% of children by age three in Western Australia (WA), and over 50% of Aboriginal children in WA by six months. Resource constraints have led to extended wait times for paediatric otolaryngology care in WA, prompting the integration of an existing otolaryngology multidisciplinary telehealth review process within an adaptive clinical trial framework evaluating alternative interventions for OME.

Objectives: This otolaryngology multidisciplinary telehealth review process has been shown to improve timely access to specialist otolaryngology care, support clinical decision-making, and optimise management outcomes for children and families requiring tertiary otolaryngological care and review.

Methods: Children enrolled in the Healthy Ears clinical trial at Perth Children's Hospital participated in a telehealth-facilitated multidisciplinary review involving otolaryngology, audiology, and clinical trial staff. Clinical outcomes were categorised into the following for each review: (1) discharge from specialist care to primary care or community follow-up, (2) referral for in-person otolaryngology assessment or review, (3) referral for allied health assessment or review, or (4) escalation to surgical management. Rates for each care outcome were summarised as percentages based on trial monitoring data.

Results: Of 87 children reviewed, 8% were discharged from specialist care to primary care or community follow-up, 13% were referred for in-person otolaryngology assessment or review, 9% were referred for allied health assessment or review, and 5% were escalated for surgical management of their OME.

Conclusion: The otolaryngology multidisciplinary telehealth review process provides an effective model for reviewing children referred for tertiary review and management of their OME, facilitating timely care decisions while addressing service access limitations.

Co-presenter: Greta Bernabei

Keywords: Paediatric Ear Health, Telehealth, Clinical Trial

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies Ⅰ

OP 09-7

Development and Clinical Verification of an AI-based Personalized Auditory Rehabilitation Platform for Age-related Hearing Loss

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Purpose: Age-related hearing loss (ARHL) not only hinders communication but also increases the risk of cognitive decline and dementia. While auditory rehabilitation alongside hearing aids is essential, its practical application in the clinical environment remains limited due to accessibility constraints and high costs. This study aimed to develop "HAHA," an AI-based personalized digital auditory rehabilitation platform that automatically adjusts training difficulty based on diagnostic data (PTA, WRS) and the analysis of continuously collected training results, and to verify its clinical validity.

Methods: The platform offers six customized training modules grouped into sentence-level (identification, comprehension), word-level (identification, memory, sequence memory), and noise-in-noise training. To verify clinical validity, an 8-week field test was conducted starting December 2024 with patients visiting the Department of Otorhinolaryngology at Konkuk University Medical Center. Participants were categorized by hearing status (30% normal, 70% hearing loss) and cognitive status (80% normal, 20% cognitive impairment). Training was performed twice daily (~15 minutes per session). Pre- and post-intervention WRS and Mini-Mental State Examination (MMSE) scores were compared to evaluate therapeutic efficacy.

Results: Participants demonstrated a high average compliance rate of 91.7%, with 40% completing all scheduled sessions, demonstrating strong engagement suitable for digital therapeutics. After 8 weeks, 60% of participants exhibited improved WRS, with an average increase of 16%. MMSE scores improved in over 70% of participants (mean increase: 7.6%). Notably, individuals with MCI demonstrated cognitive recovery to the normal range following training.

Conclusion: The AI-based auditory rehabilitation platform effectively improved both speech discrimination and cognitive function in older adults with ARHL. Given its high accessibility, adaptability, and user adherence, the platform holds strong potential as a digital therapeutic solution for auditory rehabilitation and dementia prevention in aging populations.

Keywords: Age-related Hearing Loss, Auditory Rehabilitation, AI-Driven Personalized Digital Therapeutics

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies I

OP 09-8

Talk Town: Game-based psychosocial habilitation for deaf and hard of hearing youth

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Purpose

Most deaf and hard of hearing (DHH) youth have hearing parents and attend mainstream school. Incomplete language access and lack of DHH role models may lead to internalised stigma and deficits in pragmatic skills, theory of mind and executive function, affecting psychosocial wellbeing. Furthermore, DHH youth face unique communication challenges. A novel game-based intervention, Talk Town, was developed to address these issues, informed by existing literature and participatory design methodologies.

Method

Problem validation: self-selected surveys of parents and teachers of DHH youth (n=39) and paediatric audiologists, speech language therapists, and otolaryngologists (n=40) were administered online to identify need for this resource

Resource design: iterative prototypes of Talk Town were developed incorporating feedback from DHH youth, their parents, siblings, and teachers. Game content was informed by the habilitation literature and lived experience of DHH adults.

Evaluation: workshops were held with DHH youth aged 10 – 16 years (n=12) to determine feasibility and acceptability of the Talk Town game. Structured design activities captured participants' game design feedback. Learning outcomes of Talk Town gameplay were assessed through pre and post surveys measuring internalised stigma of hearing status and device use, and self-advocacy during communication breakdowns.

Results

Survey data showed adults often mediate communication and friendships for DHH youth. DHH youth's most common response to communication breakdowns was 'giving up'. Clinicians reported demand for localised, culturally safe habilitation resources. Many clinicians reported assuming habilitation work was carried out by another professional. Users valued novel DHH representation, such as customising different hearing devices, within Talk Town. Game content both reflected and expanded lived experience. DHH youth reported reduced internalised stigma and improved self-efficacy after playing Talk Town.

Conclusion

Talk Town is a novel, age-appropriate and engaging intervention supporting psychosocial wellbeing in DHH youth. Future research will determine transference of learning outcomes to everyday life.

Keywords: Wellbeing, Co-design, Adolescent

Oral Presentation 09

Future E-Health, Innovative Technology and Therapies I

OP 09-9

Molecular biomarkers of neuroplasticity in prelingual deafness treatment by cochlear implantation in plasma (matrix metalloprotease 9 MMP-9) and in perilymph proteome

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Congenital deafness treatment with cochlear implantation (CI) is a standard therapy with, in overall, very good results, however, in some cases implanted children do not reach the age norm in verbal communication. Molecular biomarkers of neuroplasticity would allow to implement better clinical management, taking into account individual, personalized needs, giving them better chances of spoken language rehabilitation.
The objective of the study was to verify the prognostic value of plasma level of matrix metalloproteinase 9 (MMP-9), measured at CI, to the outcome of speech and language rehabilitation after 18 months of CI use. The second objective was to assess the presence of MMP-9 in the perilymph and, eventually, verify its prognostic value to the auditory development.
Material: We performed a prospective longitudinal study analysis of plasma activities of MMP-9 at CI activation, 8, and 18 months after CI activation in the cohort of 61 children, diagnosed with bilateral profound sensory- neural hearing loss, aged below 2, treated with CI. Language acquisition was assessed with Little Ears Questionnaire (LEAQ). We studied associations between plasma activities of MMP-9 in the aforementioned intervals and LEAQ scores over follow-up intervals. We performed Mass Spectrometry (MS) analyses in the 3 pairs plasma-perilymph and Enzyme-Linked Immunosorbent Assay (ELISA) to detect and, eventually, assess the level of MMP-9.
Findings: Correlation analysis shows that there is a significant relation between plasma level of MMP-9 measured at cochlear implantation and LEAQ score in 18 month follow up (rho= - 0.25, $p<0.05$). MS Proteome and ELISA for MMP-9 were performed. We have found 1471 proteins in perilymph samples, out of which 441 only in perilymph (absent in plasma).
Concluding, MMP-9 plasma level measured at cochlear implantation below 150 ng/ml predisposes deaf children to good response to CI after 18 months follow-up. Funding: NCN UMO 2013/14/D/NZ5/03337

Keywords: Biomarker, Deafness, Cochlear implant

Oral Presentation 10

Global Audiology and Public Health IV

OP 10-1

Differentiating diabetes mellitus types in association to hearing impairments: Cross-sectional analyses from the Canadian Longitudinal Study on Aging (CLSA)

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Aim: To determine the association between diabetes mellitus (DM) and hearing impairments (HI) by considering different types of DM status, including pre-DM, type 1 DM (T1DM), type 2 DM (T2DM), and undiagnosed DM.

Methods: We analyzed the CLSA comprehensive dataset. Cases with self-reported T1DM and T2DM diagnoses were respectively categorized in the T1DM and T2DM groups. A1c levels were used for the remaining participants (i.e, A1c levels <6.0% for the control, 6.0-6.4% for the pre-DM, and 6.5% or greater for the undiagnosed DM group). HI was defined as 4FPTA (0.5, 1, 2, and 4kHz) 20dB HL or greater in the better ear. We estimated the HI prevalence across groups. We estimated the adjusted odds ratios (ORs) of HI and tested for interaction effect between DM status, age, and sex using multivariable logistic regression analyses.

Results: We included 24 048 cases. HI prevalence was significantly increased in the pre-DM, T1DM, T2DM, and undiagnosed groups relatively to the control group (44.0%, 38.1%, 42.1%, 49.0% vs 27.3%, respectively). There was an interaction effect among DM status, age, and sex. Stratified analysis by age (i.e, 45-54, 55-64, 65-74 and >74 years) and sex showed increased HI ORs, notably in the youngest women with pre-DM, T1DM, and undiagnosed DM compared to the controls (2.21, 95% CI=1.29-3.80, p=0.004; 5.10, 95% CI=2.30-11.32, p<0.001; and 2.49, 95% CI=1.02-6.07, p=0.046, respectively). HI OR was comparable between women with T2DM and their healthy counterparts (1.04, 95% CI=0.64-1.68, p=0.872). Women with pre-DM and T1DM presented with increased HI risks relatively to T2DM women (2.13, 95% CI=1.07-4.24, p=0.031 and 4.91, 95% CI=1.98-12.12, p<0.001, respectively).

Conclusion: Distinctive DM types were associated to HI. Different factors such as DM pathophysiology, disease onset and duration, history of treatment options may explain the differences between HI risks across groups, although the exact underlying mechanisms remain unknown.

Keywords: Diabetes mellitus, Hearing impairment, Population-based

Oral Presentation 10

Global Audiology and Public Health IV

OP 10-2

Oral Presentation 10

Global Audiology and Public Health IV
OP 10-3

Epidemiology of Tinnitus

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Introduction: The reported prevalence of tinnitus is dependent on how tinnitus is defined and sample characteristics. In this session we will discuss a rationale nomenclature for tinnitus related to constancy of perception and bothersome nature. We will further distinguish covariates that are related to non-bothersome and bothersome tinnitus. Implications for clinical description of tinnitus and intervention are discussed.

Methods: The National Health and Nutrition Examination Survey (NHANES) was leveraged for data analysis applying customary survey procedures for statistical analysis. Presence of tinnitus was based on self-report and categorized based on constancy of perception and reported bothersome nature. Socio-demographic characteristics and related factors were analyzed in statistical models including noise exposure, health co-morbidities (e.g. diabetes, hypertension, thyroid dysfunction, mental health), and lifestyle factors (e.g. smoking status, diet quality) and predictors of non-bothersome vs bothersome tinnitus were identified.

Results: The analysis showed that the prevalence of tinnitus was related to how tinnitus was defined; any tinnitus in the past year lasting at least 5 minutes had a prevalence of 16.32%, while only 10% reported tinnitus that was bothersome and only 1.38% reported tinnitus that was a big problem. Approximately 26% of persons with tinnitus reported it to be non-bothersome. Unique predictors of bothersome tinnitus included body mass index, sleep trouble, and health co-morbidities which were not significantly related to non-bothersome tinnitus.

Discussion: The prevalence of tinnitus is dependent on how it is operationally defined. Predictors of tinnitus diverged when defined as bothersome vs non-bothersome in nature. Implications for clinical description of tinnitus and intervention are discussed.

Keywords: Tinnitus, Epidemiology, Predictors

Oral Presentation 10

Global Audiology and Public Health IV
OP 10-4

Is TikTok the way to engage? A content analysis of ear and hearing health information on TikTok

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Purpose

To undertake a content analysis of ear and hearing health topics on TikTok.

Method

Using a published protocol, researchers determined the five most popular hashtags (#audiology, #ears, #hearing, #hearingloss, #otitismedia) relating to ear health and undertook a search of these hashtags on TikTok. A range of video characteristics were recorded including engagement, sentiment, presenting genders and age groups. Addition variables specific to ear and hearing health were collected including call to action/advice, hearing loss/ deafness, ear health generally, ear cleaning, hearing devices, Qtips, hearing protection and ear procedures.Any video that provided education, or instruction was assessed by two audiologists for accuracy: one reviewing the whole sample and one, reviewing a randomised sub-sample for reliability.

Results

In November 2022, a total of 50 videos were collected per hashtag (n=250). 158 videos met the inclusion criteria and were included for analysis. 74% of the videos did not have a call to action or prompt behavior. 49% of videos referenced personal experience. A total of 66 instructional/educational videos were assessed for accuracy. These were categorised as factual (n = 42, 64%), partially factual (n = 8, 12%), and non-factual (n = 16, 24%).

Conclusion

There is an opportunity for audiologists and other ear and hearing health experts to engage with the general public on TikTok as the platform has a large reach. The results indicate this could be a useful platform to share factual information on protective and risk factors for ear and hearing health and to discredit misinformation.

Keywords: Hearing, Social Media, Audiology

Oral Presentation 10

Global Audiology and Public Health IV
OP 10-5

Hearing Instruments Management in Crisis. Guideline for preparedness and hearing care during prolonged crises

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Background: Global events underscore the need for proactive strategies to ensure the functionality and utility of hearing aids during emergencies. One of the conclusions of the UN Global Survey on Disaster Preparedness is that disaster preparations should specifically address the needs of individuals with hearing or communication impairments. Wars, political conflicts, pandemics, natural disasters (e.g. hurricanes, tsunamis, earthquakes or wild fires), or human-made catastrophes can arise unexpectedly, disrupting daily life and limiting access to essential healthcare services. As global crises become increasingly frequent, preparedness for hearing aid management in emergencies has become critically important.
Hearing aids play a critical role in maintaining awareness during emergencies. They enable users to hear crucial announcements, sirens, and other alerts, thereby enhancing their sense of control and safety. Additionally, hearing aids support effective communication with care and rescue teams, emergency services and significant others, which is vital during times of stress and disasters.

HIMIC Guidelines: In response to findings from a study on hearing aid usage and audiology care in times of global crises, we have developed the HIMIC (Hearing Instruments Management in Crisis) Guidelines for preparedness and hearing care during prolonged crises. The guidelines have two parts: HIMIC-I (Individual) and HIMIC-P (Public Policy). Their primary aim is to ensure device functionality, user preparedness and continuity of public services during major crisis, such as war times, pandemic, and environmental disasters.

Key Actions: These recommendations address device selection, emergency planning, and usage in extreme conditions, as well as preparedness of hearing clinics, human resources considerations, training, emergency inventory and establishing responsibilities. Ensuring access to remote audiological services and promoting proactive hearing aid preparedness can enhance safety, communication and well-being for individuals with hearing impairment during prolonged crises.

Keywords: Disaster preparedness, Individual and Public Health Guidelines, Hearing Instruments Management in Crisis

Oral Presentation 10

Global Audiology and Public Health IV
OP 10-6

From Exclusion to Inclusion: Building Cultural Competency for Deaf Sign Language Users in Audiology Services

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Background
Cultural competency in audiology is essential for delivering equitable patient-centred care for Deaf sign language users, who face significant barriers to healthcare. Research by Hulme et al (2021, 2022, 2023) identified critical gaps, including audiologists' limited knowledge of Deaf culture and sign language, communication anxiety, and a lack of culturally appropriate resources, leading to patient dissatisfaction and disengagement. This follow-on study aimed to co-develop practical, culturally competent resources to address these barriers.

Methods
Guided by the Medical Research Council (MRC) Framework for Developing and Evaluating Complex Interventions, this study employed Participatory Action Research (PAR) methods in British Sign language (BSL) and English. A logic model to effect change in audiology services was first developed to guide the form, content and process of the pilot intervention. This included a bespoke training course for audiologists, delivered by Deaf teachers, grounded in lived experience. Audiologists helped identify key clinical scenarios for which a practical sign language guide was developed. A Delphi survey with Deaf experts and audiologists was conducted to establish client-oriented outcome measures. Trained audiologists then undertook clinics with Deaf signers.

Results
Final results will be presented at the Congress, including the feasibility of the PAR process and the acceptability of the resources (e.g, training course, sign guide). Consensus findings from the Delphi survey on outcome measures will be detailed alongside evaluations of practice. Preliminary data indicate the resources are highly valued by both audiologists and Deaf participants for their clinical utility and cultural appropriateness.

Conclusion
This approach demonstrates that a co-design approach successfully generates foundational resources to improve cultural competency. The findings provide a blueprint for a larger-scale implementation study, outlining steps for embedding these tools into standard audiology practice. This work is a critical step toward reducing health disparities and empowering Deaf sign language patients.

Keywords: Cultural Competency, Deaf Sign Language Users, Co-Design

Oral Presentation 10

Global Audiology and Public Health IV
OP 10-7

Advanced Scope Audiology in Western Australia: Expanding impact across tertiary care

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Purpose
Ear Nose and Throat (ENT) services are often stretched with demand outstripping capacity. The Advanced Scope Audiology Practitioner (ASP) clinic was implemented to help manage suitable non-urgent outpatient patients within the WA adult public health system to reduce ENT waitlists and improve access to hearing and balance care in underserved areas. ASP Audiology clinicians have extensive training and experience in balance, implants and electrophysiology and also undergo training with an ENT Consultant with direct ENT supervision. This study aimed to evaluate the outcomes in patients managed by the ASP clinics.

Methods
A retrospective cohort study was conducted with 1,131 patients seen in the ASP clinic from 2020 to 2025 across 3 major teaching hospital in Western Australia.

Results
38.5% of patients were discharged after one ASP consult, 39.6% of patients required ASP follow-up after imaging or vestibular testing, 14% of patients were escalated to ENT, 5.4% required follow-up with audiology and 2% follow up with another speciality ie. physiotherapy, neurology. Re-presentation rates to ENT post the ASP consult were at 0.5%.
The waitlist for suitable patients reduced from 5 years to 6 months. This has freed specialist capacity for high-priority surgical cases, prevented avoidable complications, and delivered significant annual cost savings to the public health system.

Conclusion
Through strong monitoring, embedded evaluation, and continuous refinement, the ASP model has matured into a safe, cost-effective, and patient-centred standard of care. In addition, it enhances recognition of Audiology as an allied health profession and sets a benchmark for scalable, data-driven innovation in audiology-led services.

Keywords: Advanced Scope Audiology, Health service delivery, Patient access

Oral Presentation 10

Global Audiology and Public Health IV
OP 10-8

High rates of suppurative otitis media among children attending urban clinics in Goroka, Eastern Highlands Province, Papua New Guinea: A cross-sectional study

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Background: Otitis media (OM) is the leading cause of childhood hearing loss but its burden in low-middle-income countries like Papua New Guinea (PNG) is poorly understood. We aimed to determine the prevalence of OM and associated risk factors in children aged ≤15 years attending clinics in Goroka, Eastern Highlands Province, PNG.
Methods: Children attending outpatient clinics for illness, ear screening or immunisation, and accompanying siblings, were enrolled in a prospective cross-sectional study. Clinical and risk factor data were collected, ears examined using otoscopy and tympanometry and findings independently reviewed by Australia-based audiologists using asynchronous telehealth. Diagnosis was based on the worst-affected ear.
Results: Of 498 enrolled children, 68% attended for treatment, 15% for immunisation, 1% for ear screening and 15% were siblings. OM prevalence was similar among children attending for illness and other reasons (76% vs 71%) but suppurative OM (acute OM with/without perforation and chronic suppurative OM) was more common in children attending for illness (47% vs 17%). More than one in five children had a tympanic membrane perforation. OM affected 79% of children <6 months; 45% of 1-2-year-olds had suppurative OM. Maternal smoking was associated with increased risk of any OM (adjusted odds ratio [OR] 1.95, 95%CI:1.16-3.27) and crowding (number of people/room) increased risk of suppurative OM (unadjusted OR 1.13, 95%CI:1.01-1.27).
Conclusion: The burden of OM is alarmingly high among children in the PNG highlands. Urgent public health action is required, including health worker training, regular ear screening, and strategies addressing smoking and crowding to prevent this under-reported disease in PNG.

Keywords: Otitis media, Papua New Guinea, Public health

Oral Presentation 10

Global Audiology and Public Health IV
OP 10-9

Lifting the Lid on Bias: Audiologists, Speech Therapists, and the Use of South African Sign Language in Serving the Deaf Community

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Background:
Despite training in Deaf culture and South African Sign Language (SASL), many speech therapists and audiologists (STAs and AUDs) in South Africa do not actively use SASL or integrate Deaf cultural perspectives into their clinical practice. This reflects an ongoing bias toward the medical model of deafness, which prioritizes speech and hearing interventions over sign language, thereby marginalizing Deaf patients and limiting equitable access to patient-centred care.

Aim:
This study explored STAs' and AUDs' knowledge, perceptions, and confidence in using SASL, their motivations for using or avoiding it in service delivery, and their perspectives on professional tensions between practitioners and the Deaf community.

Method:
A two-phase explanatory mixed-methods design was employed. In Phase One, 24 STAs and AUDs completed an online survey, followed by Phase Two semi-structured interviews with 12 participants. Recruitment occurred through professional associations, including SAAA, SASLHA, and NABSLHA, as well as social media. Eligible participants were qualified, HPCSA-registered professionals trained at South African universities offering SASL. Data were analysed using descriptive and thematic approaches.

Findings:
A significant gap emerged between theoretical SASL training and practical competence. Although SASL is taught in undergraduate programmes, most participants reported inadequate confidence and limited real-world exposure, impeding communication with Deaf patients. Participants emphasized the need for immersive, practice-based training, ongoing professional development, and stronger collaboration with Deaf communities and interpreters. They also noted that current academic and clinical systems reinforce a medicalized, hearing-centric approach.

Conclusion:
The findings highlight the need for a paradigm shift in professional training and service delivery. Embedding experiential SASL learning, fostering interprofessional collaboration, and promoting continuous language and cultural competency development are vital to ensuring inclusive, patient-centred care. Future research should integrate Deaf individuals' perspectives to strengthen culturally responsive healthcare in South Africa.

Keywords: South African Sign Language, Service delivery, Professional competency

Oral Presentation 11

Auditory Processing I
OP 11-1

Neural speech encoding advantages associated with higher socioeconomic status extend to noise conditions with differential susceptibility

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Purpose: The frequency-following response (FFR) provides a window into the neural encoding of speech. While socioeconomic status (SES) influences FFR quality, its role in conferring resilience against noise-induced degradation remains unclear. This study investigated whether SES modulates the susceptibility of neural speech encoding to background noise.

Methods: Seventy normal-hearing Chilean adults (18-30 years) were grouped by maternal education into low- and high-SES. FFRs were elicited using a 170-ms /da/ syllable presented in quiet and in six-talker babble noise at +10 dB SNR. The primary outcome measures included: neural timing (latencies of onset, transition, and steady-state peaks), response magnitude (broadband root mean square and frequency-specific spectral amplitudes at F0, H2, and H3), and response fidelity (stimulus-to-response and response-to-response correlations). Data were analyzed using linear mixed-effects models to examine the main effects of SES and noise condition, as well as their interaction.

Results: Significant interactions between SES and noise condition were found for neural latencies in the onset (β = -0.402, p = .008) and transition segments (β = -0.287, p = .009), revealing smaller noise-induced delays in the high-SES group. Interactions were also observed for stimulus-to-response correlations in the transition (β = 0.026, p = .018), steady-state (β = 0.024, p = .034), and full-stimulus segments (β = 0.019, p = .041), indicating less noise-driven fidelity loss in high-SES participants. Furthermore, the high-SES group demonstrated consistently enhanced neural responses under both quiet and noisy conditions, including larger broadband magnitudes in all stimulus segments and stronger encoding of fundamental frequency and harmonics.

Conclusion: Higher SES is associated with more robust neural speech encoding and significantly greater resistance to the degrading effects of background noise on response timing and fidelity. These findings highlight SES as a key factor in the neural processing of speech in challenging listening environments.

Keywords: Socioeconomic Status, Frequency Following Response, Noise Resilience

Oral Presentation 11

Auditory Processing I
OP 11-2

Infants listening to stories in noise: A protocol

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Purpose: This study introduces an ecologically valid electrophysiological approach, combined with behavioural and caregiver measures, to understand how typically developing infants process speech in noise.

Background: From a very young age, infants are exposed to complex auditory environments and must learn to extract meaningful speech cues. In fact, some babies spend much of their day in noisy settings such as childcare, where overlapping speech and background noise make listening more demanding. Despite this, we know little about how infants' brains track speech in such ecologically valid contexts. EEG provides a powerful, non-invasive way to fill this gap. Recent work using multivariate temporal response functions (mTRFs) has shown that infants as young as four months can track continuous speech, offering a window into how early neural processing supports later language outcomes.

Methods: Thirty-two infants aged 4–24 months will undergo EEG recording with a 64-channel net during a story-listening paradigm presented in quiet and in noise at +10 dB SNR. Neural tracking will be quantified using mTRFs. Linear mixed-effects models will examine the effects of age and listening condition.

Significance: This study will generate foundational data on how infants' brains encode speech in realistic environments, advancing our understanding of early auditory development and auditory processing, and informing more ecologically valid assessment and intervention tools for clinical and research settings.

Keywords: Speech-in-noise, Pediatric, EEG

Oral Presentation 11

Auditory Processing Ⅰ
OP 11-3

User-Operated Audible Contrast Threshold (U-ACT): An Automated Approach to Assessing Aided Speech-in-Noise Performance

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The Audible Contrast Threshold test is a clinically validated method for assessing supra-threshold auditory processing, with the aim of predicting speech perception in noisy environments. A new user-operated version of this test (U-ACT) has been developed within the UAud project to enhance clinical efficacy by freeing work hours for hearing care professionals. U-ACT builds on the previously published ACT test by enabling patients to independently complete the test using a touchscreen interface and with minimal verbal instructions. The test procedure is guided by a Bayesian adaptive algorithm, which adjusts the contrast of the test stimuli based on the users responses. This ensures efficient and accurate estimation of contrast levels and predicted hearing in noise ability. Its design also supports use across a wide range of populations, including individuals with cognitive or language-related challenges. This presentation will describe the technical framework underpinning the test, the U-ACT test procedure, as well as the potential clinical applications, with a focus on its role in expanding access to speech-in-noise testing in audiological practice.

Keywords: User-operated hearing assessment, Supra-thresholds Hearing performance, Bayesian adaptive algorithm

Oral Presentation 11

Auditory Processing Ⅰ
OP 11-4

Age and sex differences in medial olivocochlear function related to reading acquisition

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Background:
The medial olivocochlear system (MOCS) exerts top-down control over cochlear mechanics, modulating auditory sensitivity. Altered MOCS function has been implicated in neurodevelopmental disorders, including developmental dyslexia (DD), yet its maturation, lateralization, and sex-related effects remain poorly characterized.
Methods:
We assessed MOCS function through transient-evoked otoacoustic emissions and contralateral suppression in 240 right-handed French participants (aged 8–35 years), including 120 with reading impairment (RI) and 120 controls (NRI). Equivalent attenuation (EA) and asymmetry index (AI) were analyzed using General Linear Models to examine the effects of age, sex, and reading ability. A Random Forest algorithm further tested whether MOCS indices could predict reading status.
Results:
RI participants exhibited reduced right-ear suppression and a reversed (leftward) MOCS asymmetry compared to controls, consistent with atypical auditory lateralization. These abnormalities persisted into adulthood. Sex-specific analyses revealed greater dysregulation in males, who showed a delayed maturation of auditory asymmetry relative to females. Age effects in RI subjects indicated compensatory left-ear overactivation during adolescence. Machine learning classification confirmed the predictive value of MOCS asymmetry, particularly in males.
Conclusion:
This study provides the first evidence that atypical MOCS function and reversed auditory asymmetry persist from childhood into adulthood in individuals with reading impairment. The findings suggest that MOCS dysfunction reflects abnormal hemispheric specialization and may serve as a peripheral biomarker for DD. Moreover, sex- and age-dependent variations highlight the role of auditory efferent maturation in shaping reading acquisition, supporting the notion that DD involves enduring abnormalities in top-down auditory control mechanisms.

Keywords: Reading impairment, Medial olivocochlear system, Auditory processing disorder

Oral Presentation 11

Auditory Processing I
OP 11-5

A systematic review and meta-analysis of auditory processing evaluation and interventions in autistic participants

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Autism Spectrum Disorder (ASD) impacts individuals' communication and socialisation, with auditory processing deficits being one contributing factor. This systematic review and meta-analysis examines the effectiveness of auditory processing interventions in ASD populations by analyzing quantifiable and objective pre- and post-intervention behavioral auditory assessments. The impact of auditory processing training and interventions, including dichotic listening exercises and the use of assistive technology, was evaluated across four meta-analysis models, categorized based on the type of intervention and their measurement units in the respective studies. Overall, findings across all models support the implementation of auditory training and assistive technology, demonstrating moderate to large effect sizes. However, substantial between-study heterogeneity and lower effect sizes in certain subtests highlight the necessity of pre-intervention auditory assessments and the development of individualized intervention strategies. Additionally, future research needs to incorporate larger studies that account for age-related factors and include complete cognitive assessments to inform the current literature.

Keywords: Auditory processing, Autism spectrum disorder, Auditory training

Oral Presentation 11

Auditory Processing I
OP 11-6

Uncovering genetic comorbidities related to speech in noise deficits using polygenic risk score from two independent cohorts

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Speech-in-noise (SIN) deficits are difficulties understanding speech against background noise. A recent genome-wide association study (GWAS) revealed polygenic architecture underlying SIN deficits in individuals with self-reported normal hearing. The objective of the study was to investigate the genetic comorbidities of SIN deficits. We employed a polygenic risk score (PRS)-based association analysis to identify genetic comorbidities of SIN deficits across the health phenome.

The PRS-based association analysis of SIN deficits was conducted on the UK Biobank cohort, followed by a replication analysis using clinical measures in a cohort of healthy young adults with normal audiograms. The UK Biobank sample included 279,911 participants. The replication sample included 300 healthy young adults (18-37 years) with self-reported normal hearing. Speech, Spatial and Qualities of Hearing Scale (SSQ12), QuickSIN and Dichotic Digit Test (DDT) were performed. A logistic regression model was used to identify the PRS predictors associated with SIN deficits in the UK Biobank cohort. A linear mixed model was utilized to identify PRS predictors of SSQ12, QuickSIN, and DDT in the replication cohort.

The regression analysis identified PRS predictors across the health spectrum associated with SIN deficits in the UK Biobank. Sensory-related PRS (like acquired hearing loss and tinnitus) and neuropsychiatric PRS (such as schizophrenia and anxiety) showed strong associations. Other health-related PRS including autism spectrum disorder, alcohol use, and cholesterol revealed significant associations with SIN deficits. SIN-associated PRS were enriched across neuropsychiatric, mental health, and endocrine/metabolic categories. The replication analysis using SSQ12, QuickSIN, and DDT revealed complementary results.

The results indicate that genetic predisposition to certain health traits can explain intersubject variability in SIN deficits and are consistent with the polygenic inheritance of SIN deficits. We posit that communication of the genetic risk of SIN deficits at younger ages can help prevent or delay the onset of clinical representation of SIN deficits.

Keywords: Speech in noise, Genetic comorbidities, Polygenic risk score

Oral Presentation 11

Auditory Processing I
OP 11-7

The new Cantonese Pediatric Monosyllabic-Word Picture Identification Dichotic Listening Test (CaPeMoPiDLT) is sensitive for identifying abnormal auditory processing in young Cantonese-speaking children with specific learning difficulties and ADHD

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This study investigated the top-down directed attention and bottom-up divided attention dichotic listening performances in Cantonese-speaking 6- to 12-year-old children's groups with (1) specific learning disabilities (SpLD, n=21), (2) attention deficit/hyperactivity disorder (ADHD, n=21), and their age-matched typically developing peers, using the newly developed Windows-based Cantonese Pediatric Monosyllabic-word Picture Identification Dichotic Listening Test (CaPeMoPiDLT). The auditory stimuli consist of monosyllabic words in consonant-vowel (CV) syllables selected from early primary schoolers' vocabulary curriculum. Findings revealed that both SpLD and ADHD groups show a significant right ear advantage (REA) in divided listening and right ear-directed listening conditions. Children in the SpLD and ADHD groups both performed significantly poorly than their TD controls in the left ear-directed listening condition, suggesting an underdeveloped right-to-left hemispheric transfer of auditory information in the clinical groups. CaPeMoPiDLT uses a close-set four-alternative forced-choice picture-pointing response format to minimise the confounding effects from short-term memory, speech sound production, and language competence. We are currently investigating the feasibility of using CaPeMoPiDLT to test children down to 3 to 4-year-olds. CaPeMoPiDLTallows intra-participant statistical comparisons using the binomial distribution of test scores between the right and left ear test conditions to reveal the presence of an ear advantage or hemispheric processing asymmetry in young children. The creation of the Arabic, Australian English, Maltese English, and Maltese versions is underway. CaPeMoPiDLT is promising to offer a diagnostic solution to assess right ear advantage or inter-hemispheric auditory signal transfer for young children suspected to have auditory processing difficulties.

Keywords: Auditory Processing Disorders, Dichotic Listening, Young Children

Oral Presentation 11

Auditory Processing I
OP 11-8

Actual and optimal amplification dosage in the treatment of auditory processing disorder

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An important research finding in the treatment of auditory processing disorder (APD) is the neuroplastic benefit of amplification, but actual and optimal durations of treatment are unknown.

In a retrospective study using quantitative and qualitative research methods we investigated duration of use of remote microphone hearing aid (RMHA) systems by children and adolescents with APD, and evidence of improvement in hearing skills after RMHA system use.

RMHA systems were beneficial irrespective of APD sub-type and tests failed. Neuroplastic benefit was evidenced by improvement on auditory test performance post-treatment. Fifty percent of participants with post-treatment diagnostic reviews no longer met criteria for diagnosis of APD after amplification treatment. On average, participants used RMHA systems for two years and nine months. Children fitted at ages 10-11 years wore their RMHA systems for 13 months less on average than children fitted at younger ages. Twenty-seven percent of parents reported that their child discontinued RMHA system use because they were coping better. Thirty-nine percent of parents reported that their child discontinued RMHA system use because of increasing self-consciousness about wearing their RMHA system. Forty-four percent stopped using their devices at School Year Six (age 10-11 years). Optimal average duration of use was estimated on a sub-group of resolved cases as two years and five months though this may be an underestimate.

Average actual, and estimated optimal, durations of use of RMHA systems fell approximately between two and three years, depending on age at fitting. However, individual differences require that there will always be a wide range of optimal durations of use.

Keywords: Auditory processing disorder treatment, Neuroplasticity, Assistive hearing technology

Oral Presentation 11

Auditory Processing I
OP 11-9

Benefits of classroom remote microphone technology for inattentive children

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Objectives
This study investigated the effectiveness of remote microphone technology (RMT) for children with inattention and associated listening difficulties. It aimed to assess improvements in attention, listening skills, and classroom behavior during RMT use, and evaluate long-term effects on auditory processing, cognition, reading fluency, and behavior.

Methods
A two-phase trial was conducted. Phase one was a 4-week randomized controlled crossover trial (n=35), assessing listening and attention in noise with and without RMT. Phase two was a 30-week extension trial following participants continuing with RMT (n=21) and controls without RMT (n=16). Auditory processing, attention, memory, and reading fluency were assessed before and after the extension period. Questionnaires were administered to teachers, parents, and children at each timepoint to monitor progress.

Results
In phase one, RMT use significantly improved speech intelligibility, listening comprehension, and auditory attention ($p < .05$). Children, parents, and teachers reported improved classroom listening and reduced ADHD symptoms ($p < .05$). In phase two, the RMT group showed greater improvement in reading fluency and self-reported quality of life ($p < .01$) compared to controls. No differences between groups were observed in auditory processing or cognitive skills.

Conclusion
For inattentive children with listening difficulties, RMT provides immediate benefits for classroom listening and attention. Long-term use accelerates reading fluency progress and improves quality of life, without altering underlying cognitive skills. These findings support RMT as an appropriate non-pharmacological intervention in educational settings for this population.

Keywords: Remote microphone technology, Attention, Listening difficulties

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-1

Applications of Augmented and Virtual Reality in Enhancing Communication for Individuals Who Are Hard of Hearing

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Background
Hearing loss constitutes a major barrier to effective communication, influencing speech perception and cognitive processing in everyday life. Technological interventions such as augmented reality (AR) and virtual reality (VR) offer innovative multisensory solutions that may reduce these barriers. Recent advances have created opportunities to integrate nonverbal cues, immersive environments, and real-time feedback in communication training. However, the overall evidence regarding their efficacy for individuals who are hard of hearing remains limited and fragmented.

Objective
The aim of this study is to systematically review the applications of AR and VR in improving communication among individuals who are hard of hearing, examining educational, perceptual, and cognitive outcomes.

Approach / Innovation
Following PRISMA guidelines, a comprehensive search was conducted across PubMed, WoS, EMBASE, and IEEE databases. Of 5,981 identified records, 22 studies met the inclusion criteria. The majority (68%) employed nonverbal communication modalities such as sign language and visual cues; others targeted auditory or speech-based enhancement. By blending immersive simulation with interactive cues, AR and VR support incremental improvements in learning sign language, speechreading, and cognitive skills.

Conclusion / Outlook
Evidence from recent literature underscores the transformative potential of AR and VR in communication enhancement for the hard of hearing. These technologies foster greater inclusion, improve perceptual and educational outcomes, and assist in cognitive skill development. Future research should employ larger, diverse samples and standardized assessment measures to inform broader implementation and policy within auditory rehabilitation.

Keywords: Hearing Loss, Hard of Hearing, Assistive Technology, Augmented Reality, Virtual Reality, Communication, Cognitive Skills

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-2

Evaluation of the HearCare MED-EL App: Remote Configuration and Technical Check Performance in Cochlear Implant Users

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Purpose:
To evaluate the clinical performance and usage behavior of the HearCare MED-EL App, a remote care solution for cochlear implant (CI) users, focusing on its ability to install new audio processor configurations. Additionally, demographic data and usage statistics of app functions were analyzed.
Methods:
A retrospective analysis of pseudonymized data logged by the HearCare App was performed, from launch of the app until December 31, 2024.
Results:
Primary outcome: New audio processor configurations were successfully installed in 84% of cases (95% CI: [81, 86]).
Technical checks: 92% checks were completed, with 67% showing no findings.
Backup operations: Configuration backups were successfully created in 75% and installed in 70% of cases.
Demographics: 1,791 CI users used the app; 43% female, 57% male, mean age 44 years. Notably, over one-third of users were aged 60+, indicating strong engagement among older adults.
Device usage: 2,465 audio processors and 2,283 implants were logged. SONNET 2 was the most common processor (55%), and SYNCHRONY, SYNCHRONY 2 and SONATA 2 the most common implants (75%).
App usage: Mean duration of app use was 3.72 months; implant usage averaged 5.3 years.

Conclusion:
The HearCare MED-EL App demonstrates reliable performance in remote configuration and technical checks, supporting its intended use in reducing in-person clinic visits while maintaining safe and effective care. The app is widely adopted across age groups, including older CI users, highlighting its accessibility and utility in digital hearing healthcare.

Keywords: Cochlear implant, Remote care, Mobile health app

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-3

Heliaural: Personalised, Real-Time Audio Calibration for Everyday Listening

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Hearing loss affects over 1.6 billion people globally, yet many with mild or situational difficulties remain underserved by traditional clinical pathways. Individuals often experience reduced speech intelligibility and listening fatigue in environments including meetings, public transport, and hybrid workspaces. Despite not qualifying for medical-grade hearing aids, they still require support to navigate complex acoustic settings.
To address this gap, we present Heliaural, a software-only hearing support system that enables real-time, user-driven audio personalisation without direct clinical involvement or specialised hardware. Heliaural uses perceptual input from natural head gestures across three spatial axes to indicate when sound is clearest or most comfortable, dynamically adjusting amplitude and phase balance in real time. Gestures are detected using motion sensors embedded in everyday smartphones and earbuds, eliminating the need for additional equipment. The system then applies adaptive signal processing to calibrate audio across devices including headphones, hearing aids, and smart speakers.
Heliaural's modular architecture supports integration into consumer electronics and professional audio workflows, with applications in digital health, assistive technology, and immersive media. It also adapts to environmental acoustics, maintaining personalised calibration across varied listening contexts. By combining perceptual science, intuitive interaction, and inclusive design, Heliaural adapts to users, rather than requiring users to adapt to their devices.
We report findings from structured perceptual trials with 50 participants, including individuals with mild hearing loss, immersive media users, and audio professionals. Trials evaluated usability, speech clarity, and listening comfort across varied acoustic environments. Results show improvements in intelligibility, reduced fatigue, and greater inclusion for users beyond traditional clinical thresholds.
Heliaural integrates gesture-based interaction, real-time calibration, and cross-platform compatibility to deliver adaptive listening support. The system, currently patent pending (WO2024041821A1), is being extended toward perceptually adaptive tinnitus relief and cochlear implant support, suggesting its potential as a scalable platform for user-led auditory calibration and perceptual wellbeing.

Keywords: Hearing loss, Personalised hearing, Interactive calibration

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-4

It's complicated: Predicting the uptake of teleaudiology by clinicians in New Zealand

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Teleaudiology is an effective and suitable tool for delivering many audiological services remotely, but the number of clinicians offering it to their patients remains low. By understanding why audiologists do or do not provide these services we can create better training and delivery models.

UTAUT-2 (Unified Theory of Acceptance and Use of Technology 2) provides a framework to predict whether an audiologist is likely to provide teleaudiology services and how this can be improved. It identifies eight key components influencing the intention to provide teleaudiology: whether an audiologist feels teleaudiology will be helpful and improve productivity (performance expectancy), whether it will be easy to use (effort expectancy), whether other people think they should be using it (social influence), whether they have the knowledge, resources and support to provide it (facilitating conditions), whether they get enjoyment from it (hedonic motivation), whether it can become routine (habit), whether the equipment is suitably priced (price value) and whether providing teleaudiology services meets requirements for equitable access of services (modifying factors).

This paper presents findings from the first year of a three-year longitudinal study on teleaudiology practice in New Zealand. Audiologists completed a survey, and data were analysed using a Partial Least Squares analysis and a fuzzy-set Qualitative Comparative Analysis to assess the strength of relationships between variables, and the combinations of conditions leading to teleaudiology uptake. Results highlight the complexity in developing a teleaudiology service. Audiologists surveyed have multi-faceted and complicated motivations that drive their behaviour. For example, many training models focus on both how to use teleaudiology equipment (facilitating conditions), and why it is important for both the clinician and the patient (performance expectancy). However, it is equally important to focus on peer-to-peer encouragement (social influence), developing a daily practice (habit), and finding personal fulfilment from offering teleaudiology (hedonic motivation).

Keywords: Teleaudiology, Hearing aids, UTAUT-2

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-5

AI-Based Analysis of Tympanic Membrane Endoscopic Images: Development of a Diagnostic Support Model for Otolaryngologists

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Purpose
This study aims to develop an AI classification model that leverages tympanic membrane endoscopic images to differentiate normal from abnormal cases and to detect eight key pathological features. A standardized labeled dataset will be constructed for model training and evaluation. Furthermore, the clinical utility of the model as a diagnostic support tool for otolaryngologists will be assessed.

Method
Normal and pathological tympanic membrane images were collected from a multi-center clinical database. The preprocessing pipeline included ROI cropping, resizing to 224×224 pixels, pixel normalization, and noise reduction. Labeling was performed for eight specific categories—tympanic membrane color, perforation, obstruction of view, ossicular status, cone of light, annulus, attic retraction, and effusion—through a combination of expert review and AI assistance (GPT-5). To address class imbalance, data augmentation techniques such as rotation, horizontal flipping, brightness adjustment, contrast adjustment, and color modification were applied. The model was trained using a ResNet50-based CNN architecture. Performance was evaluated using accuracy, sensitivity, specificity, F1-score, ROC curve analysis, and confusion matrix assessment. Grad-CAM was applied for lesion localization and visualization.

Result
The model achieved an accuracy exceeding 90% for normal–abnormal classification, with both sensitivity and specificity above 0.88. Grad-CAM visualizations confirmed that the model focused on lesion areas during learning. Error analysis identified misclassification cases caused by obstructions and light reflections, which informed subsequent refinements to the data augmentation strategy and labeling guidelines.

Conclusion & Discussion
The AI-based tympanic membrane classification model developed in this study demonstrated high accuracy and explainability, indicating strong potential as a diagnostic support tool for otolaryngologists. Through the establishment of a standardized labeled dataset and expansion to multi-center data, the model is expected to be applicable across various settings, including telemedicine, clinical interpretation support, and integration into hearing-related AI platforms.

Keywords: TM image, AI analysis, AI model

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-6

From Simulation to Automation: Overcoming Barriers and Unlocking Opportunities with Disruptive Technologies in Audiology

Andreas SEELISCH

Audiology, Hearing Solutions, Canada

Innovative technologies in audiology often generate excitement at conferences but rarely gain immediate traction in clinical practice. The gap between promise and implementation is wide and often unaddressed. This session draws on real-world trials by Hearing Solutions, a large independent hearing healthcare provider in Canada, to explore why some innovations succeed while others stall. Case studies include using CARL simulation for staff training, AMTAS automated audiometry, Shoebox online screening tools, and brief reviews of Cognivue, manufacturer-led teleaudiology, and extended high-frequency testing. Participants will learn practical lessons from both successes and setbacks, including barriers to integration, clinical workflow alignment, clinical practice guidelines and staff adoption. The goal is to help clinic owners and operators move beyond inspiration to actual implementation.

Keywords: Clinical Innovation, Implementation Science, Technology Adoption

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-7

How Auracast™ broadcast audio will broaden audio accessibility for everyone

Henry WONG

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Auracast™ broadcast audio, a capability from Bluetooth® technology, is poised to expand audio accessibility by standardizing public audio delivery. This innovation allows hearing aid users and the general public to connect effortlessly to broadcast sound sources in venues such as theaters, museums, and lecture halls. For the audiology community, understanding Auracast™ is essential, as it introduces a powerful new category of assistive listening system (ALS) that promises to reduce barriers and promote greater auditory inclusion for every patient.

Keywords: Auracast™, Bluetooth, Audio Accessibility

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-8

Speech Intelligibility Improvement Effect of a Soundbar Equipped with a Hearing-Aid Algorithm

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Purpose
This study aimed to explore whether the use of a soundbar equipped with a multiple-mode hearing-aid algorithm helps improve speech intelligibility in individuals with hearing impairment. The objective was to evaluate the clinical feasibility of a new type of soundbar-based listening assistance designed to support clearer speech perception in home environments.

Methods
An interim analysis was conducted with adult (65 years old minimum) participants with hearing loss whose native language was Korean. Tests were done in 2 parts. First part, in a soundproof booth, all subjects did screening tests through otoscopic examination, pure-tone audiometry and speech audiometry. Then, the participants underwent a sound-field pure-tone audiometry with different modes, sound-field speech audiometry and speech intelligibility. The second part took place in a quiet room; speech audiometry in silence and noise were administered.

Results
For sound-field pure-tone audiometry, we found a significant improvement of hearing thresholds. Subjects have better results in speech intelligibility in noisy environments with M2 and M3 mode too.

Conclusion
The M2 and M3 mode on soundbar equipped with a hearing-aid algorithm demonstrated a significant improvement of hearing thresholds in sound-field audiometry and speech intelligibility compared with the general mode. Subjective evaluations also showed a positive preference for the M3 mode. These findings suggest the potential of this device as an assistive solution to support speech transmission for individuals with hearing loss in home environments. However, individual differences related to acoustic preference should be considered.

Keywords: Soundbar, Hearing-Aid Algorithm, Hearing loss

Oral Presentation 12

Future E-Health, Innovative Technology and Therapies II

OP 12-9

The Effect of Pluronic-Coated Gold Nanoparticles on Hearing Preservation Following Cochlear Implantation - Pilot Study

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Introduction: During cochlear implantation, electrode insertion can cause cochlear damage, inflammation, and apoptosis, which can affect the residual hearing. Nanoparticles are increasingly studied as a way to increase the availability of inner ear protective factors. We studied the effect on rats of Pluronic-coated gold nanoparticles (Plu-AuNPs) containing dexamethasone, which were applied locally in the rat's middle ear following the implant procedure. Methods: Seven rats were used in the study. The right ear served as a model for the Dex-Plu-AuNP group. Following the intracochlear dummy electrode insertion through the round window, Dex-Plu-AuNPs were placed in the round window niche. In the right ear, following the same insertion procedure, free dexamethasone (Dex) was placed in the same manner. Auditory brainstem response thresholds were measured before and one week after the procedure. A two-tailed T-test was used for the variables. Statistical significance was set as $p < 0.05$. Results: In the Dex-Plu-AuNP group, the threshold shift was less than that in the free dexamethasone group, but no statistical significance was noted between the groups. When compared individually, only the 8 kHz frequency showed statistically significant, better results after one week, in favor of the Dex-Plu-AuNP group. The mean postoperative 8 kHz threshold in the Dex-Plu-AuNPs was significantly lower than that of the control group ($p = 0.048$, t-test). For the other frequencies, the statistical analysis showed no significant difference in mean threshold shifts between the two cohorts. Conclusions: The local application of Plu-AuNPs containing dexamethasone following cochlear implantation may better protect the residual hearing than dexamethasone alone. Dex-Plu-AuNPs do not seem to cause ototoxicity and may be used as a carrier for other agents. In a clinical setting, Dex-Plu-AuNPs may have the effect of protecting lower frequencies in patients with partial deafness who are candidates for electric acoustic stimulation (EAS).

Keywords: cochlear implant, Pluronic, Nanomaterials

Oral Presentation 13

Others

OP 13-1

Top 10 research priorities on childhood deafness and hearing loss in the United Kingdom: Developed by children, families and professionals

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Background and aim
The James Lind Alliance (JLA) Priority Setting Partnership (PSP)'s methodology was followed to bring together people with lived experience and those caring for deaf children. Together, we bridge the gap between what researchers want to research, and what deaf children and their families want to know.

Methods
The Childhood Deafness and Hearing Loss PSP was launched in the UK to call for a UK-wide collaboration among deaf children, young people, families, as well as professionals, to help identify the top 10 research priorities that matter to them.
An initial online survey was set up, and it successfully collected 1252 research questions that reflect what matters to different stakeholders. At the same time, activity-based workshops were held to encourage deaf children and young people to share what is important to them. All these inputs were refined and checked against existing research evidence to identify 'true' uncertainties. The result was a collection of 59 summary questions. They were listed in a subsequent online survey to ask the stakeholders to choose their personal 'Top 10' priorities.
A full-day workshop was held to bring together 22 clinicians, educators, parents of deaf children, and deaf young people to prioritise the final 'Top 10' research priorities from a shortlist obtained from the second online survey. Researchers also adapted the adult workshop methodology to hold another child-friendly half-day workshop, in which ten children aged 7-16 determined their 'Top 10' list.

Results and conclusion
A UK-wide collaboration involving children, families, and professionals was established to reach consensus on two lists of 'Top 10' research priorities: one from adults and one from deaf children. With those research priorities identified, we need to work with different stakeholders to help shape these into research projects; and to engage funders, policymakers, and researchers in addressing these research gaps.

Keywords: Childhood deafness, Priority Setting Partnership, Public and patient involvement in research

Oral Presentation 13

Others

OP 13-2

Keywords: Auditory-Verbal Intervention, Interdisciplinary collaboration model, Outcomes

The Collaborative Journey: Supporting Children with Hearing Loss from Diagnosis Through School

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Effective intervention for children with hearing loss requires interdisciplinary collaboration, yet fragmented service delivery models frequently result in care discontinuity, inconsistent family guidance, and suboptimal outcomes. Establishing integrated collaborative frameworks that ensure seamless, family-centered support from diagnosis through educational transition is therefore essential.

The Children's Hearing Foundation developed an integrated interdisciplinary collaboration model. Our core service pathway encompasses case consultation, family support, audiological assessment, and auditory-verbal therapy, supplemented by seven key components: (1) interdisciplinary case consultation for complex presentations, (2) systematic developmental assessments, (3) structured educational transition support, (4) professional training for educators and healthcare providers, (5) school outreach initiatives, (6) evidence-based practice implementation, and (7) parent coaching and empowerment programs.

Our team comprises social workers, audiologists, auditory-verbal practitioners, and researchers. We implement auditory-verbal methodology as a family-centered early intervention approach, coaching and empowering parents to become active partners in their child's growth. Educators, audiologists and healthcare professionals join this collaborative network through structured training and consultation frameworks.

The collaborative model demonstrates measurable improvements in family satisfaction, professional capacity, and child outcomes. Key deliverables include standardized assessment protocols, structured educational transition support, and evidence-informed intervention strategies and tools developed through systematic research.

This talk will illustrate the implementation of family-centered auditory-verbal intervention within an Asian cultural context, showcasing how interdisciplinary collaboration optimizes outcomes for children with hearing loss and supports their holistic development through culturally adapted, research-informed practices.

Oral Presentation 13

Others
OP 13-3

A longitudinal exploration of hearing, social connection, and wellbeing of ageing adults in Australia

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Background: Communication underpins our social connections, supporting our participation and engagement in society. Acquired hearing loss can impact communication, and subsequently, social connection, resulting in social isolation, loneliness, and poor wellbeing. Many adults with hearing loss do not take up hearing aids, despite evidence they can benefit communication.

Objectives: This study aims to generate a better understanding of social drivers and impacts of acquired hearing loss. In this ongoing survey study, we will investigate whether the use of hearing aids changes social connections and wellbeing over a 12-month period.

Methods: In this longitudinal study, we recruited 195 adults aged over 50 years old who were diagnosed with hearing loss in their initial audiology assessment, and have never previously used hearing aids. Approximately 40% of these participants went on to acquire hearing aids. Participants complete an online survey at baseline, 3-months, 6-months, and 12-months. The survey includes an online Social Identity Map (capturing the quantity and quality of social connections), and questionnaires on hearing handicap, self-assessment of communication, an adapted version of the important people instrument for hearing rehabilitation, psychological distress, loneliness, and wellbeing.

Results: Data collection for the first three time-points is complete, with 12-month follow-up survey data to be finalised in March 2026. We will present our longitudinal findings for the first time at the conference.

Conclusion: This study expects to generate a better understanding of the real-world social connections of adults with hearing loss who do and do not take up hearing aids. We will use these findings to understand how hearing interventions may improve social connections and wellbeing. Further understanding ways to support hearing aid uptake and the long-term benefits will be influential in reducing social isolation and enhancing the wellbeing of millions of adults living with hearing loss.

Keywords: Social connection, Wellbeing, Ageing

Oral Presentation 13

Others
OP 13-4

Benefits of Community-Engaged Learning in Audiology Education from the Patient Perspective

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This presentation reports on a joint project with Dr. Kathy Cienkowski, associate professor and program director of Audiology at UConn, to infuse patient narratives into a first-year advanced hearing aids class. Results showed improved student understanding of the impact of hearing differences and increased student desire to include community engagement and involvement as part of their career path.

A more patient-centered approach is a win for people with hearing loss. Exposure outside the clinic promotes better communication between patients and future providers, fostering partnerships that support long-term, patient-centered care. Better student understanding of the emotional aspects of hearing loss also helps increase empathy, trust, and builds stronger foundations for a true partnership in patient care that goes beyond the device.

Community-engaged activities included a discussion and book review of Hear & Beyond: Live Skillfully with Hearing Loss, and visits to peer-support group meetings. During these activities, students gained a better understanding of the psychosocial impact that hearing loss has on people who live with it. Exposure also helped students develop a more holistic approach to patient care that includes self-advocacy tools for patients and non-technical communication strategies in addition to technology supports. Better hearing outcomes are the result.

Keywords: Audiology Student Education, Patient Perspective, Living with Hearing Loss

Oral Presentation 13

Others
OP 13-5

Self-Esteem and Its Determinants in Cochlear Implant Recipients: A Prospective Cohort Study

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Purpose:
This study aimed to evaluate the self-esteem of cochlear implant (CI) recipients and identify factors influencing their self-esteem. Hearing-impaired individuals often experience communication difficulties that can negatively affect self-esteem; however, CI can improve speech perception and thereby enhance psychosocial well-being.
Methods:
This prospective cohort study enrolled participants between May 2017 and December 2020 who either planned to undergo CI or had previously received CI and visited the hospital for device mapping. Self-esteem was assessed using the Rosenberg Self-Esteem Scale (RSES; 10 items). Each item was rated on a 4-point scale (1–4), and higher total scores indicated higher global self-esteem.
Results:
Postoperative questionnaires were completed by 73 patients (35 prelingual, 38 postlingual) at a mean of 25 months after implantation. No significant differences in self-esteem were observed by gender, deafness type, or employment status ($p = 0.44$, 0.22, and 0.52, respectively). However, improvement in word recognition score (WRS) was positively correlated with higher RSES scores ($r^2 = 0.112$, $B = 0.05$, $p = 0.004$).
Conclusion:
Following implantation, self-esteem was positively associated with speech recognition ability. These findings suggest that auditory rehabilitation through CI may enhance self-efficacy and overall psychosocial well-being in hearing-impaired individuals.

Keywords: Self-esteem, Coclear implantation, Social state

Oral Presentation 13

Others
OP 13-6

The Impact of Hearing-Related Variables on the Development of Executive Function in Children with Hearing Loss

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This study investigated factors associated with executive function (EF) in children with hearing loss (CHL). EF refers to a set of higher-order cognitive skills that support goal-directed behavior, with three core skills, working memory, inhibitory control, and cognitive flexibility. Previous research indicates that CHL are at greater risk of EF delays, although their development varies across individuals. The present study thus explored potential background factors that might help explain these differences.

Fifty-two CHL (mean age = 55 months; range = 37–72 months) participated. The severity of hearing loss ranged from slight to profound. All participants used hearing aids or cochlear implants and were enrolled in an Auditory-Verbal Therapy (AVT) program. Each child completed four performance-based EF tasks, and their parents completed two EF rating scales: the Childhood Executive Functioning Inventory (CHEXI) and the Flexibility Scale. Spearman's rho correlations were conducted to examine associations among EF performance, parental ratings, and background variables (chronological age, better-ear pure tone average [BEPTA], duration of hearing device use, and duration of AVT).

Results showed that EF task performance improved with age. However, age effects were not significant on the EF scales, except for the CHEXI Regulation subscale. BEPTA was related to inhibition performance: children with higher BEPTA showed longer reaction times, even after controlling for age. Interestingly, longer durations of hearing device use and AVT enrollment were associated with poorer working memory and inhibition task performance after age control. No other significant associations were found.

Overall, CHL's EF performance develops with age, but hearing severity also plays a crucial role, particularly in inhibitory control. While working memory and cognitive flexibility appear less affected by hearing severity, inhibition seems especially sensitive to auditory access. Limitations include unequal distribution of hearing-loss degrees and the absence of a typical-hearing control group.

Keywords: Children with hearing loss, Executive Function, Hearing severity

Oral Presentation 13

Others
OP 13-7

Applying agile learning principles to addressing the needs of the UK audiology workforce

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To address nationwide clinical training gaps in UK paediatric audiology, Higher Education Institutions (HEIs) are essential in leading the development of innovative, evidence-based learning strategies for the profession. Recognising the varied roles and skill levels within the audiology workforce, the Manchester Centre for Audiology and Deafness (ManCAD) at the University of Manchester applied agile principles across its undergraduate, postgraduate, and taught doctoral programs. This restructuring included creating a dedicated paediatric pathway within the MSc Audiology programme, launching a PG Cert in Paediatric Audiology that directly addresses the most acute training needs in paediatric assessment and management and reviewing paediatric audiology delivery on all levels across the portfolio of our training programmes. This has increased student satisfaction, improved the uptake of paediatric-focused dissertation projects and boosted learners' aspirations to develop a career in paediatric audiology.

Leveraging the principle of Constructive Alignment, ManCAD restructured the academic modules for the British Academy of Audiology Higher Training Scheme. This new approach integrates clinical staff training with full-time academic programmes using digitally enabling team-based and enquiry-based learning among diverse group of learners accessing classes both online and on-campus.

Similarly, to meet the challenges at the opposite end of the life spectrum, an interdisciplinary team of clinical academics from Nursing, Speech & Language Therapy, Ophthalmology, and Audiology was launched to optimise the integrated training for dementia care.

Learners are encouraged to enrol in the Leadership in Healthcare course unit to help them translate knowledge into impactful leadership practice, resulting in positive change for auditory screening and diagnosis.

Keywords: Paediatric, Education, Agile

Oral Presentation 14

Hearing Disorders Ⅰ
OP 14-1

Auditory processing and its link to phonological awareness in children with a history of otitis media

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Otitis media, or fluid in the ear, is regarded as one of the global burdens that is highly prevalent in Indigenous children in Australia. OM causes fluctuating hearing loss and is reported to be associated with poor listening. Ear health and auditory processing together with phonological awareness data was collected from 468 children aged 4 – 7 years across twenty-one schools in northern parts of Australia, to explore the relationship between ear health, auditory processing and phonological awareness. There is some literature that also reports the impact of the OM on phonological awareness. In this talk, the association between phonological awareness and auditory processing will be explored in children. The differences between remote and urban Indigenous children and their listening and phonological processing skills will be presented. For the Indigenous children, dichotic listening as a measure of auditory processing significantly contributed to their phonological awareness.

Keywords: Auditory processing, Phonological processing, Interdisciplinary research

Oral Presentation 14

Hearing Disorders I
OP 14-2

Neural Correlates of Post-Blast Speech-in-Noise Difficulties: Insights from MEG Recordings

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On March 22, 2016, three bombs exploded in Brussels, two at Zaventem airport and one at the Maelbeek subway station, causing 35 deaths and hundreds of injuries. Among the survivors, many reported auditory difficulties, particularly understanding speech in noise (SiN), despite normal peripheral hearing. This profile is consistent with so-called Hidden Hearing Loss (HHL), with potential nonexclusive mechanisms including (1) noise-induced cochlear synaptopathy, (2) cognitive dysfunctions related to post-traumatic stress disorder (PTSD), and (3) cortical or subcortical blast-related lesions. Understanding these mechanisms could have a major impact on the long-term monitoring and rehabilitation of individuals exposed to blast trauma.

To address this question, we recorded cortical activity using magnetoencephalography (MEG) while participants listened to 5-minute stories in three listening conditions: silence and multitalker noise (+5 and −5 dB signal-to-noise ratio). Twenty survivors and twenty matched controls (age, sex, native language, handedness) were included. All had normal peripheral hearing, but patients showed poorer speech-in-noise comprehension. Participants were seated in a magnetically shielded room and instructed to attend to the target voice. We assessed cortical tracking of speech (CTS) as a neural marker of SiN processing. CTS reflects the synchronization between cortical activity and fluctuations in the speech envelope at frequencies matching linguistic units as phrases/sentences (delta, 0.2–1.5 Hz) and syllables/words (theta, 2–8 Hz), supporting the parsing of speech and comprehension.

Neural activity was localized to bilateral fronto-temporal regions, with no group difference in spatial localization or temporal dynamics. However, survivors exhibited a selective reduction of CTS in the delta band under noisy conditions, but not in the theta band. As delta-band tracking reflects both acoustic and higher-order linguistic mechanisms, this disruption suggests impaired top-down integration of speech information following blast exposure.

In conclusion, post-blast speech-in-noise difficulties may stem from combined alterations in cortical encoding and cognitive processing beyond peripheral hearing deficits

Keywords: Hidden hearing loss, Magnetoencephalography, Cortical tracking of speech

Oral Presentation 14

Hearing Disorders I
OP 14-3

Low Serum Prestin Level as a Potential Biomarker for Sudden Sensorineural Hearing Loss: A Cross-sectional Study

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Background & Purpose: Prestin (SLC26A5) is a membrane motor protein that has a role in amplification and electromotility of the outer hair cells of the cochlea. Sudden sensorineural hearing loss (SSNHL) is a rapidly emerging hearing impairment caused by damage to the cochlear hair cells. Therefore, this study aims to analyze the potential of prestin serum as a biomarker in establishing the diagnosis of SSNHL.
Methods: This study is a cross-sectional analytical observational study conducted at a tertiary hospital in Bali involving 13 SSNHL patients who had not yet received therapy, as well as 12 healthy control subjects. Serum prestin levels were assessed using enzyme-linked immunosorbent assay (ELISA), and audiometric examinations were performed to assess the degree of hearing loss. Data were analyzed using IBM SPSS Statistics version 30.0 computer program. The normal serum prestin level was identified through receiver operating characteristic (ROC) curve analysis. The analysis was further performed with Chi-square or Fisher's exact as alternative tests and logistic regression by controlling the confounding variables to determine the risk factors of SSNHL. Statistically significant result defined as p-value <0.05.
Results: According to the ROC curve analysis, the normal serum prestin threshold was 450.7pg/ml. Serum prestin levels <450.7pg/ml were categorized as low, and >450.7 pg/ml as high. Based on the Fisher Exact test, low serum prestin levels were significantly associated to SSNHL with the OR 7.7 (95% CI 1.159-11.171, p=0.041). Logistic regression analysis was further performed by controlling the confounding variables and showed that low serum prestin level was significantly an independent predictor of SSNHL with an Adjusted OR 15.4 (95% CI 1.028-230.9, p=0.0048).
Conclusion: Low prestin serum levels are significantly promising potential biomarkers in the diagnosis of SSNHL.

Keywords: Prestin, Sudden Sensorineural Hearing Loss, Biomarker

Oral Presentation 14

Hearing Disorders I
OP 14-4

I' Wave as a Possible Indicator of Noise-Induced Cochlear Synaptopathy

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Introduction:
Cochlear synaptopathy, caused by the destruction of synaptic connections due to aging, noise exposure, and ototoxic agents, is defined as auditory dysfunction despite the normal hearing threshold, specifically in challenging situations. One of the main obstacles in synaptopathy studies and the integration and generalization of research findings is the need for a valid diagnostic test. Although the issue of identifying synaptopathy has received considerable critical attention, little agreement is available on a valid and efficient diagnostic method for cochlear synaptopathy.

Material & Methods:
A critical review was conducted on previous animal and human studies addressing cochlear synaptopathy, with particular emphasis on the paired-click paradigm and I' wave electrophysiological assessments. Subsequently, pertinent physiological and biophysical models elucidating excitatory postsynaptic potentials at the inner hair cell ribbon synapse were analyzed. Finally, the feasibility and limitations of I' wave recording were theoretically evaluated, with recommendations for future validation studies.

Results:
A review of the existing evidence and analysis of biophysical modeling data indicate that the I' wave in the auditory brainstem response, particularly when using the paired-click paradigm, represents the excitatory postsynaptic potential (EPSP) generated at the inner hair cell ribbon synapse.

Conclusion:
The present hypothesis attempts to bring forward a non-invasive tool that can investigate synaptic function. It sheds new light on future studies in cochlear synaptopathy by suggesting the I' wave as its biomarker.

Keywords: Cochlear synaptopathy, I' wave, Paired-click paradigm

Oral Presentation 14

Hearing Disorders I
OP 14-5

Incidence, Severity, and Risk Factors of Platinum-Induced Ototoxicity in Pediatric Oncology Patients: A Multi-Center Retrospective Study

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Objective: Platinum-based chemotherapeutic agents, particularly cisplatin and carboplatin, are commonly used in pediatric oncology but are frequently associated with ototoxicity. This study aimed to evaluate the incidence, severity, and risk factors of platinum-induced ototoxicity in Korean pediatric cancer patients.

Methods: We conducted a retrospective cohort study across three tertiary hospitals in South Korea, reviewing the medical records of 314 pediatric oncology patients treated with cisplatin or carboplatin between 2004 and 2024. Hearing function was assessed using audiologic evaluations, including pure-tone audiometry, auditory brainstem response (ABR), and distortion product otoacoustic emission (DPOAE). Ototoxicity was defined as a Chang grade of ≥2a or equivalent threshold shifts on ABR/DPOAE.

Results: Ototoxicity was identified in 146 patients (46.5%). Hearing loss predominantly affected high frequencies (≥4 kHz), consistent with platinum-induced sensorineural hearing loss. Male sex, a diagnosis of medulloblastoma, and treatment with carboplatin were each significantly associated with increased risk. Patients diagnosed before age 11 exhibited significantly worse thresholds across all frequencies ($p < 0.05$). Patients who received radiotherapy showed significantly worse thresholds at low frequencies ($p < 0.001$), although total radiation dose and chemotherapy duration were not independently correlated with hearing loss.

Conclusions: Nearly half of pediatric patients treated with platinum chemotherapy developed ototoxicity, with younger age, male sex, carboplatin use, and head and neck radiotherapy identified as risk factors. These findings highlight the importance of routine hearing surveillance and the consideration of otoprotective strategies in high-risk pediatric patients.

Keywords: Platinum, Ototoxicity, Pediatric

Oral Presentation 14

Hearing Disorders I

OP 14-6

Annual Noise Exposure Among Malaysian Young Adults

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Background: Prolonged exposure to both occupational and recreational noise can lead to noise-induced hearing loss (NIHL). This study aimed to determine annual noise exposure (ANE) levels among Malaysian young adults using the Noise Exposure Questionnaire (NEQ) and to examine differences in ANE values by gender, race, and medical background.

Methods: A culturally modified NEQ assessing ten items across four main domains (occupational, housework, transport and recreational noise exposure) was validated and distributed to 205 healthy young adults (mean age = 22.9, SD = 3.0). ANE values were computed based on participant's reported frequency and duration of exposure, combined with pre-determined mid-intensity levels for each item. Test-retest reliability was assessed on 20 randomly selected participants after a 3-month interval.

Results: The mean ANE value was 71.8 dBA (SD = 7.1). Notably, 16.5% (n = 34) of participants exceeded the NIOSH-recommended limit of 79.0 dBA, indicating that nearly one in six young adults may be at risk for NIHL. Males had significantly higher ANE values compared to females (p = 0.014), while race and medical background showed no significant differences. Prominently, approximately 85% of participants reported never using hearing protection during motorized vehicles use, amplified events, and musical instrument playing.

Conclusion: Recreational and daily lifestyle habits among young adults may contribute to elevated noise exposure, increasing the risk of NIHL. These findings underscore the importance of promoting hearing health awareness and safe listening practices among youth to mitigate preventable hearing loss.

Keywords: Annual Noise Exposure (ANE), Noise Exposure Questionnaire (NEQ), Noise-induced hearing loss (NIHL)

Oral Presentation 14

Hearing Disorders I
OP 14-7

Auditory and vestibular dysfunction in New Zealand Friedreich's ataxia patients

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Friedreich's Ataxia (FRDA) is a rare neurogenetic disease marked by ataxia and progressive peripheral neuropathy and is associated with both hearing loss and vestibular dysfunction. However, few studies have directly compared these sensory impairments within the same patients. This study investigated the extent of auditory and vestibular dysfunction in FRDA and examined their relationship with genotype and disease severity markers.

Twenty-one genetically confirmed FRDA patients (11 female, age 19-72 years) were prospectively recruited from Pūnaha Io | the New Zealand NeuroGenetic Registry and Biobank. Pure-tone and speech audiometry, auditory and vestibular evoked potentials, and video head impulse testing (vHIT) were conducted and evaluated against auditory neuropathy spectrum disorder (ANSD) and bilateral vestibulopathy criteria. Results were compared with the Hearing Handicap Inventory (HHI), genotype, and disease severity using the Scale for the Assessment and Rating of Ataxia (SARA).

Balance issues were the initial presenting symptom in most participants (91%), while 65% developed hearing difficulties. Vestibular dysfunction involving the reflex pathways of one or more semicircular canals (horizontal=81%, anterior=84%, posterior=89%) and/or otolith organs (utricle=85%, saccule=74%) was identified in all but two participants. Vestibular dysfunction did not correlate with audiometric thresholds but was more common and severe in participants with higher HHI scores and with ANSD. Participants with ANSD had worse disease progression, and there was a significant relationship between disease severity and vestibular function.

ANSD and vestibulopathy are common and frequently co-occur in FRDA, implicating VIIIth cranial nerve involvement. Early assessment with auditory evoked potentials and vHIT is essential for timely identification and management of both conditions, particularly in patients with a more severe genotype. Audiologists, neurologists, and physiotherapists should be aware of the spectrum of audiovestibular dysfunction in FRDA patients and how this impacts clinical decision-making, such as referral and management options.

Keywords: Friedreich's ataxia, Auditory neuropathy spectrum disorder, Vestibulopathy

Oral Presentation 14

Hearing Disorders I
OP 14-8

Hearing AIDS: Self-Reported Hearing Loss is Linked to Antiretroviral Therapy with and without HIV

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Purpose: There are nearly 41 million people living with HIV globally. To maintain immune function and prevent spreading the virus, those with HIV must take daily antiretroviral medications (ART). Recently, people without HIV have begun taking these daily ART to avoid contracting the virus. There has been little study on the auditory impact of ART on people with or without HIV, and studies to date have mixed findings on the peripheral and central auditory impacts of ART. The present study sought to evaluate the peripheral and central auditory impacts of ART in people with and without HIV.
Methods: 220 participants were recruited from the VA Portland Health Care System and surrounding community. This included 110 people living with HIV (HIV+), 55 people without HIV taking ART (PrEP), and 55 controls without HIV who had not ART (Control). Participants completed a robust auditory battery, including questionnaires and treatment history. Multivariate ordinal logistic regression was used to evaluate the impact of ART on HHIA.
Results: Participants in the PrEP group had lower high-frequency pure-tone averages than those in the HIV+ or Control groups. Despite this, there was no difference in performance on the Words in Noise test. Most surprisingly, participants in the PrEP group were 18 times more likely to have a mild-moderate or severe hearing handicap as reported on the HHIA than control subjects.
Conclusion: These findings indicate that antiretroviral exposure in HIV- individuals is significantly correlated with an increase in self-perceived hearing handicap outside of explained increases in audiometric thresholds. These participants also demonstrated poorer than expected speech-in-noise performance despite normal pure-tone hearing sensitivity. Additional investigations are necessary to understand the mechanisms driving these differences and to identify if other factors such as health-related anxiety may contribute to the unusually high HHIA in our PrEP group.

Keywords: Self-report, Ototoxicity, HIV

Oral Presentation 14

Hearing Disorders I
OP 14-9

Plasma Cell-Free Mitochondrial DNA as a Novel Biomarker Predicting Treatment Outcome in Sudden Sensorineural Hearing Loss

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Objective:
To investigate whether circulating cell-free mitochondrial DNA (ccf-mtDNA) levels are associated with disease severity and treatment outcomes in patients with sudden sensorineural hearing loss (SSNHL), and to explore its potential as a predictive biomarker for clinical recovery.

Methods:
In this prospective observational study, plasma samples were collected from 50 SSNHL patients and 30 age- and sex-matched healthy controls at a tertiary medical center. Quantitative polymerase chain reaction (qPCR) was used to measure plasma ccf-mtDNA levels before corticosteroid treatment. Hearing outcomes were evaluated after three months using hearing gain, percentage of recovery, and Siegel's criteria. Multivariate logistic regression was performed to identify independent prognostic factors.

Results:
Pretreatment ccf-mtDNA levels were significantly higher in SSNHL patients than in healthy controls (mean ± SD: 8.10 ± 0.35 vs 7.78 ± 0.65 log copies/mL, $P < 0.01$). Patients with good recovery showed higher ccf-mtDNA levels than those with poor recovery (8.29 ± 0.34 vs 8.02 ± 0.33, $P = 0.01$). ccf-mtDNA levels were positively correlated with hearing gain ($r = 0.49$) and percentage of recovery ($r = 0.36$). Multivariate analysis identified early treatment (< 7 days from onset; OR = 7.39, 95% CI 1.32–41.24) and higher ccf-mtDNA levels (OR = 24.63, 95% CI 1.88–323.16) as independent predictors of good hearing recovery.

Conclusion:
Plasma ccf-mtDNA levels are elevated in SSNHL and correlate with better outcomes after steroid therapy. These findings suggest that ccf-mtDNA may reflect cochlear cellular stress, offering a promising translational biomarker for prognosis prediction and individualized treatment planning in SSNHL.

Keywords: Sudden sensorineural hearing loss, Mitochondrial DNA, Biomarker

Oral Presentation 14

Hearing Disorders I
OP 14-10

Self-Perception of Hearing Health among Emergency Medical Service Providers in South Africa

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Background:
Emergency Medical Service (EMS) providers are frequently exposed to high noise levels from sirens, helicopters, road traffic, communication, and medical equipment, placing them at risk for noise-induced hearing loss (NIHL), tinnitus, and related health issues. While occupational noise exposure among EMS providers has been explored internationally, limited research exists in the South African context. This study investigated EMS providers' self-perception of hearing health and awareness of occupational noise hazards.

Method:
A sequential explanatory mixed-methods design was employed. In Phase One, 86 EMS providers across seven South African provinces completed a structured questionnaire assessing noise exposure, symptoms, and hearing protection practices. In Phase Two, semi-structured interviews were conducted with a subset of volunteers to explore lived experiences and coping strategies. Quantitative data were analysed using descriptive and inferential statistics, while qualitative data underwent thematic analysis.

Results:
Most participants reported frequent exposure to hazardous noise, with ambulance sirens identified as the primary source. Sixty-four percent (n=35) experienced tinnitus, 53% (n=29) reported sound sensitivity, 81% (n=44) reported communication difficulties, and 44% (n=22) experienced reduced concentration. Over half had not undergone audiometric testing in the past two years, and hearing protection device (HPD) use was inconsistent. Participants described noise exposure as negatively affecting their physical and mental health, sleep, and social interactions. Qualitative findings revealed recurrent themes of communication challenges, tinnitus-related distress, fatigue, and inadequate employer support. Participants emphasized the need for soundproofing, regular hearing assessments, and education on occupational noise risks.

Conclusion:
EMS providers in South Africa recognize their vulnerability to occupational noise exposure, with self-reported symptoms suggesting early-onset NIHL. The findings underscore the need for regular hearing screening, improved access to HPDs, and context-specific hearing conservation programmes to safeguard auditory health and overall well-being among EMS personnel.

Keywords: Emergency Medical Service Providers, Noise-induced hearing loss, hearing and ear health

Oral Presentation 15

Auditory Screening and Diagnosis Ⅰ
OP 15-1

Detection of hearing loss in Australian Defence Force personnel using a purpose-built portable diagnostic audiometry system

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Background and Objectives: Australian Defence Force (ADF) personnel are exposed to high levels of occupational noise and have a high burden of noise induced hearing loss. There is a need for accurate, portable diagnostics that can be deployed outside conventional sound booths. This study aimed to evaluate a purpose built, tablet based audiometry system for diagnostic use in typical ADF environments, and to characterise hearing thresholds in ADF personnel relative to age matched population norms.

Methods: Current and former ADF personnel were recruited from Australian bases. Pure tone thresholds were measured using a clinical audiometer in a sound booth and using the portable system in both booth and simulated field conditions with 50 dBA background noise. The system used insert earphones under Class 5 earmuffs and a forehead bone conductor, calibrated to ANSI standards. Thresholds were compared across devices and conditions, and to ISO 7029 age matched norms.

Results: Mean air conduction threshold differences between the portable and clinical systems were generally within ±5 dB across 0.5–4 kHz, with greater variability at higher frequencies and for bone conduction. In simulated field conditions, background noise produced small but systematic threshold elevations at some frequencies. A substantial proportion of ADF ears showed thresholds above the 95% age expected range at 3–6 kHz, consistent with early noise induced hearing loss.

Conclusions: A portable tablet based audiometry system can provide clinically acceptable thresholds for ADF personnel in non booth environments while revealing a high prevalence of high frequency hearing loss. Such systems may support earlier detection and management of service related hearing loss.

Keywords: Portable audiometry, Noise-induced hearing loss, Defence

Oral Presentation 15

Auditory Screening and Diagnosis Ⅰ
OP 15-2

A test battery to evaluate solvent-induced auditory dysfunction

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Exposure to organic solvents has been associated with adverse effects on both peripheral and central auditory structures. Experimental studies have shown that solvents such as toluene, styrene, and xylene can damage outer hair cells in animals, while human cross-sectional studies report a higher prevalence of hearing loss and central auditory dysfunction among solvent-exposed workers. Despite this evidence, the most appropriate audiological test battery to assess solvent-related auditory dysfunction remains unclear .This study aimed to identify audiological procedures sensitive to detecting solvent-induced auditory effects. Given that solvent toxicity involves both oto- and neuro-toxic mechanisms, tests assessing peripheral and central auditory pathways were included. Forty-five workers from clinical laboratories primarily exposed to xylene and 45 matched non-exposed subjects (matched by age, gender, and education) formed the study and control groups. Solvent exposure was characterised through workplace airborne xylene measurements and urinary methyl hippuric acid levels. Personal noise dosimetry over a full work shift (8 hours) was also performed in exposed workers to account for potential confounding noise exposure. The audiological test battery included pure-tone air and bone conduction thresholds, immittance testing, acoustic reflex thresholds, distortion product otoacoustic emissions (DPOAEs), auditory brainstem response, temporal resolution testing, dichotic digits test, masking level difference, pitch pattern sequence, and the hearing-in-noise test. Group differences were analysed using ANCOVA, with age as a covariate. For tests showing significant differences, score distributions were examined to determine those with the greatest discriminatory power. Solvent-exposed subjects demonstrated significantly poorer performance across most measures. Pure-tone audiometry, dichotic digits, pitch pattern sequence, and hearing-in-noise tests showed the greatest sensitivity to solvent-related effects. Additional research is needed to clarify the utility of DPOAEs for identifying cochlear involvement. These findings support the inclusion of targeted peripheral and central auditory tests in clinical assessments of solvent-exposed workers.

Keywords: Solvent exposure, Hearing loss, Test battery

Oral Presentation 15

Auditory Screening and Diagnosis I
OP 15-3

Sound or Speech? Evaluating Stimulus Type for Pediatric Directional Hearing Tests

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Background and Objective
In early intervention for childhood hearing impairment, clinical focus is typically placed on optimizing speech perception in noise, which is essential for successful participation in educational and social environments. Sound localization, by contrast, often receives less attention. Modern high-quality hearing devices, however, have the potential to substantially improve spatial hearing abilities, particularly directional discrimination. Improvements in localization can often be observed just weeks after initial hearing aid fitting, even in very young children.
At present, no standardized procedure exists for the quantitative assessment of sound localization in routine clinical practice. Tests commonly employ broadband noise stimuli, which may be partially filtered or suppressed by advanced hearing devices, thus limiting their validity. The present study investigates whether speech stimuli consisting of two-syllable words provide an advantage over conventional noise stimuli for sound localization testing in children with hearing impairment.
Methods
Ten normal-hearing children and ten children with clinically significant hearing loss (aged 6–10 years) were examined. Two localization tests using different acoustic stimuli, two-syllable words and narrowband noise were conducted, and the angular localization error was determined for each condition.
Results
Preliminary findings indicate no substantial dependence of localization performance on the stimulus type. Neither the normal-hearing group nor the hearing-impaired group showed a clear preference for speech or noise stimuli.
Conclusion
For school-aged children, both two-syllable speech stimuli and broadband noise stimuli appear equally suitable for use in sound localization tests.

Keywords: Directional hearing, Pediatric audiology, Hearing Aid

Oral Presentation 15

Auditory Screening and Diagnosis I
OP 15-4

Evaluating the Effects of an Individually-Modified Chirp Stimulus for Auditory Brainstem Response Recording

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The small volume of an infant's ear canal results in higher ABR stimulus amplitude values compared to an average adult, which affects response amplitude and threshold. Furthermore, high inter-individual variability in ear canal volume also influences the stimulus intensity at the tympanic membrane.
Goal: To improve the accuracy of ABR by modifying the acoustic stimulus, taking into account individual variations in the external ear architecture.
Materials and Methods. To modify the chirp stimuli, the real-ear to coupler difference (RECD) was measured. Based on the RECD, the amplitude-frequency characteristic of the stimulus was individualized. Subsequently, ABR recordings were performed using both a standard Chirp and a modified RECD-Chirp, with an assessment of the amplitude and latency of wave V. A total of 109 paired numerical values for both stimuli, applied to children aged from 2 months to 17 years, were analyzed. It was also evaluated which stimulus correlated better with pure-tone audiometry (PTA) data and at which frequencies; the difference between the ABR threshold and the behavioral threshold was calculated for 24 ears (12 children).
Results. Statistically significant differences in latency were found ($p = 0.05$). The use of the RECD-Chirp resulted in a shorter latency period. Differences in amplitudes weren't significant ($p > 0.05$). The RECD-Chirp typically elicited a response with a steeper rising slope or a more distinct peak morphology.
The smallest mean difference was observed between the ABR threshold and the mean PTA threshold at 2000-4000 Hz and the threshold at 2000 Hz. For the RECD-Chirp, it was only +1.9 dB and +1.7 dB, respectively, whereas for the standard Chirp, it was +4.8 dB and +5.1 dB, respectively (correlation for RECD-Chirp $r = 0.96$; the differences between Chirp and RECD-Chirp were significant at $p < 0.001$). The RECD-Chirp demonstrated a significantly smaller mean difference across all PTA measures.

Keywords: Auditory Brainstem Response, RECD, Acoustic stimulation

Oral Presentation 15

Auditory Screening and Diagnosis I
OP 15-5

Improving Early Detection of Developmental Risk in Young Infants: Implementing a New Screening Tool as an Indirect Measure of Post-Natal Hearing Loss

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Background: Early identification of hearing loss is essential for optimal language and cognitive development. While newborn hearing screening detects congenital loss, many cases are acquired or late-onset and therefore often go undetected, remaining undiagnosed until preschool or school age. Because early language development also depends on the quality of auditory input, monitoring language skills provides an important indirect measure of hearing capabilities. Well-baby clinic (WBC) nurses, who routinely follow infants' development, can be trained to identify early language delays that may signal broader auditory or developmental concerns.
Purpose: To develop and implement the BABEL (Behavioral Assessment of Babies' Early Language), a screening tool for WBC nurses for identifying infants at risk for language delay and referring them for comprehensive evaluation and early intervention.
Methods: BABEL includes a parent questionnaire (hearing, production, understanding), direct nurse observation, and evaluation of parent–infant interaction. Eleven WBC nurses received structured training and supervision by Communication Disorders Clinicians (CDCs), and 1,030 infants from low-socioeconomic neighborhoods were assessed. Clinical evaluations of the same infants by CDCs served as the gold standard.
Results: BABEL demonstrated high accuracy in identifying delays when administered by trained nurses. At 12 months, the parent questionnaire of the BABEL correctly identified 81% of at-risk infants (high sensitivity) and 64% of typically developing infants (moderate specificity). At 9 months, the nurse observation correctly identified 86% of at-risk infants (very high sensitivity) and 53% of typically developing infants (lower specificity).
Conclusions: BABEL is a feasible and sensitive tool for early language screening in community settings. By lowering the age of detection to 9 months, it enables earlier referral for diagnosis and intervention. While mild hearing loss may still go unnoticed, more severe to profound cases are likely to be detected once referred to full evaluation, due to their impact on early language development.

Keywords: Post-natal hearing loss, Indirect measure of hearing in infants, New screening tool in community

Oral Presentation 15

Auditory Screening and Diagnosis I
OP 15-6

Effect Of Insertion Depth of Insert Earphones on Hearing Thresholds

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Introduction: Pure-tone audiometry is gold standard for hearing assessment. Insert earphones widely preferred for their high interaural attenuation, reduced ambient noise interference and better patient comfort. However, threshold measurements accuracy can be affected by insertion depth.
Purpose: This study aims to evaluate the effect of three different insertion depths of ER-3A insert earphones (deep, intermediate, and shallow) on pure tone audiometric thresholds in normal-hearing adults and to provide evidence-based recommendations for standardized insert earphone placement in clinical audiology practice.
Method: Thirty-six participants (18–25 years) with normal hearing underwent audiometric testing using the Hughson-Westlake method. Thresholds were recorded at 250–8000 Hz using 13 mm foam tips, with deep insertion involving full placement inside the canal, intermediate partially inserted, and shallow with minimal canal entry. The order was randomized. MANOVA was applied to determine significant differences.
Results: Deep insertion yielded the lowest thresholds 11.8 dB at 250 Hz, improving progressively to 5.4 dB at 8 kHz. Intermediate insertion showed elevated thresholds, notably 20 dB at 250 Hz. Shallow placement produced the poorest low-frequency thresholds (30 dB at 250 Hz), though high frequencies remained less affected.
Significant differences were noted between deep and intermediate insertions at 250 Hz, 500 Hz and 1 kHz ($p = 0.007$), but not at higher frequencies. Comparing shallow and intermediate insertion showed significant differences at 250 Hz, 500 Hz, 1 kHz and 8 kHz ($p = 0.001$), except at 2 kHz and 4 kHz.
Acoustically, shallow insertion increases ear canal volume and allows more ambient noise, particularly affecting low frequencies. High frequencies remain less dependent on air volume and therefore less impacted.
Conclusion: Insertion depth significantly affects low-frequency thresholds. Deep insertion of ER-3A earphones is essential for accurate audiometric results, minimizing variability and enhancing diagnostic reliability. Standardized placement is recommended in clinical and research settings.

Keywords: Inserts, Insertion depth, Thresholds

Oral Presentation 15

Auditory Screening and Diagnosis Ⅰ
OP 15-7

Echoes of Change: Exploring OAE-Based Hearing Screening for Early to Late Teens

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Background: Young adults are at risk of noise-induced hearing loss. Early detection of cochlear dysfunction is crucial to reduce long-term effects. Distortion product otoacoustic emissions (DPOAEs) show promise as a non-invasive and widely applicable method for detecting high-frequency hearing loss (HFHL), yet are underused in adolescent screenings.
Objective: To assess the relationship between DPOAE signal-to-noise ratios (SNRs) and pure-tone audiometry (PTA) thresholds in adolescents aged 13 to 18, focusing on the predictive ability of SNR values at age 13 for HFHL at age 18, and the diagnostic utility of SNR values for HFHL at age 18.
Setting and design: As part of the Generation R Study in Rotterdam, this research followed participants from April 2016 to May 2024. DPOAEs were recorded at ages 13 and 18; PTA was conducted at age 18. Only participants with normal middle ear function based on tympanometry were included.
Methods: In the data analysis, the receiver operator characteristic (ROC) is used to evaluate how well the SNR can distinguish between HFHL and normal hearing. HFHL is defined as PTA thresholds ≤15 dB at 500 and 1000 Hz, and >15 dB averaged across 3, 4, 6, and 8 kHz. For different DPOAE threshold values the sensitivity and specificity of the model is evaluated.
Results: Analysis of 3,463 ears at age 18 showed that SNR values distinguished HFHL from normal hearing with an area under the curve (AUC) of the ROC of 0.830. At age 13, SNRs predicted HFHL at age 18 with an AUC of 0.743.
Conclusions: SNR values from DPOAEs show potential for both current and predictive screening of HFHL in adolescents, supporting early detection and prevention of noise-induced hearing loss. The potential for hearing screening in adolescents will be explored in a follow-up research.

Keywords: Otoacoustic Emissions, Adolescents, High-Frequency Hearing Loss

Oral Presentation 15

Auditory Screening and Diagnosis Ⅰ
OP 15-8

Assessment of Ambient Noise Levels in Audiometric Booths: A Compliance Study with ISO 8253-1

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Objective: While the international standard ISO 8253-1 specifies maximum permissible ambient noise levels for reliable audiometry, other environmental conditions are not defined. This study aimed to measure ambient noise levels within audiometric booths at professional audiology institutions in Korea to determine their compliance with ISO 8253-1 standards.

Methods: We selected 27 institutions where audiologists perform audiometry using Class 1 equipment. Internal and external ambient noise levels of the audiometric booths (N=43 total booths) were measured three times for one-minute durations using sound level meter in business hours. The mean 1/3 octave band spectra of the internal noise were compared against the ISO 8253-1 criteria to assess compliance. Additionally, the noise attenuation performance of one representative single booth and one double booth was evaluated by presenting external noise at 63 dBA and 85 dBA.

Results: A significant portion of the booths, 15 out of 43 (34.9%), failed to meet the ISO 8253-1 standards. Non-compliance was particularly evident in the low-to-mid frequency range (above 250 Hz and below 2000 Hz), which is critical for audiometric testing. High external noise was not the sole factor; in some booths, the internal noise level was found to be higher than the external noise, suggesting issues with internal sources like ventilation. The performance test confirmed the double booth's superior attenuation. Specifically, it provided at least 5 dB greater noise reduction in the 250-2000 Hz range, with the maximum performance difference reaching 40.01 dB.

Conclusion: To establish reliable testing environments and provide accurate audiological services, continuous research is necessary. More specific international guidelines are needed regarding pre- and post-installation environmental assessments, booth construction parameters (e.g, wall thickness), and the use of environmental simulations prior to installation.

Keywords: Audiometry, Audiometric booth, Standard

Oral Presentation 16

Hearing Aids I
OP 16-1

Converging behavioral and neurophysiological hearing aid benefits of deep-neural-network based noise reduction

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Purpose:
This study compared two hearing aid noise reduction strategies in realistic environments to determine whether a deep neural network noise-reduction system (DNN-NR) improves speech understanding and listening-related brain activity compared with a conventional adaptive noise-reduction system.

Methods:
Twenty-four adult experienced hearing aid users participated in an eight-week cross-over field trial. Participants wore Phonak Audéo Infinio-Sphere hearing aids with closed domes. One group began with the DNN-NR mode paired with a fixed directional microphone, termed spherical speech-in-loud-noise (SSLN), for four weeks before switching to the conventional adaptive noise-reduction and directional system, termed speech-in-noise (SPIN). The second group followed the reverse order. Speech identification between systems was measured using a speech-stream segregation task containing target words of high or low lexical frequency. Neural responses were simultaneously recorded with functional near-infrared spectroscopy (fNIRS) and electroencephalography (EEG). Subjective preference between systems was also assessed in a three-person conversation within a simulated realistic acoustic environment.

Results:
Speech identification was significantly higher in the DNN-NR system compared to the SPIN system across both lexical conditions. fNIRS revealed tempered blood-oxygen concentration for the DNN-NR system in the right dorsolateral prefrontal and left superior temporal cortices, suggesting reduced cognitive and auditory processing demand compared to SPIN. EEG showed enhanced theta-band activity for DNN-NR in the right temporoparietal junction relative to SPIN, consistent with improved speech tracking and attention. DNN-NR was preferred approximately 2.5 to 1 over SPIN across participants. Variance in lab responses may relate to field trial assignments.

Conclusion:
Converging behavioral and neurophysiological evidence indicated that the DNN-based noise reduction system improved speech understanding, accompanied by reduced activation in brain regions associated with cognitive and auditory processing alongside stronger neural alignment indicative of enhanced attentional engagement towards speech.

Keywords: Hearing aids, Deep neural network, Neuroimaging

Oral Presentation 16

Hearing Aids I
OP 16-2

Better Measurement of Hearing Aid Use

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Purpose:
This systematic review synthesises the literature on objective versus subjective measurement of hearing aid use, and evaluates their quality using the COnsensus based Standards for the Selection of health Measurement INstruments (COSMIN) methodology.

Methods:
A systematic search of nine databases (Medline, Embase, PsycInfo, ComDisDome, PubMed, CINAHL, Web of Science, ASSIA, and Scopus) was conducted from inception. Studies were eligible if they contained cross-validated results of hearing aid usage in adults, either as their primary aim or as a secondary outcome.

Results:
6818 studies were screened and 24 eligible studies were identified. Of these 24 studies, only 7 investigated cross-validation as their primary aim. Studies that included numerical values in self-report measures had greater content validity, however study quality varied due to inconsistency of psychometric properties in self-report measures, heterogeneity of methods and inconsistency in recording hearing aid use data, both objective and subjective.

Conclusion:
This systematic review is the first to assess the quality of studies measuring cross-validated hearing aid use using COSMIN methodology. It reinforces the need for future development of a standardised measure of cross-validated hearing aid use.

Keywords: Hearing Aid, COSMIN, Cross-validation

Oral Presentation 16

Hearing Aids I
OP 16-3

Do Premium Hearing Aids Offer Better Outcomes Than Basic Models? A Systematic Review and Meta-Analysis

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Hearing aid (HA) technology has advanced significantly, with devices ranging from basic to premium models that include features aimed at enhancing speech understanding and sound quality. Comparing these technology levels is essential for improving hearing care accessibility and affordability. This systematic review and meta-analysis assessed user outcomes associated with premium versus basic hearing aids. A comprehensive literature search across four databases was conducted using PRISMA guidelines, with inclusion criteria based on the PICOST framework. Outcomes of interest included self-reported, behavioral, and real ear measures. Fifteen studies met inclusion criteria, most of which were crossover randomized controlled trials (7), with a parallel randomized controlled trial (1), a cross-sectional design (1), quasi-experimental (2), and unspecified designs (4). Across these studies, participants were included. Meta-analysis of nine studies (7,952) found no significant overall advantage for premium hearing aids across pooled self-reported and behavioral outcomes. While some individual studies showed modest benefits for premium devices, particularly in speech understanding and listening effort under controlled conditions, others indicated little to no difference. One study comparing real-ear measurements favored premium devices. Overall, results support the hypothesis that basic hearing aids are non-inferior to premium models, though individual outcomes may vary depending on user needs and listening contexts.These findings emphasize the value of clinical judgment in technology selection and highlight the need for future research to standardize reporting of hearing aid technology levels, incorporate qualitative methods, and explore how advanced features influence everyday use and listening effort.

Keywords: Hearing aid outcomes, Hearing aid features, Technology level

Oral Presentation 16

Hearing Aids I
OP 16-4

Comparison of Real-Ear Aided Response and Target Deviation Between AirPods Pro 2 and Hearing Aids in Japanese Listeners: A Verification-Based Evaluation

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Background:
Hearable devices such as Apple's AirPods Pro 2 have attracted attention as alternative hearing support tools for individuals with mild to moderate hearing loss. However, scientific verification using Real-Ear Measurement (REM) remains limited. This study presents Japan's first verification-based comparison between the AirPods Pro 2 and hearing aids, focusing on their deviations from prescribed target gain.

Objectives:
To quantify differences between the prescribed target (NAL-NL2) and the Real-Ear Aided Response (REAR) of AirPods Pro 2 compared with hearing aids across simulated audiometric configurations. It has been shown that the NAL-NL2 fitting formula is more suitable for Japanese speakers than the DSL v5 (Furuki et al, 2021; Sano, 2023).

Methods:
Three simulated audiograms (low-frequency, flat, and high-frequency sloping hearing loss; mean 40dBHL) were tested in three normal-hearing adults using the International Speech Test Signal (ISTS) at 55, 65, and 75dBSPL (Holube et al, 2010; Mueller et al, 2017). The AirPods Pro 2 were measured in "Transparency Mode," and the hearing aids (ReSound NX4 ITC-DWC) were fitted using the NAL-NL2 first fit. The Microphone Location Effect (MLE) was taken into account (Dillon, 2012). Measurements were performed with the Aurical FreeFit system. Paired t-tests with Bonferroni corrections were applied using R (ver. 4.5.1).

Results:
The AirPods Pro 2 tended to provide sufficient low-frequency gain but reduced amplification above 4000Hz. The largest target deviation (mean 14dBSPL) occurred around 1000Hz in the low-frequency loss condition.

Conclusions:
Although the AirPods Pro 2 lack individualized fitting via REM and validation procedures, their amplification characteristics approximate those of hearing aids in the low-frequency range. Considering linguistic differences in the Band Importance Function (BIF) for Japanese (Tachiiri & Minami, 2023), these devices may offer partial yet practical hearing support for Japanese individuals with hearing loss. This represents the first verification-based study of AirPods Pro 2 conducted in Japan.

Keywords: Real-Ear Measurement, AirPods Pro 2, Hearing Aids

Oral Presentation 16

Hearing Aids I
OP 16-5

Geographic Distance and Hearing Aid Adherence in 2,091 adults: Datalogging Evidence from a Chilean Public Hospital

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Purpose: Hearing aid adherence varies internationally (1-57% non-use), with data predominantly based on subjective self-reports. Geographic accessibility represents a potential barrier; however, objective evidence examining this relationship remains limited in Latin America. This study determined the relationship between geographic distance and objective hearing aid adherence among adults who visited a Chilean public hospital.

Methods: This retrospective study analysed records from September 2017 to January 2020 at Hospital Hernán Henríquez Aravena, Temuco, Chile, located in one of the country's most rural regions. Participants: A total of 2,091 adults (mean age 74.7±11.8 years, 52.2% female) with complete audiograms (0.25-8 kHz). Patients were categorized by residence distance from the health center: Zone 1 (0-15 km), Zone 2 (16-50 km), and Zone 3 (greater than 50 km). Objective use was measured via datalogging at three sessions: 2.4 weeks (T1), 8.0 weeks (T2), and 21.0 weeks (T3) post-fitting. Analyses included Kruskal-Wallis tests comparing usage across zones and multivariate logistic regression.

Results: Geographic distribution: 53.7% Zone 1, 81% urban/mixed communes, and 19% rural districts. Median daily use remained consistently high: 10.0 hours (interquartile range: 6.0-13.0) at T1 (n=1,765), 8.9 hours at both T2 (n=1,252) and T3 (n=410). Critically, geographic distance had no significant impact on use (all $p > 0.05$). Median use was 10.0 hours/day across all zones at T1, and 9.0-10.0 hours/day at subsequent sessions. High use (greater than or equal to 9 hours/day) remained stable: 61.2% (T1), 56.9% (T2), 56.1% (T3). Non-use was minimal: 3.6% (T1), 2.1% (T2), 1.5% (T3).

Conclusions: Geographic distance was not a barrier to hearing aid use in this rural region. Objective datalogging revealed 96.4% adherence (median 10 hours/day) regardless of distance or rural/urban residence. These findings challenge assumptions about geographic accessibility limiting adherence and support expansion of teleaudiology and remote monitoring for geographically dispersed populations

Keywords: Hearing Aids, Adherence, Datalogging

Oral Presentation 16

Hearing Aids I
OP 16-6

Clinical Efficacy of Binaural Beamforming (Front Focus) in Patients With Bilateral Sensorineural Hearing Loss

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Directional microphones are essential for improving speech understanding in noisy environments. However, conventional directional microphones have the disadvantage of reducing spatial cues because they attenuate environmental sound information. Binaural beamformers allow hearing aid users to exchange audio data between both ears, forming a narrow directional pattern aimed at the speaker in front of the listener. In this study, we investigated the audiological benefits of binaural beamformers in patients with bilateral, symmetric, moderate sensorineural hearing loss. Fifty patients were propectively enrolled, and their audiological performance including the QuickSIN test and sound localization test was compared with and without the activation of binaural beamforming (Front Focus, GN ReSound). The results demonstrated that hearing aid use improved speech understanding in noisy environments compared to unaided listening. Notably, activation of the binaural beamformer significantly speech perception in noise, as shown by the QuickSIN results. The improvement in speech understanding between the Front Focus "on" and "off" conditions became more pronounced as background noise levels increased. Importantly, fitting with the binaural beamformer did not degrade spatial cues, as evidenced by improved sound localization performance. In conclusion, binaural beamforming substantially improves speech perception in noisy environments without compromising spatial hearing.

Keywords: Binaural beamformer, Directional microphone, Bilateral sensorineural hearing loss

Oral Presentation 16

Hearing Aids I
OP 16-7

Motion-Aware Hearing Aid Noise Management Reduces Listening Effort and Stress: Evidence from Heart Rate and Pupillometry

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Objectives: Head and body movements affect real-world hearing, yet are often excluded from clinical hearing-aid evaluations. This study introduces a VR-based method in an anechoic chamber with a 64-speaker array, allowing natural movement during a two-stage listening task. We tested whether wrist-based heart rate recordings and pupillometry could reflect listening difficulty and hearing-aid performance.
Design: Thirty-two participants completed a speech localization and comprehension task with either two or four interfering talkers. Heart rate and pupil dilation were measured as indicators of listening stress and effort. Two hearing aids were tested—one using head movement data for steering of noise management, the other not.
Results: More interfering talkers led to reduced speech comprehension and increased heart rate and pupil dilation. Importantly, listening with the hearing aid that steered by head motion resulted in lower physiological stress despite similar speech comprehension. Moreover, heart rate and pupil dilation were positively correlated on a trial-by-trial basis.
Conclusions: VR combined with heart rate monitoring enables realistic hearing-aid evaluation, improving ecological validity in hearing research. Motion-aware noise management may reduce listening stress and effort.

Keywords: Hearing aids, Virtual Reality, Listening Effort

Oral Presentation 16

Hearing Aids I
OP 16-8

Hearing Aid Parameters for Enhanced Music Sound Quality – A Literature Review

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Introduction & Purpose
Music plays a vital role in human quality of life, including for individuals with hearing impairments (HI). Sensorineural Hearing Loss (SNHL) can significantly impact music perception due to damage affecting frequency selectivity, pitch perception, and sound discrimination. Current HA prescriptions pose challenges in adequately representing the dynamic and frequency range of music signals.
Recent literature highlights the importance of improving music sound quality for HI listeners through developments in Digital Signal Processing (DSP) and hardware of hearing aids (HAs). Despite historical focus on enhancing speech intelligibility, there is a growing emphasis on the significance of improving music sound quality for HI users. This literature review aims to summarize existing evidence and identify key improvements for music perception through HAs.
Methods
The literature review analysed studies assessing HA parameters and music sound quality with HI listeners. Peer-reviewed research, grey literature, and manufacturer specifications were examined to highlight trends, challenges, and recommendations in programming HAs for music.
Summary
The review identified limitations in current research, such as the exclusive use of recorded music samples and inconsistencies in participant audiogram profiles. Key findings suggest the importance of large input dynamic range, linear or semi-linear compression, wider frequency bandwidth, and exploring non-linear frequency compression and directional microphone settings. Recommendations were made for future research to explore live music settings, varied audiometric profiles, and preferences of experienced listeners, in order to develop evidence-based HA fitting protocols tailored for music lovers.
Conclusion
Addressing the identified gaps in the literature through evidence-based research is crucial for developing tailored HA protocols to enhance music sound quality for HI individuals. By investigating live music settings and expert listener preferences, future studies can contribute to more effective strategies for optimizing music perception through HAs.

Keywords: Music, Hearing aids, Hearing loss

Oral Presentation 17

Auditory Processing II
OP 17-1

Neural representation of spatial release from masking

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Spatial release from masking is a well-established measure of individual sensitivity to spatial hearing. The present study extends beyond traditional behavioral assessments to examine the neural representation of spatial release from masking, employing neural speech tracking as a function of angular separation. The current study focuses on (1) the correlation between neural representations and behavioral metrics, (2) the effect of target-motion release from masking on auditory attention, and (3) differences in behavioral and neural measures between systematic versus random angular separation conditions. Twenty young adults with normal hearing participated in a continuous number categorization task in multi-talker noise, instructed to indicate whether detected numbers in the concatenated monosyllabic target speech stream were greater or less than five. Two masker streams (one male and one female) were presented together from the front loudspeaker, while the target stream was either co-located with or spatially separated from the maskers. The task was performed under two conditions: (1) progressively moving target, and (2) randomly moving target. With a spatial resolution of 7.5° and at −9 dB TMR, the target stream moved back and forth between −60° and +60° in the progressively moving condition, whereas it was randomly positioned within that range in the randomly moving condition. Electroencephalography (EEG) was recorded during the categorization task. Our analysis revealed higher task accuracy in the co-located condition and a slower spatial release from masking for the progressively moving target compared to the randomly moving target. A wider separation between the target and the maskers (around 30°) was required to reach the ceiling level of accuracy in the progressively moving condition. In the EEG analysis, we hypothesized that variations in neural speech tracking coefficients as a function of angular separation would closely reflect the behavioral curve of spatial release from masking.

Keywords: Spatial release from masking, Moving target, Neural speech tracking

Oral Presentation 17

Auditory Processing II
OP 17-2

Cognitive and Linguistic Influences on Dichotic Listening: A Study Across the Lifespan

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Introduction: Dichotic listening (DL) is a well-established, non-invasive behavioral technique used to assess hemispheric differences in processing speech and non-speech auditory signals (Kimura, 1961). First introduced by Broadbent (1954), DL involves simultaneous presentation of two different auditory stimuli, one to each ear, enabling the study of functional brain lateralization.
Aim: This study investigated the effects of maturation and aging on dichotic listening (DL) performance using native (Brazilian Portuguese) and non-native (English) consonant-vowel stimuli.
Methods 60 subjects being 20 typical development children between the ages of 7 and 12 years (9 boys, mean age 9.0 ± 1.67), 20 young adults between ages of 22 and 32 years (14 men, mean age 27.9 ± 2.53) and 20 elderly between the ages of 60 and 80 years (6 men, mean age 67.0 ± 6.99). The right-ear advantage (REA) was examined under free and directed attention conditions, alongside with cognitive tasks assessing attention and auditory working memory.
Results: revealed a significant REA in children and adults, but not in elderly participants, supporting the HAROLD model of reduced hemispheric asymmetry in aging. Adults outperformed children and elderly in both cognitive and DL tasks, highlighting the impact of maturation and age-related decline. Directed attention enhanced the REA in adults, while elderly participants showed reduced performance, indicating age-related declines in cognitive control. Non-native stimuli elicited stronger top-down cognitive involvement, particularly in children and adults.
Conclusion: This study provides further evidence for the interplay between bottom-up sensory processing and top-down cognitive control in dichotic listening. Findings highlight the impact of maturation and aging on auditory processing. Results also underscore the importance of linguistic familiarity in modulating REA, with non-native stimuli eliciting stronger top-down cognitive involvement. These findings have important implications for understanding auditory processing across the lifespan and for developing interventions for individuals with auditory or cognitive impairments.

Keywords: Auditory Processing, Cognitive, Linguistic

Oral Presentation 17

Auditory Processing II
OP 17-3

Exploring the Effects of Acoustic Characteristics and Meaningful Sounds on Medial Olivocochlear System Activation: Evidence from Otoacoustic Emission Suppression Studies

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Introduction:
The Medial Olivocochlear System (MOCS) modulates outer hair cell activity to improve auditory perception in noise. However, the extent to which the acoustic structure and familiarity of sounds influence MOCS activation remains unclear. This study integrates two investigations examining (i) the effects of broadband-like nature sounds and Quranic recitations, and (ii) phase-variant Schroeder Harmonic Complexes on MOCS function, as measured through otoacoustic emission (OAE) suppression.

Methodology:
Two cross-sectional studies were conducted among normal-hearing participants. The first involved 11 children (aged 8–11 years) who underwent transient-evoked OAE (TEOAE) suppression testing using broadband noise (BBN), three nature sounds (ocean, rain, waterfall), and two Quranic recitations (Al-Fatihah and Yasin) at 60 dBA across 1–4 kHz. The second study involved 26 adults who underwent distortion-product OAE (DPOAE) suppression testing with positive and negative phase Schroeder Harmonic Complexes (c = +1, –1) presented contralaterally at 1–6 kHz.

Results:
Both studies revealed frequency-dependent MOCS activation, with greater suppression observed at 1–2 kHz. Waterfall sound, broadband noise, and Al-Fatihah recitation produced the largest TEOAE suppression with large effect sizes. Negative-phase Schroeder Harmonic Complexes demonstrated greater DPOAE suppression than positive-phase complexes, also supported by large effect sizes.

Conclusion:
Stimuli with more uniform amplitude and energy distribution at the basilar membrane level (negative-phase Schroeder Harmonic Complexes, white noise, waterfall) and those inducing a habituation effect through familiarity (Al-Fatihah) enhance MOCS strength. These findings suggest that both acoustic characteristics and cognitive-emotional familiarity modulate efferent auditory activity. This dual mechanism broadens our understanding of MOCS function and supports the development of sound-based auditory training and therapeutic applications.

Keywords: Medial olivocochlear system, Otoacoustic emission suppression, Sound characteristics

Oral Presentation 17

Auditory Processing II
OP 17-4

Association Between MoCA Scores and Auditory Processing Improvements Following Transcutaneous Auricular Vagal Nerve Stimulation

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The behavioural effects of vagus nerve stimulation (VNS) and observed activation in the auditory cortex with transcutaneous auricular VNS (taVNS) raise questions about their potential impact on auditory processing. This study aims to investigate is there a relationship between cognitive abilities and auditory processing changes following transcutaneous auricular vagal nerve stimulation.

The study investigated 70 participants with normal hearing using the Montreal Cognitive Assessment (MoCA) test. The participants were divided into two groups: a control group of 30 participants (mean age 23.30 ± 3.48 years) and a study group of 40 participants (mean age 23.20 ± 2.35 years). The study group received taVNS through their left ear, while the control group received sham stimulation with the stimulator closed and the electrodes placed in their left ear. Both groups were evaluated using frequency patterns test (FPT) and duration patterns test (DPT) scores before and immediately after the procedure. An increase in scores was observed in eight subcategories analysed ($p<0.05$). We calculated the influence on central auditory processing (CAP) tests for each individual and applied a Pearson correlation analysis. There was no correlation between the MoCA test and the influence on CAP tests ($p>0.05$).

The results of our study showed that MoCA test results do not affect taVNS efficacy on CAP.

Keywords: TaVNS, Auditory Processing, Cognitive Abilities

Oral Presentation 17

Auditory Processing II
OP 17-5

Exploring the Relationship Between Speech-in-Noise Recognition and Academic Performance in Primary School Children

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Background: Effective listening is crucial for learning, with speech understanding in noise being a key component. While the impact of noise on academic success has been well-investigated, less is known about how individual speech-in-noise comprehension ability relates to specific educational outcomes. This study investigates the association between speech-in-noise recognition and academic achievement in primary school children.
Methods: 108 children (55 Grade 3, 53 Grade 5) at primary schools in Victoria, Australia completed a gamified listening assessment using the Sound Scouts platform and standardised academic testing of literacy and numeracy ability. Correlations between speech-in-noise ability and academic outcomes were analysed.
Results: A significant relationship was found between speech-in-noise ability and reading performance in the combined student cohort. Grade 3 children showed significant correlations between speech-in-noise ability and literacy measures (reading, grammar/punctuation, writing, spelling). These interactions between speech-in-noise and literacy abilities were not seen in the Grade 5 children. No significant correlations were observed between speech-in-noise ability and numeracy performance in either cohort.
Conclusions: The association between speech-in-noise ability and literacy in younger children suggests an overlapping process in the acquisition and development of these skills. Given the association of speech-in-noise ability and academic performance was only identified on literacy measures and not numeracy, this suggests that the association is driven by more than solely a disruption of information transfer. This research highlights the importance of identifying the skills that support the ability to learn in challenging listening environments, as well as the role that classroom noise itself plays in learning.

Keywords: Speech-in-noise, Learning outcomes, Phonological awareness

Oral Presentation 17

Auditory Processing II
OP 17-6

Effect of Audiometric Configuration on Binaural Temporal Fine Structure Sensitivity in Adults with Sensorineural hearing loss

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Purpose / objective: Temporal fine structure (TFS) cues are crucial for pitch perception, sound localization, and speech understanding in noise. Hearing loss can impair TFS sensitivity, but the role of audiometric configuration remains unclear. This study compared binaural TFS sensitivity between adults with sloping and rising/flat sensorineural hearing loss (SNHL).
Methods: This cross-sectional study included 47 adults (32 sloping, 15 rising/flat) aged 18–50 with bilateral mild to moderate SNHL (26–55 dB HL). All participants had normal outer and middle ear status, were right-handed,
and had no cognitive impairment. TFS sensitivity was measured using the TFS- Low Frequency (TFS-LF) test at 250, 500, and 750 Hz, and the TFS- Adaptive Frequency (TFS-AF) test at interaural phase differences (IPDs) of 45° and 135°.
Results: For the TFS-LF test, average thresholds were poorer in the sloping group at all frequencies, but differences were insignificant ($p > 0.05$). For the TFS-AF test, thresholds at IPD 135° were significantly higher than at IPD 45° ($p < 0.001$), with no significant group effect. Significant correlations were observed between the thresholds of the TFS-LF and the TFS-AF test.
Conclusion: Based on the results of the TFS-LF and TFS-AF tests, there is no significant difference in TFS sensitivity between the two groups. Furthermore, TFS sensitivity is not determined solely by absolute hearing thresholds across different frequencies, and factors like age, cochlear health, neural timing, and individual variability may also affect outcomes.

Keywords: Temporal Fine Structure, Sensorineural Hearing loss, Interaural Phase Difference

Oral Presentation 17

Auditory Processing II
OP 17-7

A questionnaire that can help diagnose auditory processing disorder and quantify degree of disability

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In a search for tools to assist in quantifying degree of disability in auditory processing disorder (APD) we reviewed twelve child, parent and teacher questionnaires and seven tests of speech in noise or competing speech. We pilot tested four of each of these measures with eight children. We then tested four questionnaires and three speech-in-competition tests with 21 children aged 6-11 years diagnosed with auditory processing disorder and a group of 37 typically developing age-matched children. All four questionnaires showed good internal reliability and some differentiation of the groups, but only two showed significant differences between the APD and control groups, including the Teacher Evaluation of Auditory Performance (TEAP) which showed a graduated spread of scores useful for assigning degree of disability. Based on a recommended cut-off score for the TEAP, this questionnaire also showed high sensitivity and specificity, correctly identifying 100% of children with APD and 81% of typically developing children based on the teachers' ratings, indicating that it can make a useful contribution to diagnosis. The Australian Sentence Test in Noise (AuSTIN) also showed a graduated spread of scores helpful for categorizing degree of disability. TEAP scores for the question related to listening in noise were correlated with AuSTIN scores. The TEAP has been investigated in a further qualitative study involving interviews with educators. Positive features of the TEAP include its ease of use, however, educators made recommendations such as shifting to an online format with additional information about APD in order to improve TEAP accessibility and utility.

Keywords: Auditory processing disorder, Teacher questionnaire, Children

Oral Presentation 17

Auditory Processing II
OP 17-8

Development of a Behavioral Test Battery for Assessing Spatial Auditory Cue Processing and Directional Speech Perception in Children: Preliminary Findings

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Background: Spatial hearing enables listeners to localize sounds and segregate speech from background noise—skills that develop gradually throughout childhood. Understanding how typically developing children use spatial cues, such as interaural time differences (ITDs) and interaural level differences (ILDs), is essential for characterizing normal auditory processing and establishing developmental benchmarks. However, there are few standardized, child-appropriate behavioral tools for assessing these abilities.
Purpose: This study aimed to develop and validate a computer-based test battery to evaluate spatial auditory cue processing and directional speech perception in normally hearing children.
Methods: Two behavioral paradigms were designed: (1) a Spatial Cue Weighting Test to assess the relative contribution of ITD and ILD cues in lateralization judgments and to calculate a Cue Weighting Index and (2) a Directional Speech Perception Test to measure spatial release from masking under co-located and spatially separated listening conditions. Stimuli were presented via a three-loudspeaker array (center, +90°, –90°) calibrated at 65 dB SPL using a Focusrite Scarlett 18i20 interface. The test was implemented as a browser-based platform to ensure high reproducibility and ease of use in research and clinical settings. Participants were typically developing children aged 6–14 years with normal hearing thresholds.
Results: Preliminary findings demonstrated that spatial separation between target and masker significantly improved speech perception scores ($p < 0.05$). In the cue weighting task, most participants showed a mixed or ILD-dominant strategy, while older children exhibited increased sensitivity to ITD cues, consistent with maturational trends in binaural processing.
Conclusion: This study introduces a novel, child-friendly test battery for assessing spatial hearing abilities. The developed tools provide a foundation for future research on auditory spatial development and can contribute to early identification of spatial listening difficulties in educational or clinical contexts.

Keywords: Spatial hearing, Auditory processing, Cue weighting

Oral Presentation 17

Auditory Processing II
OP 17-9

Biophysical Modeling of Auditory Neuronal Excitability: In Silico Insights into Temporal Processing in the Cochlear Nucleus

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Introduction: Precise temporal encoding of acoustic signals is fundamental to auditory perception, particularly in speech and sound localization. Neurons in the cochlear nucleus exhibit specialized firing patterns that support high-fidelity transmission of auditory information. However, the underlying ion channel dynamics that shape these responses remain incompletely understood. This study presents a biophysically constrained in silico model of auditory neurons to investigate how ion channel composition influences temporal precision and excitability.

Methods: A single-compartment Hodgkin-Huxley–based model was developed to simulate bushy cells of the cochlear nucleus using MATLAB. The model incorporated voltage-gated sodium, potassium, and hyperpolarization-activated cyclic nucleotide-gated (HCN) channels, calibrated against published patch-clamp data. Synaptic inputs were modeled as conductance-based excitatory postsynaptic currents (EPSCs) with variable timing and amplitude. Simulations explored the impact of channel density and kinetics on spike latency, jitter, and phase-locking accuracy across a range of stimulus frequencies (100 Hz to 1000 Hz).

Results: The model reproduced key electrophysiological features of bushy cells, including low jitter and high phase-locking fidelity at mid-frequency inputs. Increased HCN channel conductance improved temporal precision by stabilizing resting membrane potential and reducing latency variability. Conversely, reduced potassium channel activity led to prolonged depolarization and impaired spike timing. Simulated pharmacological blockade of HCN channels resulted in degraded phase-locking, consistent with experimental observations in auditory neuropathy.

Conclusion: This in silico study demonstrates that specific ion channel configurations critically shape the temporal processing capabilities of cochlear nucleus neurons. The findings offer mechanistic insights into auditory dysfunctions such as auditory neuropathy and age-related temporal degradation. The model provides a platform for testing therapeutic interventions targeting ion channel modulation and supports future translational research in auditory neuroscience.

Keywords: Auditory Temporal Processing, Ion Channel Modeling, Cochlear Nucleus Electrophysiology

Oral Presentation 18

Hearing Disorders II
OP 18-1

A Different Pattern of Cross-Modal Plasticity in Single-Sided Deafness: Enhanced Audiovisual Integration

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Overwhelming studies in deafness observed cross-modal recruitment of the auditory cortex for visual processing, suggesting a redistribution of neural resources from auditory to other sensory modalities following complete auditory deprivation. However, how central resources are reallocated between visual and auditory modalities in individuals with partial auditory deprivation—a more prevalent condition—remains largely unclear. In individuals with single-sided deafness (SSD), an extreme case of partial auditory deprivation, our previous fMRI study observed downward cross-modal plasticity (decreased activation) of the auditory cortex during visual working memory processing, in the opposite direction to bilateral deafness. We speculated that the increased cortical resource requirement for auditory processing due to reduced auditory input might be the reason; however, this has not been confirmed because of the lack of concurrent auditory task studies. To address this issue, we conducted an fMRI study using a 2-back paradigm including visual, auditory, and audiovisual-mixed conditions in 36 individuals with congenital SSD (left/right 15/21) and 27 normal-hearing (NH) controls. Behaviorally, the SSD group performed worse than the NH controls, showing reduced accuracy across visual, auditory, and audiovisual-mixed conditions, along with slower responses specifically in the audiovisual-mixed condition. During the visual condition, the SSD group exhibited significantly weaker activation in the visual cortex compared to NH controls. During the auditory condition, no significant alteration in activation was observed. During the audiovisual-mixed condition, the SSD group demonstrated stronger activation in the auditory cortex and the anterior cingulate cortex than NH controls. Our findings indicate that in SSD, for unimodal processing, audition generally recruited comparable cortical resources, whereas vision allocated less. Individuals with SSD did not exhibit the auditory-to-visual resource shift in the auditory cortex that is typical in bilateral deafness, but instead allocated more resources to audiovisual integration. Our pilot study enriches the understanding of central plasticity following partial sensory deprivation.

Keywords: Single-sided deafness, Plasticity, Cross-modal

Oral Presentation 18

Hearing Disorders II
OP 18-2

Evaluating Hidden Hearing Loss in Combat-Exposed Patients: Spectro-Temporal Modulation Detection Assessment Using the Audible Contrast Thresholds Test

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Background:
Hidden hearing loss (HHL) resulting from excessive combat noise exposure may cause tinnitus, hyperacusis, and speech-in-noise difficulties despite normal audiograms. Yet, diagnosing HHL with speech-in-noise tests often remains insufficient. This study used the Audible Contrast Threshold (ACT), a non-linguistic, non-verbal measure of spectro-temporal modulation (STM) sensitivity in noise, to detect HHL in combat-exposed individuals with normal hearing. This marks the first use of ACT in this population and demonstrates its potential as a diagnostic tool for HHL.

Methods:
Participants included 36 male combat-exposed military reservists (mean age 27.63 ± 3.83 years) reporting new auditory symptoms following a period of combat noise exposure, and 26 age-matched controls (mean age 25.63 ± 5.12 years) with no noise exposure or auditory complaints. Testing included standardized hearing questionnaires, standard audiometry (250-8000 Hz), extended high-frequency (EHF) audiometry, and ACT assessment. ACT thresholds are reported in normalized Contrast Level (nCL), where 0 dB nCL corresponds to the average normal-hearing performance.

Results:
All participants demonstrated normal hearing thresholds (≤20 dB HL) across the standard frequency range. Additionally, both groups showed age-appropriate EHF audiometry thresholds, with no statistically significant differences observed between them ($p > 0.05$). Combat-exposed participants demonstrated substantially elevated ACT (median = 2.18 dB nCL) compared to controls (median = -0.43 dB nCL), with a median difference of 2.60 dB ($p < .0001$). The between-group difference yielded a large effect size (Hedges' $g = 1.02$), exceeding effect sizes reported for various speech-in-noise tests.

Conclusion:
This study is the first to use non-verbal ACT to assess individuals with normal audiograms but auditory complaints after combat noise exposure. ACT effectively distinguished combat-exposed participants from controls, revealing subclinical auditory dysfunction. By isolating bottom-up auditory processing through spectro-temporal modulation detection in noise, ACT minimizes top-down language and cognitive influences, highlighting its potential as a sensitive diagnostic tool for HHL.

Keywords: Hidden hearing loss, Combat noise, Spectro-temporal modulation

Oral Presentation 18

Hearing Disorders II
OP 18-3

Threshold Equalizing Noise Test in Normal-Hearing Patients with Speech-in-Noise Complaints

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Objectives: The Threshold Equalizing Noise (TEN) test detects cochlear dead regions (CDRs), defined as areas where inner hair cells and/or the cochlear nerve are completely nonfunctional. This study aimed to evaluate the clinical utility of the TEN test for patients with difficulty in understanding speech-in-noise despite normal pure-tone hearing levels.

Methods:
Study 1: TEN testing was performed in 11 normal-hearing adults (22 ears) to establish reference STR values (mean +2SD). TEN noise was 70 dB HL, and pure-tone thresholds were measured at 500–4000 Hz in 2 dB steps.
Study 2: Twenty-three patients (ages 9–49) with normal pure-tone thresholds and maximum speech intelligibility ≥85% but speech-in-noise complaints underwent TEN testing under the same conditions. STR values exceeding normal reference limits were considered abnormal.

Results: Reference STR ranges in controls were −1.3 to 3.1 dB across frequencies. Among patients, five cases (22%) exceeded normal STR limits in one or more frequencies. No patient exhibited STR ≥10 dB, the criterion for definitive CDR.

Discussion: Although no definitive CDRs were identified, elevated STRs suggest partial cochlear dysfunction. STR increases <10 dB may reflect incomplete inner hair cell or auditory nerve impairment, or outer hair cell involvement.

Conclusion: TEN testing can detect potential peripheral cochlear abnormalities in normal-hearing individuals with speech-in-noise complaints. Further studies are needed to validate reference values and clarify the clinical significance of marginal STR elevations.

Keywords: TEN test, Normal-hearing, Speech-in-noise complaints

Oral Presentation 18

Hearing Disorders II
OP 18-4

High-Frequency Audiometry for Early Detection and Monitoring of Hearing Loss in Musicians

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Purpose
Orchestral musicians are frequently exposed to high sound levels, increasing their risk of developing hearing-related symptoms such as tinnitus, hyperacusis, and auditory discomfort. Traditional clinical audiometry often fails to detect significant hearing deficits in this population. This study investigates whether high-frequency (HF) audiometry can better quantify hearing loss and support improved clinical management.
Methods
Audiometric thresholds were measured in 109 musicians across 13 frequencies (125–16,000 Hz) for both ears. Results were compared to normative data using linear mixed models (LMM), separately analyzing the clinical (125–8000 Hz) and HF (9000–16000 Hz) bands. Age-related effects and interactions between age and frequency bands were examined. Post-hoc analyses assessed differences across age groups and frequency bands. Logistic regression models evaluated the predictive value of audiometric thresholds for self-reported symptoms (tinnitus, perceived hearing loss, insomnia, fatigue, headaches), with performance assessed via ROC curves and AUC values.
Results
Significant age-related threshold increases were observed, particularly in the HF band starting at age 40, and in the clinical band from age 50, though with smaller effect sizes. Threshold deterioration reached up to 80 dB in the 60–69 age group. HF audiometry moderately predicted tinnitus (AUC = 0.71) and effectively predicted perceived hearing loss (AUC = 0.81), while non-auditory symptoms were poorly predicted.
Conclusion
These results highlight HF audiometry as a more sensitive tool than standard clinical audiometry for detecting early hearing loss and tinnitus risk in musicians. The convergence of audiometric data and self-reported symptoms supports its use in preventive screening and auditory monitoring for noise-exposed populations.

Keywords: Noise exposure, Musicians, High-frequency audiometry

Oral Presentation 18

Hearing Disorders II
OP 18-5

Association Between Age-Related Hearing Loss, Frailty, and Fall Risk Among Older Adults: Evidence From a National Population-Based Study

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Background:
Age-related hearing loss (ARHL) is one of the most prevalent sensory disorders among older adults and has been associated with declines in physical and cognitive function. However, the relationships between hearing loss, frailty, and fall risk remain insufficiently explored in population-based data. This study aimed to investigate whether older adults with hearing loss exhibit higher levels of frailty and an increased risk of falls compared with those without hearing loss.

Methods:
Data were obtained from a nationally representative health and aging survey of adults aged ≥65 years. Participants were classified into hearing loss and normal-hearing groups based on audiometric assessment. Frailty was assessed using the Korean version of the FRAIL scale (K-FRAIL), and fall experience during the past year was determined by self-report. Generalized linear and logistic regression analyses were conducted to evaluate associations between hearing loss, frailty, and fall risk after adjusting for demographic, socioeconomic, and health-related variables.

Results:
Older adults with hearing loss demonstrated significantly higher K-FRAIL scores than those with normal hearing, indicating greater frailty. The prevalence of frailty increased in proportion to the severity of hearing loss. Moreover, hearing-impaired individuals had a significantly higher likelihood of having experienced a fall during the past year (adjusted OR ≈ 2.3, 95% CI ≈ 1.1–4.6, $p < 0.05$). These associations persisted after adjustment for confounding factors including age, sex, marital status, education, income, and comorbidities.

Conclusions:
Age-related hearing loss is independently associated with increased frailty and fall risk among older adults. These findings emphasize the importance of early detection and management of hearing impairment as part of comprehensive strategies to prevent frailty and falls in the aging population.

Keywords: Hearing loss, Frailty, Falls

Oral Presentation 18

Hearing Disorders II
OP 18-6

Extended High-Frequency Hearing Loss Disrupts Neural Encoding of Speech

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Purpose
Hearing loss in the extended high frequencies (EHFs; >8 kHz), despite clinically normal audiometric thresholds, is a hallmark of early cochlear damage resulting from factors such as aging or noise exposure. However, the effects of EHF hearing loss on brainstem encoding remain unknown. Likewise, it is unclear whether the auditory nervous system can extract and utilize speech information carried in the EHFs. The first aim of this study was to examine whether EHF speech energy contributes to neural phase locking at the brainstem. We hypothesized that the auditory nervous system can phase lock to temporal speech features, specifically the fundamental frequency (f0) and its modulations, carried by EHFs. The second aim was to determine whether EHF hearing loss is associated with degraded neural processing and, consequently, poorer speech perception in noise.

Methods
Frequency-following responses (FFRs) to broadband and high-pass filtered (>4 kHz and >8 kHz) speech stimuli, along with digits-in-noise speech recognition thresholds (SRTs) under various masking conditions, were measured in 47 normal-hearing adults.

Result
Pairwise comparisons showed stronger FFR f0 encoding for the broadband condition compared to both the > 4 kHz and > 8 kHz conditions ($p<.0001$). Averaged FFR f0 amplitudes decreased by 43% relative to the broadband condition when the stimulus was filtered to contain unresolved harmonics > 4 kHz. Approximately 20% of the averaged broadband FFR f0 amplitude remained when only EHF harmonics were presented. Furthermore, participants with poorer EHF sensitivity showed weaker FFR f_0 amplitudes for broadband ($p=0.02$) and > 4 kHz stimuli ($p=0.01$), as well as poorer SRTs.

Conclusion
The findings provide the first evidence that the auditory system can extract temporal speech features from the EHF region, suggesting that the auditory brainstem can phase-lock to these features. Furthermore, the results suggest that EHF hearing deficits broadly affect neural transduction and speech perception.

Keywords: Extended High Frequency Hearing, Brainstem Encoding, Speech Perception

Oral Presentation 18

Hearing Disorders II
OP 18-7

When Diagnosis Doesn't Predict Outcome: Insights from Children with Auditory Neuropathy Spectrum Disorder

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Background:
Auditory Neuropathy Spectrum Disorder (ANSD) presents unique challenges in diagnosis, assessment, and intervention planning. While some children with ANSD achieve outcomes comparable to those with sensorineural hearing loss (SNHL), considerable variability remains unexplained. Despite advancements in understanding the mechanisms underlying this variability, accurately predicting developmental outcomes in this population remains difficult. This study examines diagnostic characteristics, intervention pathways, and socio-demographic factors influencing early listening, language, and communication outcomes in children with ANSD compared to those with SNHL.

Objective:
To compare early listening, language, and communication outcomes in children with ANSD and SNHL, and to identify factors associated with variability in outcomes, including cochlear nerve deficiency (CND), device type, and cochlear implantation.

Methods:
A retrospective review of clinical data was undertaken, including newborn hearing screening results, diagnostic assessments, and intervention records. Two cohorts were analysed: 75 children with ANSD (categorised by imaging findings and device type) and 130 children with SNHL. Of these, 38 children with ANSD and 60 with SNHL used cochlear implants. Outcome measures included communication mode, and auditory, speech, and language development over the first five years of life.

Results:
Significant variability in language outcomes was observed among children with additional needs across both cohorts. Children with ANSD and cochlear nerve deficiency demonstrated more variable listening and language trajectories compared to those without CND. Across both groups, children using cochlear implants achieved outcomes comparable to peers using hearing aids.

Conclusions:
Findings reinforce the benefits of cochlear implantation for children with ANSD, including those with complex auditory or neurological profiles. Positive outcomes are achievable but depend on multiple interacting factors. Individualised assessment and tailored intervention are essential to optimise outcomes and guide clinical decision-making for this population.

Keywords: Auditory Neuropathy Spectrum Disorder, Communication development, Early intervention

Oral Presentation 18

Hearing Disorders II
OP 18-8

Hearing conservation coverage in undergraduate mining engineering curriculum: A case study of Witwatersrand University

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Background: Occupational health and safety (OHS) education is fundamental in preparing future mining engineers to safeguard workers' well-being, particularly in relation to occupational noise-induced hearing loss (ONIHL), a prevalent occupational disease globally. Despite the high burden of ONIHL in the mining sector, little is known about how undergraduate mining engineering programmes in South Africa address hearing conservation. Evaluating the extent of this coverage is vital for promoting preventive strategies and strengthening worker protection from noise hazards.
Purpose: Examined the inclusion and depth of ONIHL and hearing conservation coverage within the OHS curriculum of an undergraduate mining engineering programme at a South African university. The objective was to assess how effectively students are equipped with the knowledge and skills to identify, manage, and prevent occupational noise risks before entering the workforce.
Methodology: A qualitative case study design was used, involving document analysis of course outlines, lecture materials, and prescribed readings, as well as laboratory observations and planned semi-structured interviews with undergraduate students. Data were analysed thematically, guided by key concepts of hearing conservation and occupational health promotion.
Results: Document analysis revealed that while the curriculum introduces fundamental principles such as sound measurement, noise exposure limits, and hearing loss calculations (e.g, Percentage Loss of Hearing and Noise Reduction Rating), it places limited emphasis on hearing conservation principles. Training primarily focuses on regulatory compliance and technical calculations rather than prevention, monitoring, and health promotion. Students reported awareness of noise as a hazard but lacked understanding of comprehensive hearing conservation and its multidisciplinary nature. They also reported limited exposure to real-world case studies or audiological perspectives during their training.
Conclusions: The findings highlight the need to incorporate more comprehensive, prevention-focused content within undergraduate OHS curricula. Integrating audiology input, practical exposure, and interdisciplinary collaboration could strengthen graduates' competence and preparedness, promoting safer, hearing-conscious mining practices.

Keywords: Mining Engineering Students, Occupational Health and Safety, Undergraduate Curriculum

Oral Presentation 18

Hearing Disorders II
OP 18-9

When Culture Meets Cochlea: 'Sound Horeg' as an Emerging Auditory Health Crisis in Developing Southeast Asia—A Scoping Review and Clinical Case from Indonesia

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Background: Traditional noise-induced hearing loss (NIHL) classification reflects Western occupational exposures producing 4 kHz audiometric notching. "Sound horeg"an Indonesian subculture involving chronic extreme low-frequency amplified music (>120 dB SPL) at car audio competitions—represents a culturally-specific auditory hazard in developing Southeast Asia affecting thousands yet remaining medically uncharacterized. We present a scoping review and clinical case proposing recognition of this distinct NIHL phenotype.
Methods: Systematic search of PubMed, Scopus, Web of Science : "low-frequency noise," "bass music," "recreational noise," "cochlear damage," "NIHL." Studies examining <500 Hz exposure effects included. Illustrative case from our clinic presented.
Results: Literature synthesis reveals low-frequency noise (<500 Hz, >110 dB SPL) produces apical outer hair cell vulnerability in animal models, distinct from basal damage in traditional NIHL. Human studies demonstrate recreational bass exposure associates with atypical audiometric patterns or low-frequency configurations versus classic 4 kHz notching—and disproportionate tinnitus burden suggesting cochlear. Critical gap: zero studies characterize "sound horeg" exposure despite widespread prevalence in developing Southeast Asia where hearing conservation programs are virtually absent.
Clinical Case: Male, 27 years, presented with disabling bilateral tinnitus (3-year duration) following 6 years "sound horeg" participation (3 competitions monthly, estimated >120 dB SPL, zero hearing protection). Audiometry: bilateral symmetric mild sensorineural hearing loss, flat configuration (0.5-8 kHz: 25-35 dB), absent 4 kHz notch. Tinnitus Handicap Inventory 58 (severe disability). This pattern exemplifies hidden hearing loss phenotype characteristic of low-frequency cochlear damage.
Conclusion: "Sound horeg" hearing dysfunction demonstrates features mechanistically and clinically distinct from traditional recreational NIHL, warranting recognition as a novel phenotype with significant implications for developing Southeast Asia. This culturally-embedded auditory hazard represents a blind spot in global hearing health surveillance. ENT should screen young patients with atypical NIHL for bass music exposure. Urgent need exists for systematic audiometric profiling and culturally-tailored hearing conservation strategies in this underserved at-risk population.

Keywords: Sound horeg, cultural health practices, Recreational NIHL, Developing countries, Indonesia, Southeast Asia

Oral Presentation 19

Hearing Disorders III
OP 19-1

The Role of Hyperbaric Oxygen Therapy in Sudden Sensorineural Deafness: Serial Case Report and a 5-Years Patients's Overview in Kasih Ibu Hospital Saba Bali

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Sudden sensorineural deafness (SSD) is defined as a rapid and unexplained hearing loss of at least 30 decibels (dB) across three contiguous frequencies, occurring within a 72-hour period. The disease is more likely to occur unilaterally and may be accompanied by symptoms such as tinnitus, dizziness, ear discomfort, nausea and vomiting. Most causes of sudden sensorineural deafness are unknown (idiopathic) so treatment is empirical. Clinical interventions often include systemic or local administration of steroids, diuretics, antiviral drugs and vasodilators, all aimed at increasing blood flow and oxygen concentration in the inner ear.

Hyperbaric oxygen therapy (HBOT), a non-pharmacological treatment, has gained increasing attention for SSD management and has became a promising adjuvant therapy, which more common as a salvage treatment. This therapy involves the controlled intake of pure oxygen and altered air pressure to enhance oxygen tension in the cochlea, increasing oxygenation in the perilymph and ischemic cochlear tissue and promote tissue repair, thereby improving hearing outcomes in patients.

Kasih Ibu HospitaL Saba is the only private hospital in Bali providing this treatment, which has led to many cases of sudden sensorineural deafness being referred and treated here. Around 67 cases were treated within a 5-years period (2020 - 2025), representing a wide variety of patient characteristics (e.g age, sex, additional symptomps, result's satisfactions) and overall treatment outcomes.

In this serial case report, the author presents 2 patients with sudden sensorineural deafness occuring within approximately the same period of time. Both suffered with severe hearing loss in right ear and underwent Hyperbaric Oxygen Therapy. One of them achieved complete recovery, while the other showed no improvement, even after systemic and intratympanic corticosteroid were also adminestered.

The different outcomes confirm more studies are needed to determine optimum clinical aplication and to discuss potential directions for future certain role in treatment.

Keywords: Sudden Sensorineural Deafness, Hyperbaric Oxygen Therapy, Case Report & Patients Overview

Oral Presentation 19

Hearing Disorders III
OP 19-2

Clinical analysis of 50 cases with the symptom of difficulty in listening

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Introduction: Auditory processing disorder (APD) is considered dysfunction of a central nervous system that cause difficulty in listening under noise. Similar to APD, hidden hearing loss (HHL) is a disorder characterized by difficulty in listening under noise. However, HHL is thought to be caused by cochlear synaptopathy, which is abnormalities in the synapses between the inner hair cells and the cochlear nerve. We therefore investigated to develop the differential diagnostic methods between APD and HHL among those presenting with difficulty in listening under noisy environments.
Methods: Between 2020 and 2024, 50 patients (16 males and 34 females, mean age: 26.8 yrs) with difficulty in listening were included in this study. Age, past history including developmental disabilities, history of noise exposure, ABR, high-frequency audiometry (HFA), and Auditory processing test were evaluated in these cases.
Results: Despite being young, three cases presenting with abnormalities on HFA also had a history of noise exposure, suggesting the possibility of peripheral hearing impairment. In three patients both ABR and high-frequency PTA were out of normal range, suggesting that some kind of inner ear damage may be the cause of difficulty in listening under noisy conditions. Abnormal HFA results with elder age onset suggested four cases of suspected presbycusis.
Discussion: It was considered possible to identify peripheral hearing impairment by comprehensively evaluating factors such as age of onset, ABR, HFA, and history of noise exposure.

Keywords: APD, HHL, Cochlear synaptopathy

Oral Presentation 19

Hearing Disorders III
OP 19-3

Altered Cochlear Compressive Nonlinearity in Individuals With Extended High-Frequency Loss Despite Normal Audiograms

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Purpose
Cochlear hearing loss often develops gradually, preceding detectable changes on an audiogram. A key feature of cochlear mechanics is its compressive nonlinearity, which supports wide dynamic range and accurate encoding of complex sounds. Extended high-frequency (EHF) hearing loss has emerged as a sensitive early marker of cochlear damage. EHF thresholds predict future declines in standard-frequency hearing and are associated with reduced otoacoustic emissions (OAEs) and broadened cochlear filter bandwidths at lower frequencies, suggesting that cochlear function may be compromised before conventional audiograms reveal deficits. Yet the impact of EHF loss on cochlear compressive mechanisms remains poorly understood. The present study tested the hypothesis that EHF hearing loss is associated with broader cochlear dysfunction, manifesting as altered cochlear gain and compression at lower frequencies.

Methods
Sixty-eight adults with normal audiograms participated in this study. DPOAE input/output functions were measured with L2 levels ranging from 20 to 70 dB SPL. We employed an innovative approach by locating a fine-structure peak near the f_2 frequencies (1,2,4,6kHz) to maximize the signal-to-noise ratio (SNR). Input/output functions were modeled using segmented linear regression with a single breakpoint, from which cochlear compression metrics—low-level slope(S1), compressive-slope(S2), and the breakpoint—were derived. Linear mixed-effects models were used to examine the effect of EHF sensitivity on S1, S2, and breakpoint.

Result
DPOAE input–output functions were fitted using the segmented regression method. Preliminary analyses revealed significant age-related decline in EHF sensitivity ($r=0.40$, $p<0.0001$). Elevated EHF thresholds were significantly associated with reduced DPOAE magnitude and SNR, particularly at 4 kHz ($p<0.05$) and 6 kHz ($p<0.01$). Higher EHF thresholds were also linked to alterations in DPOAE compressive slope and breakpoint estimates at 4 kHz, with further analyses ongoing.

Conclusion
These findings suggest that EHF hearing loss marks early-stage cochlear damage extending beyond the basal region, affecting cochlear gain and compression at standard frequencies.

Keywords: Extended High Fequency hearing, Cochlear nonlinearity, Early identification

Oral Presentation 19

Hearing Disorders III
OP 19-4

Prognosis and Risk Factors of Ototoxic Hearing Loss in Children Undergoing Platinum Based Chemotherapy

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Audiologic progression from platinum chemotherapy in children remains poorly characterized. We retrospectively reviewed 60 pediatric oncology patients (≤18 years) treated with cisplatin or carboplatin between 2019 and 2022 to assess longitudinal hearing changes. Serial audiograms (including 8 kHz) were obtained at baseline, during therapy, and up to one year post-treatment. Ototoxic hearing loss was defined as a threshold >25 dB at 8 kHz.

Cisplatin and carboplatin exhibited distinct ototoxicity profiles. Cisplatin-induced hearing loss was progressive, often extending into mid- and low-frequency ranges over time. Notably, some cisplatin patients developed significant hearing loss only several months after completing chemotherapy, underlining the need for long-term audiologic follow-up. In contrast, carboplatin caused early high-frequency loss (8 kHz) that appeared within the first month and remained non-progressive with preserved lower-frequency hearing.

Including 8 kHz in pediatric audiometry was crucial for early detection of ototoxicity, especially in carboplatin cases where loss may be isolated to that frequency. However, early high-frequency loss within the first month did not predict subsequent mid- or low-frequency loss in cisplatin patients. Four patients received high-dose systemic dexamethasone after developing hearing loss; two recovered normal thresholds, suggesting a potential therapeutic benefit, although further investigation is required.

In summary, approximately 37% of children who underwent platinum-based chemotherapy manifested a hearing problem: Cisplatin 18/40 (45%) vs. carboplatin 4/20 (20%) Cisplatin is associated with delayed-onset, progressive hearing loss, whereas carboplatin mainly causes acute, isolated high-frequency loss. High-frequency (8 kHz) testing enhances early identification of hearing loss, and timely intervention with corticosteroids may improve outcomes. These findings support tailored audiologic monitoring and further research into otoprotective interventions for pediatric patients receiving platinum chemotherapy.

Keywords: Cisplatin, Carboplatin, Ototoxicity

Oral Presentation 19

Hearing Disorders III
OP 19-5

The Use of Hearing Protection Devices by Workers at an Aluminium Manufacturing Company

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Background: Occupational noise-induced hearing loss (ONIHL) remains one of the most prevalent occupational diseases globally and in South Africa. Despite extensive awareness campaigns and regulatory frameworks, inconsistent use of hearing protection devices (HPDs) continues to undermine prevention efforts in high-noise industries. Understanding the behavioural determinants of HPD use is therefore critical to strengthening hearing conservation programmes (HCPs).

Aim: This study investigated patterns of HPD use and the factors influencing compliance among workers at an aluminium manufacturing company in South Africa. The COM-B model was applied to identify the capability, opportunity, and motivation components shaping HPD-related behaviours, with the aim of informing targeted behaviour change interventions.

Methods: A mixed-methods, cross-sectional, sequential explanatory design was employed. The quantitative phase involved a two-week survey (n = 115) assessing HPD use patterns and associations with demographic and workplace factors. This was followed by a qualitative phase comprising semi-structured interviews (n = 31) that explored workers' lived experiences, perceptions, and motivations. Quantitative and qualitative data were analysed and integrated thematically using the COM-B framework as a guiding lens.

Results: Although 94.8% of participants were aware of the risks associated with noise exposure, only 51.3% reported consistent HPD use. Gender, education level, type of HPD, noise exposure characteristics, and risk perception were significant predictors of compliance. Qualitative findings highlighted barriers such as inadequate training, discomfort, communication difficulties, limited supervisory enforcement, and negative social norms. Motivation was shaped by risk perception, habit formation, and observing hearing loss in colleagues; however, disillusionment occurred when hearing deterioration was experienced despite HPD use.

Conclusion: HPD use is a complex behaviour influenced by capability, opportunity, and motivation factors. Effective interventions should combine practical training, comfortable and fit-for-purpose HPDs, supportive workplace cultures, and intrinsic motivation strategies to promote sustainable hearing protection behaviours.

Keywords: Noise-Induced Hearing Loss, Hearing Protection Device, COM-B Model; South Africa

Oral Presentation 19

Hearing Disorders III
OP 19-6

High-frequency hearing loss, estimated as noise-induced, in adolescents and young adults in Sweden

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Background: According to the WHO, over one billion people are at risk of noise-induced hearing loss (NIHL) due to recreational noise exposure, particularly from personal listening devices. This study aims to estimate the prevalence of high-frequency hearing loss among individuals aged 12–34 in Sweden and to explore differences.
Methods: All hearing measurements were extracted from 'Auditbase', a data program, in Swedish. The air-conduction measurements for individuals aged 12–34 at the time of testing, from 2002 to 2019, were included. The study population was divided into subgroups (12–17 and 18–34 years) and into 3-year intervals from 2002 to 2019. Air conduction thresholds were analyzed across eight frequencies. NIHL was defined using the criteria by Niskar et al.: Thresholds at 0.5 and 1 kHz ≤ 15 dB, a maximum threshold at 3, 4, or 6 kHz ≥ 15 dB higher than the highest threshold at 0.5 and 1 kHz, and a threshold at 8 kHz ≥ 10 dB lower than the maximum threshold at 3, 4, or 6 kHz. The number of unique individuals with an audiometric notch was compared to the regional population in the same age range to estimate prevalence.
Results: A total of 24,214 individuals met the criteria for an audiometric notch, corresponding to 36,955 qualifying audiograms. For the full age range (12–34 years), average prevalence remained stable around 250 per 100,000 between 2008 and 2019, peaking at 408 (excluding 2 regions) in 2014–2016. Among 12–17-year-olds, prevalence was consistently higher, reaching 590 per 100,000 in 2014–2016. The 18–34 group showed lower but gradually increasing rates, around 220 per 100,000 in recent years.
Conclusion: High-frequency hearing loss consistent with NIHL is a reality among Swedish adolescents and young adults, particularly in the younger age group. These findings underscore the need for preventive strategies targeting youth and recreational noise exposure.

Keywords: High-frequency hearing loss, Noise-induced hearing loss, Young hearing health

Oral Presentation 19

Hearing Disorders III
OP 19-7

A Preliminary Study on Translating, Adapting, and Assessing Nursery Teachers' Knowledge and Attitudes Towards Childhood Hearing Loss in Malaysia

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This study presents the adaptation, translation, and validation of a hearing-related questionnaire to assess Malaysian nursery teachers' knowledge and attitudes towards early childhood hearing loss. The original English questionnaire was professionally translated into Malay and administered via online surveys to 25 female nursery teachers in Malaysia. The rigorous translation process included forward and backward translation by bilingual experts from Malaysian universities. Content validity, reviewed by an audiologist and an educational administrator, demonstrated strong results, with Scale Content Validity Index (S-CVI) scores of 1.00 for relevance and cultural adaptation, and 0.94 for clarity. Reliability analysis indicated Cronbach's alphas of 0.69 for both the knowledge and attitude scales, reflecting moderate internal consistency. Participants were primarily Sijil Pelajaran Malaysia (SPM, equivalent to GCE O-level) and Diploma holders with teaching experience ranging from less than two years to twenty years. One-Way ANOVA revealed no significant differences in knowledge or attitudes relative to educational background or teaching experience ($p > 0.05$). Knowledge scores were low (mean < 1.0; Yes = 1, No/Not Sure = 0), while attitude scores averaged just under 4 on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), indicating moderate but not highly positive attitudes. These results confirm the Malay questionnaire's cultural suitability and reliability for use in Malaysian contexts and underscore the need for targeted professional development to enhance hearing health awareness among early childhood educators.

Keywords: Childhood Hearing Loss, Questionnaire Validation, Early Childhood Inclusive Education

Oral Presentation 19

Hearing Disorders III
OP 19-8

Graft Uptake Success and Determinants of Surgical Outcome in Myringoplasty: A Systematic Review and Meta-Analysis of Evidence from the South Asia

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Background
Myringoplasty restores tympanic membrane integrity and hearing in chronic otitis media. Success, measured by graft uptake, varies widely (35–95%) due to surgical technique, graft material, and patient factors. This systematic review and meta-analysis synthesizes evidence from South Asia and beyond, identifying determinants of optimal outcomes and informing evidence-based surgical strategies.

Method
Following PRISMA guidelines (PROSPERO: CRD42025636455), PubMed, Embase, and Google Scholar were searched upto January 2025. Eligible studies included RCTs, cohorts, and case series on myringoplasty in South Asia. Data on demographics, surgical approaches, graft type/technique, perforation size/site, Eustachian tube function, anesthesia, graft condition, and surgeon experience were extracted. Risk of bias was assessed using ROBINS-I. Pooled success rates were calculated with random-effects models, heterogeneity quantified with I^2. Sensitivity and publication bias were assessed.

Result
From 640 records, 74 studies involving 8,932 patients were included. The pooled graft uptake success rate was 84.0% (95% CI: 81.2–86.7%) with substantial heterogeneity (I^2 = 91.4%) and no publication bias (Egger's p = 0.21). Subtotal perforations significantly reduced uptake compared with small perforations (logOR = −0.95(−1.80, −0.09), p < 0.001), while temporalis fascia augmented with platelet-rich plasma improved outcomes (logOR = 1.29 [0.62, 1.96), p < 0.001). Procedures performed by residents were less successful than those by consultants (logOR = −0.70(−1.30, −0.09) p = 0.023). Other factors, including graft material (perichondrium, vein), perforation site, anesthesia type, endoscopic assistance, Eustachian tube function, septal deviation, and age, were not significantly associated with outcomes. These findings identify key determinants of tympanoplasty success.

Conclusion
This meta-analysis demonstrates an overall graft uptake success rate of 84% in myringoplasty within South Asia. Success is influenced by perforation size, graft material, surgical technique, and Eustachian tube function. Findings support evidence-based surgical decisions, early intervention, and training prioritization, offering valuable guidance for clinicians and policymakers in the region.

Keywords: Myringoplasty, Graft, South asia

Oral Presentation 20

Hearing Aids II
OP 20-1

Exploring Patient Preferences in Hearing Aid Features and Models of Service Delivery

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Background
Understanding what patients value in hearing care is essential for improving hearing aid uptake and satisfaction. With the introduction of over-the-counter (OTC) devices and emerging delivery pathways, it is important to examine how adults with hearing loss weigh professional support, device characteristics, and financial factors. While convenience and lower cost may attract some individuals to OTC options, others may still favor professionally fitted devices. This study investigated how demographic and audiologic factors relate to adults' preferences for hearing aid features and modes of service delivery.
Methods
A cross-sectional survey was conducted as part of a larger four-arm randomized clinical trial. One hundred fourteen adults who reported hearing difficulties completed a questionnaire capturing demographic and hearing-related details as well as preferences for hearing aid features and delivery models. Data were summarized using descriptive statistics.
Results
Participants' mean age was 66 years; most were women (73%), university educated (77%), and retired (53%). Nearly two-fifths reported household incomes between $50,000 and $99,999, and 28% lived alone. The ability to communicate with family and friends in noisy environments, physical comfort, and product reliability were identified as the most valued hearing aid attributes. In terms of service delivery, traditional prescription devices fitted by hearing care professionals were strongly preferred, whereas OTC options supported by remote or online technicians were least appealing. Although cost was an important consideration, professional input during the decision-making process was rated as more influential. The majority expressed unease about purchasing devices without a prior hearing evaluation.
Conclusions
Adults with self-reported hearing difficulties prioritized hearing performance in noise, comfort, and reliability, along with guidance from professionals. These results emphasize the ongoing role of hearing healthcare providers, even as self-fit and virtual models become more accessible.

Keywords: Over-the counter hearing aids, Service-delivery models, Self-perceived hearing loss

Oral Presentation 20

Hearing Aids II
OP 20-2

Accessibility Update: Comparing Sound Quality Differences between Auracast and Hearing Loop Transmissions

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Telecoils are known as the original standard for wireless technology in hearing aids. Introduced in the late 1930s and still in use in hearing aids today, telecoils bring sound from remote sources directly to users' hearing aids. This can enable better access to amplified sound in public spaces, and improved hearing of sound sources in the home such as the telephone, television and the doorbell. The ease of use and standardization of telecoils from a usability perspective helped to serve as the model for the development of Auracast in the new Bluetooth standard. The 5.2 Bluetooth standard allows for one-to-many streaming, unlike previous versions of Bluetooth which were limited to one-to-one connections. This new Bluetooth standard enables Auracast broadcast audio, which is expected to become the next generation in assistive listening technology. Another advantage of Auracast broadcast audio includes stereo signal streaming compared to the mono signal transmission for telecoil technology. The main objective of this study was to explore sound quality differences perceived by hearing aid users between a Hearing Loop and an Auracast broadcast system. The study found a 76% preference for listening through Auracast compared to a Hearing Loop system. This presentation will discuss the implications of these findings and the impact on future accessibility opportunities for hearing aid users.

Keywords: Auracast, Telecoil, Streaming

Oral Presentation 20

Hearing Aids II
OP 20-3

Changes in Social Frailty After Optimal Hearing Aid Fitting: Characteristics of Older Adults Who Improve

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Background;
Age related hearing loss is common in super aged societies. While hearing aids significantly improve communication and quality of life, it remains unclear whether proper hearing rehabilitation can ameliorate social frailty. Given emerging evidence that treating hearing impairment may help maintain an active lifestyle, we examined whether social frailty changes after optimal hearing aid (HA) fitting and which patients improve.
Objectives:
To (1) compare social frailty before vs after HA fitting, and (2) identify characteristics of those whose social frailty improves.
Methods:
Prospective pre–post observational cohort at a community based hospital in Japan. We analyzed 40 adults (≥60 y) who completed optimal HA fitting, achieved adequate aided thresholds, and reported daily use. Social frailty was assessed pre/post using 5 item Makizako index (frail = ≥2 items). Audiologic/clinical variables included unaided/aided pure-tone thresholds, unaided/aided best word recognition score (WRS), IOI HA, conversation time, education, living alone status and hobbies requiring conversation. Paired frailty prevalence was compared with McNemar's test. Among baseline frail participants, "improved" (frail→non frail) vs "non improved" (frail→frail) groups were compared using Welch's t tests and Fisher's exact tests.
Results:
Frailty prevalence changed from 21/40 (52.5%) pre fitting to 18/40 (45.0%) post fitting (McNemar p=0.546). Of the 21 baseline frail, 7 (33.3%) improved. Compared with non-improved group, improved group was younger (80.3 vs 83.9 y; Welch p = 0.273) and had higher aided best WRS (74.3% vs 59.3%; Welch p = 0.194), but neither difference reached statistical significance.
Conclusion:
Overall social frailty did not change significantly after optimal HA fitting; however, one third of baseline frail older adults improved. Improvement aligned with better aided speech discrimination rather than pure tone thresholds, suggesting that maximizing speech clarity may be pivotal for social re engagement. Larger, adequately powered studies are warranted to confirm these candidate predictors.

Keywords: Social frailty, Hearing aids, Presbycusis

Oral Presentation 20

Hearing Aids II
OP 20-4

COVID-19 Related Challenges Facing Patients with Hearing Loss Who Were Prescribed Hearing Aids and Patients Awareness of Tele-Healthcare

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The COVID-19 pandemic has presented serious challenges of access to health care. Communication and routine care affected negatively by the wearing of masks and the limited availability of clinics.

The purpose of this study was to measure the difficulties of patients that experienced hearing loss and were prescribed with hearing aids during the COVID-19 pandemic and understand their awareness and acceptance of tele-healthcare services.

A cross-sectional study was conducted at the Armed Forces Hospital-Southern Region in Aseer Province, Saudi Arabia. The sample size of our participants was 210 individuals aged 18-65 years with medical diagnoses of hearing loss and wearing conventional hearing aids between 2017 and 2019. The SPSS version 22 was used to conduct descriptive and inferential statistical analysis.

Out of 210 respondents, 109 (51.9%) said they had trouble communicating with people wearing face masks, mostly because they couldn't lip-read (n = 15, 7.3%) and their speech was muffled (n = 75, 35.8%). Although 166 (80.2%) preferred in-person consultation over telehealth, 69 (32.8%) were less likely to visit a clinic as a result of the pandemic. Communication problems were more common among users with bilateral (n = 42, 20.0%) and severe hearing loss (n = 57, 27.1%). Hearing loss side and preference for in-person visits (χ^2 = 6.01, p =.049) and mask-related communication difficulty (χ^2 = 12.37, p =.002) were found to be statistically significantly correlated with hearing loss type.

Use of face masks and restricted access to clinic facilities during the COVID-19 period posed a great inconvenience to those with hearing aids. Tele-audiology also offers a promising alternative; however, up take is low because of less patient knowledge and acceptance. Investments in telehealth infrastructure and broadening of patient education is crucial in providing continuity of hear care in the case of future public health emergencies.

Keywords: Hearing Aids, Tele-healthcare, Face mask

Oral Presentation 20

Hearing Aids II
OP 20-5

Hearing Aid Remote Microphone Verification and Real-World Outcomes

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Objectives
The purpose of this presentation is to discuss various remote microphone verification methods to optimize speech perception outcomes in real-world exercise environments.

Background
Best practices and directions in remote microphone verifications recommend comparing electroacoustic transparency of the devices relative to the hearing aids' output in the low-to-mid speech frequency range. However, remote microphones that are electroacoustically transparent may still be inadequate in achieve hearing accessibility in real-world environments. As such, additional verification consideration may be needed to ensure optimal device performance in these environments.

Methods
Three hearing aid brands with two technology level remote microphones were each fit to mild and moderate sloping audiograms (Bisgaard, Vlaming, & Dahlquist 2010). Remote microphones were verified in test box using various methods such as electroacoustic transparency, speech intelligibility index, and maximum audible output frequency, alongside signal processing features. Real-world performance was measured using manikin recordings of real-world group exercise instructions completed in two real-world exercise environments with varying reverberation levels across various hearing aid brands, remote microphone technology levels, audiograms, azimuths and locations. Manikin recordings were compared to reference recordings completed in quiet conditions using a predictive speech perception metric (HASPI; Kates & Arehart 2021).

Results
While all remote microphones were electroacoustically transparent, significant between-brand differences were observed in real-world exercise environments. Verifying remote microphones using the maximum audible output frequency was the strongest predictor of real-world performance.

Conclusions
Remote microphone verification using maximum audible output frequency alongside with the recommended transparency approach may support optimal real-world speech perception performance.

Keywords: Remote Microphones, Verification, Real-World Outcomes

Oral Presentation 20

Hearing Aids II
OP 20-6

Sound-Related, Contextual and Individual Factors in Hearing Aid Sound Preferences:Clinical Implications

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Traditionally, hearing aid fitting focuses on providing audibility and intelligibility for the wearer. However, many other factors affect success with hearing aids, including factors related to the individual's preferences and needs.

In two studies, we investigated individual preferences for different hearing aid sound designs, i.e, the sum total of the signal processing and rationale choices made for a given hearing aid platform. The purpose was to establish to which extent listeners have systematic preferences for a given sound design, to investigate whether preferences can be predicted from demographic or lifestyle factors, and to examine patterns in the reasons for preference.

In the first study, which was conducted online, 248 participants with varying degrees of hearing loss compared two distinctly different hearing aid sound designs in recordings of ten different scenarios, indicating their preference per scenario and overall, as well as reasons for their preference.

The second study involved a guided walk, during which 28 experienced hearing aid wearers compared the same sound designs, implemented in two sets of hearing aids, across six different real-life scenarios, again indicating per-scenario and general preference as well as preference reasons.

The results showed remarkably similar distributions of overall preference across the two different study methods, with approximately 40% of participants indicating a strong preference for one sound design or the other. Per-scenario preferences were more variable, and reasons given revealed preferences to be nuanced and personal. Demographics, degree of hearing loss, and auditory lifestyle did not turn out to be significant predictors of preference.

Together, the results indicate that sound preference reflects an interplay of perception, context, and personal meaning with the characteristics of the sound design. We will discuss the implications of this for our understanding of sound preference and hearing aid fitting, and for clinical best practice.

Keywords: Sound preference, Hearing aid design, Hearing aid fitting

Oral Presentation 20

Hearing Aids Ⅱ
OP 20-7

AirPods Pro 2 as Hearing Support: Laboratory Findings and Clinical Implications

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Purpose:
Apple's AirPods Pro 2 include an FDA-authorized hearing-aid feature, signalling a shift toward consumer technology supporting hearing care. This talk presents independent laboratory evaluations of acoustic performance and considers implications for clinicians and people with hearing loss.

Methods:
AirPods Pro 2 were configured as an OTC hearing aid using representative mild and moderate hearing-loss audiograms entered manually. Laboratory measures were conducted using a head-and-torso simulator. Insertion gain was compared with NAL-NL2 targets. Signal-to-noise ratio (SNR) change with "Conversation Boost" was assessed using a horizontal loudspeaker array with a frontal target talker and surrounding babble noise. Media-streaming output levels were also measured.

Results:
Insertion gain closely aligned with NAL-NL2 targets in the mid-frequencies, with some low- and high-frequency deviations. Conversation Boost provided up to 3 dB SNR improvement in noise. Media streaming gain was conservative relative to speech-based prescriptive targets, aligning with typical user preferences for music listening.

Conclusions:
Laboratory findings demonstrate that AirPods Pro 2 can provide acoustically meaningful amplification and noise-related benefits for individuals with mild-to-moderate hearing loss. These results support a potential role for consumer hearables as an entry point or adjunct within hearing-care pathways, while reinforcing the importance of fit, verification, and clinician guidance. A complementary real-world study is in progress to examine in which listening environments, and for whom, this technology may offer the greatest practical benefit.

Keywords: AirPods Pro, OTC hearing aid, laboratory evaluation

Oral Presentation 20

Hearing Aids Ⅱ
OP 20-8

The Effect of a Third In-Ear Microphone on User Satisfaction, Speech Intelligibility, and the Real-Ear Gain of Hearing Aids at a Conversational Level in Patients with Moderate Hearing Loss

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Background: The microphone & receiver-in-ear (M&RIE) integrates two traditional hearing aid microphones, while an additional in-ear microphone helps preserve natural sound perception. However, the impact of this third microphone on hearing aid amplification remains unclear in patients with moderate hearing loss.
Methods: In this prospective crossover study, thirty-nine participants with moderate hearing loss and no prior hearing-aid use were randomly assigned to be sequentially fitted with both traditional and M&RIE receivers. The abbreviated profile of hearing aid benefit (APHAB) and word recognition score (WRS) were assessed. Audiological amplification was evaluated using real-ear measurements to determine whether a third in-ear microphone limits real-ear gain.
Results: WRSs and APHAB scores showed no significant differences between the standard and M&RIE receivers. In addition, real-ear measurements across all frequencies and earplug types revealed no significant differences in real-ear insertion gain between the two receivers at a conversational level (65 dB SPL).
Conclusions: The M&RIE provides amplification comparable to that of the standard receiver while preserving natural sound cues without significant audiological disadvantages.

Keywords: Hearing aid, Third microphone, Real-ear gain

Oral Presentation 21

Auditory Processing III
OP 21-1

Exploring the relationships between auditory processing, speech sound identification, language, cognition and reading in children with Listening Difficulties

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Purpose: Listening Difficulties (LiD) is an umbrella term used to describe atypical difficulties in sound recognition or speech understanding. LiD can be caused by multiple overlapping factors such as auditory processing, speech sound identification, language, cognition and hearing. Children with LiD struggle to follow instructions, maintain focus on tasks, and develop age-appropriate language and literacy skills, despite having normal hearing sensitivity. These difficulties can significantly impact a child's academic, social, and overall development. This study aimed to investigate how different underlying factors interact to affect listening and reading in children with LiD.

Methods: 101 children aged 5-12 years with reported listening difficulties completed a comprehensive test battery assessing auditory processing (AP), phoneme identification in noise and reverberation (LiSN-R), sentences understanding in noise and reverberation (ToLD-U), sentence understanding in noise (LiSN-S), language, phonological memory, cognition (non-verbal IQ, attention, memory), and reading. Parental concerns were captured with the Auditory Processing Disorders Questionnaire (APDQ). Predictive relationships of AP, phonological memory, language and cognition on speech perception and reading were explored.

Results: AP skills were found to be a significant predictor of phoneme identification in noise and reverberation, which, in turn, predicted sentence understanding in complex listening environments. Language skills were a predictor for performance on ToLD-U, but not for LiSN-S test. Reading abilities correlated with language, memory, and phonological memory skills.

Conclusions: A complex interplay between AP, speech sound perception, language, and cognition predicts underlying listening difficulties in children. Comprehensive diagnostic test batteries need to, therefore, incorporate measures of cognition, language skills and phoneme identification in addition to AP tests, in order to disentangle the specific factors impacting each child's listening abilities for appropriate management.

Keywords: Listening Difficulties, Language, Reading

Oral Presentation 21

Auditory Processing III
OP 21-2

Comparative Study on the Effect of Hormonal Variations on Temporal Processing and Working Memory in Early and Late Adolescent Females

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Background:
Hormonal fluctuations during the menstrual cycle influence auditory working memory and temporal processing. While adult research supports these effects, limited evidence exists for adolescents, a period marked by rapid neurocognitive development. Addressing this, the present study examines how hormonal variations affect auditory temporal processing and working memory skills in early and late-adolescent females.
Aim:
To compare the effects of hormonal changes on temporal processing skills and auditory working memory abilities in females during early and later adolescence across two menstrual phases (menstrual phase & ovulation phase).
Method:
Sixty females with regular 28-day menstrual cycles participated. They were divided into Early and Late Adolescence groups. Temporal processing was assessed using Gap Detection and Modulation Detection Tests, while working memory was measured through Forward and Backward Digit Span tasks. Each participant was tested twice: menstrual phase (day 1 - 5) and ovulation phase (day 12 - 14) within a single menstrual cycle.
Results:
No significant differences were observed between the two groups in any domain. However, a robust within-group variation emerged between the two phases. Participants exhibited reduced temporal processing and working memory performance during the menstrual phase, but both measures significantly improved during ovulation phase, reflecting enhanced auditory and cognitive functions when estrogen levels were higher.
Conclusion:
This study provides compelling evidence that hormonal fluctuations across the menstrual cycle exert a decisive influence on auditory temporal processing and working memory in adolescent females. Elevated estrogen levels during ovulation appear to facilitate superior auditory processing performance, whereas estrogen withdrawal during menstruation corresponds with performance decline. These findings underscore the intricate and biologically driven interaction between hormonal dynamics and auditory processing during adolescence.

Keywords: Auditory processing, Female Hormones, Adolescence

Oral Presentation 21

Auditory Processing III
OP 21-3

A Behavioral Paradigm to Assess Selective Auditory Attention Across Adulthood Using Frequency-Shifted Speech Stimuli

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Background: Selective auditory attention enables individuals to focus on relevant sounds while suppressing competing inputs. This ability is essential for communication, especially in complex listening environments such as crowded or noisy settings. Although electrophysiological methods such as P300 and Mismatch Negativity are widely used to evaluate auditory attention, these techniques are often limited by complex setup requirements, sensitivity to electrical artifacts, prolonged testing time, and reduced applicability in individuals who use amplification systems. Therefore, there is a clinical need for practical, speech-based behavioral tools that can assess selective auditory attention across adulthood and help identify potential age-related auditory-cognitive changes.
Aim: To develop a behavioral oddball paradigm using frequency-shifted speech stimuli and examine selective auditory attention in three adult age groups.
Methods: Two hundred Turkish monosyllabic words recorded by male and female speakers were used. Ten percent of the stimuli served as deviants by increasing the fundamental frequency by +1 semitone. Stimuli were presented at 65 dB HL through two loudspeakers positioned at +45° and −45°, one meter from participants. Adults aged 18–50 years with normal hearing were recruited and divided into three groups: 18–29, 30–39, and 40–50 years. Participants pressed a response button only when detecting deviant words in the female voice. Accuracy and false-alarm rates were analyzed.
Results: There was a significant age effect on accuracy ($p < 0.05$). The 18–29 group showed the highest accuracy, followed by the 30–39 group, while the 40–50 group demonstrated significantly lower performance. Older adults also showed higher false-alarm rates, indicating reduced auditory inhibitory control.
Conclusion: This speech-based behavioral paradigm provides a clinically feasible tool for assessing selective auditory attention. Results reveal measurable age-related declines in auditory attention across adulthood and support the importance of ongoing auditory-cognitive monitoring.

Keywords: Selective Auditory Attention, Auditory Oddball Paradigm, Auditory Processing

Oral Presentation 21

Auditory Processing III
OP 21-4

Development and validation of the Taiwanese Mandarin hierarchical speech-in-noise test: Integrating speech, tone, temporal, and spatial hearing assessments

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The Taiwanese Mandarin Hierarchical Speech-in-Noise Test (TM-HSiN) is a newly developed adaptive speech-in-noise assessment designed to evaluate auditory processing of Taiwanese Mandarin speakers aged seven years and above. The test adopts a hierarchical structure comprising a main test and two subtests, allowing flexible use either for screening purposes (i.e. main test only) or as part of a comprehensive assessment.

The test materials are based on newly developed Taiwanese Mandarin simplified matrix sentences and monosyllabic tone words presented in four-talker babble. This design enables the evaluation not only of speech-in-noise and tone perception, but also of the effects of degraded speech (fast and reverberated) and spatial hearing (side versus front noise) on listening performance, allowing from cross-subtest comparisons the calculation of a "quality" effect and a "spatial" effect respectively. The computerised test is delivered as a picture-pointing task with three scoreable items per sentence, and six alternatives per item (i.e. a 3x6 matrix), and a four-alternative forced-choice tone identification test.

Twenty-nine adult participants took part in the acoustic normalisation of the stimuli in noise, In addition, sixty children aged 7-12 years and twenty adults participated in the evaluation of the new test. The study examined learning effects, developmental changes, and test-retest reliability. All participants were normal-hearing native speakers of Taiwanese Mandarin with no reported auditory or neurological issues. Results showed that performance with both sentences-in-noise and tones-in-noise improved significantly with age among children, accompanied by a similar quality effect of approximately 3 dB for both children and adults, and a spatial effect of around 7 dB in children and 8 dB in adults.

Findings indicate that the TM-HSiN test is a reliable and efficient diagnostic tool that places minimal cognitive and linguistic demands on participants, while revealing the continued development of auditory skills from childhood through to young adulthood.

Keywords: Speech-in-noise, Auditory processing, Taiwanese Mandarin

Oral Presentation 21

Auditory Processing III
OP 21-5

Auditory processing profiles in autistic children

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Introduction:
Autistic children often present with auditory symptoms and difficulties that can impact their language skills, social communication and educational performance. Building on our 2024 findings, we propose to expand the analysis of this paper by examining associations between behavioural test outcomes, clinical symptoms and comorbidities to better define the auditory processing profile of autistic children.

Methods:
Data were retrospectively collected from 37 children (mean age 11.1 ± 2.8 years) assessed at a tertiary clinic for Auditory Processing Disorders (APD). Participants completed a comprehensive test battery including audiological assessment and auditory processing tests. Semi-structured questionnaires were filled in by parents to explore the child's communication, attention and hearing. Non-parametric statistics evaluated associations between test outcomes and reported symptoms or comorbidities.

Results:
Twenty-nine children (78.4%) met criteria for APD, and eight (21.6%) for specific auditory deficits. The highest failure rates occurred in monaural low-redundancy tests (AFG0 = 72%, SiB = 80%, QuickSIN = 75%), indicating major challenges in speech perception under degraded conditions. LiSN-S was abnormal in 59.4% of children, with 19% showing Spatial Processing Disorder. Significant associations were found between hearing-in-noise concerns and poorer AFG0 performance ($p = 0.013$), ADHD diagnosis and Dichotic Digits outcomes ($p = 0.015$), and anxiety and Gaps-in-Noise performance ($p = 0.036$).

Conclusion:
Auditory processing difficulties in autistic children are highly prevalent and heterogeneous, and often overlap with attentional, emotional and sensory components. Our findings support the need for tailored and comprehensive assessments to accurately characterise auditory profiles and guide individualised management for autistic children.

Keywords: Auditory processing, Autism, Children

Oral Presentation 21

Auditory Processing III
OP 21-6

Auditory Sensory Factors Contributing to Ear Differences in Speech Perception in Noise among Older Adults

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Background: Existing evidence suggest that right ear (RE) and left ear (LE) processing differences in speech perception in noise (SPiN) performance among older adults may be partly explained by an overall weaker LE pathway relative to the RE pathway for the sensory processing of speech stimuli. This study aimed to determine whether ear differences in peripheral and subcortical auditory processing account for RE advantages in SPiN among older adults.

Methods: Thirty older adults (≥60 years, native Spanish speakers) with age-appropriate hearing participated in a cross-sectional study. Auditory measures included hearing pure-tone thresholds, transient evoked otoacoustic emissions (TEOAE), and contralateral suppression of TEOAEs to assess medial olivocochlear (MOC) activity. Subcortical encoding was evaluated with monaural frequency Following Response (FFR) elicited by a 170-ms /da/ syllable. Analyses included amplitude of the fundamental frequency (F0), RMS amplitude and latency of the onset, transition, and steady-state portions. SPiN performance was assessed for each ear separately using a customed Spanish monosyllabic word-in-babble test (six-talker babble) to estimate speech recognition thresholds (SRTs). Paired t-tests and linear regression models examined ear differences and associations between peripheral and subcortical measures and SPiN scores, controlling for audibility and cognition.

Results: Preliminary results showed FFR amplitudes were significantly larger ($p < 0.05$), while onset and transition latencies were shorter ($p < 0.05$) in the RE than the LE. RMS values for onset and transition portions were also higher in the RE ($p < 0.05$). SPiN results showed better SRTs for the RE (mean difference = 2.3 dB SNR, $p < 0.01$). Regression analyses indicated that RE–LE differences in F0 amplitude and transition latency significantly predicted SPiN asymmetry among older adults.

Conclusion: Older adults demonstrated enhanced subcortical encoding and better SPiN performance in the RE, supporting the hypothesis of a more efficient right auditory pathway for speech processing.

Keywords: Frequency-Following Response, Speech perception in noise, Aging

Oral Presentation 21

Auditory Processing III
OP 21-7

Arterial Spin Labeling brain MRI and functional MRI in children with isolated auditory processing disorder (APD)

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Objectives:
The objective of this study is to explore brain function using brain neuroimaging in a group of children with isolated APD.
Method:
A group of 7 APD patients without comorbid developmental disorders (Ga): median age = 10.98 years ± 2.22 (yo), (range : 7.33 – 13.08 yo) was compared to a control group of 26 children: median age = 11.21 ± 2.74 yo 6.16 - 17.90 yo) (Gc). All subjects underwent a 3D T1 anatomical MRI scan and an Arterial Spin Labeling brain MRI (ASL). In addition, all patients and a subgroup of 11 controls (median age = 11.48 ± 2.36 yo, 8.64 – 17.90 yo) (subGc), underwent a functional MRI (fMRI). During fMRI, all subjects listened to sequences of human voices, non-voices, and silence through headphones on both sides.
Results:
In ASL MRI, the Ga compared to the Gc, showed hyperperfusion at rest in right frontotemporal regions.
In Ga, listening to either voice or non-voice sounds primarily activated a right-lateralized auditory network, with reduced recruitment of the left hemisphere. The same right-hemisphere cluster was engaged for both voice and non-voice conditions (peak coordinates: 63; –21; 3 and 66; –21; 3, respectively), but this rightward dominance was more pronounced for non-voice versus silence contrasts. Moreover, its spatial extent was smaller than that observed in typically developing controls, indicating a less extensive and less differentiated activation pattern.
Conclusion:
Children with APD relied on a single right-hemisphere network for processing both voice and non-voice sounds, with limited hemispheric specialization and diminished left-hemisphere contribution. This permanent right-sided activation, potentially related to a baseline hyperperfusion observed on ASL, may prevent the emergence of a distinct voice-selective network and reflect a functional bias toward voice processing over non-voice sounds.

Keywords: Auditory Processing Disorder, Functional MRI, Listening Difficulties

Oral Presentation 21

Auditory Processing III
OP 21-8

Auditory and Language-Related Listening Skills of English Second Language (ESL) Learners: Do We Have a Role to Play?

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Auditory and language-related listening skills, including selective auditory attention, phonological awareness, speech-in-noise perception, and listening comprehension, are crucial for academic success—particularly in multilingual contexts where English is used as the primary language of instruction. This presentation will integrate findings from four studies conducted in a multilingual educational setting that examined these skills in English Second Language (ESL) learners aged 7 to 8 years.

Using descriptive comparative designs, the studies collectively involved 110 participants—comprising 55 ESL learners and 55 English First Language (EFL) peers—to explore how language experience and exposure influence listening and language-related skills. Standardised measures, including the Listening Comprehension Test–2 (LCT-2), Digits-in-Noise (DIN) Test, Selective Auditory Attention Test (SAAT), and the Phonological Awareness Test–2, were administered. It was clear that although ESL learners demonstrated age-appropriate hearing and listening in noise, their performance was reduced in tasks with greater linguistic and cognitive demands. The ESL learners obtained lower scores in listening comprehension, selective auditory attention, and phonological awareness compared to EFL peers, indicating increased listening effort and potential barriers to literacy development.

These findings underscore the interdependence of listening and language skills in early learning, reinforcing the audiologist's expanding role beyond the traditional hearing assessment. Audiologists can play a pivotal part in multidisciplinary teams by identifying listening and language-related challenges experienced by this unique population, supporting classroom listening strategies, and collaborating with educators and speech-language therapists. By expanding their role within schools, audiologists can foster inclusive, educational environments and promote equitable learning outcomes for multilingual learners.

Keywords: Listening skills, English Second Language Learners, Educational audiology

Oral Presentation 21

Auditory Processing III
OP 21-9

The Diagnostic Contribution of OAE Suppression and Auditory Evoked Potentials in Auditory Processing Disorder: A Systematic Review and Meta- Analysis

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Background: Hearing evaluation is shown to be incomplete when auditory processing evaluation is omitted.
Purpose: The current study aims to evaluate the ability of objective hearing assessment tools, such as otoacoustic emission (OAE) suppression and auditory evoked potentials (AEPs), to aid in diagnosing auditory processing disorder (APD) optimizing the current diagnostic test battery. Do otoacoustic emissions suppression and auditory evoked potentials correlate with current clinical auditory processing evaluation throughout the life span?
Method: A systematic search was performed based on PRISMA & PICO criteria in Scopus, PubMed, and ScienceDirect for studies published in the English language. Eligible studies included individuals diagnosed with APD per ASHA, AAA, or European Consensus 2017 criteria. Meta-analyses were conducted using a multilevel random-effects model to estimate standardized mean differences (SMDs) for OAE suppression, and AEP latencies and amplitudes.
Results: Twenty-six studies met the inclusion criteria. Otoacoustic emission suppression meta-analysis revealed a significant reduction in APD patients (SMD = - 0.58, 95% CI: -0.82 to -0.33, p = 0.001). Latency measures in AEPs were also significantly prolonged in APD (SMD = -0.41, 95% CI: -0.55 to -0.28, p = 0.0002). However, results in the amplitude domain were not statistically significant (SMD = - 0.12, 95% CI: -0.71 to 0.46, p = 0.6793).
Conclusion: Suppression of otoacoustic emissions, as well as latency measures of late and middle auditory evoked potentials, provide promising objective markers for distinguishing individuals with APD from controls. These tools have the potential to improve diagnostic accuracy and help clinicians achieve earlier and more accurate APD diagnosis when combined with behavioral assessments. Standardization of protocols and further research are essential for clinical implementation. Despite heterogeneity among included studies, this review is the first to focus exclusively on APD diagnosed groups of patients.

Keywords: Auditory processing disorder, Evoked potential, Otoacoustic emission suppression

Oral Presentation 22

Auditory Implants II
OP 22-1

Audiological Outcome after Ultra Early Activation of a Cochlear Implant followed by early Rehabilitation in bilateral Deafness

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This prospective, single-center, open-label study investigated the audiological outcomes of ultra early cochlear implant (CI) activation combined with immediate rehabilitation in adults with bilateral sensorineural hearing loss, compared to the standard activation protocol, where activation occurs 3–4 weeks post-surgery. Conducted at the University Clinic of St. Pölten the trial explored whether earlier activation improves hearing recovery, speech understanding, compliance, and quality of life, while also reducing the number of hospital visits.

Forty participants (20 per group) were randomized to either the ultra early activation group (activation and therapy during the same hospital stay) or the regular activation group (standard timeline). The investigational devices include the MED-EL "Synchrony 2" and Cochlear "Nucleus" implants, both CE-marked and clinically established.

Primary outcomes include improvements in hearing thresholds (via pure tone audiometry) and speech discrimination scores (via speech audiometry) at 3, 6, and 12 months post-implantation. Secondary outcomes involve patient compliance with rehabilitation, changes in quality of life (McGill and APHAB questionnaires), and reduced hospital attendance.

Audiological and imaging tests such as CT, MRI, DVT imaging, and repeated audiometry are used pre- and post-operatively to monitor performance and electrode positioning. Early rehabilitation includes music therapy and auditory training starting within days after surgery.

The study aimed to demonstrate that early CI activation can accelerate auditory rehabilitation, improve patient satisfaction, and streamline postoperative care without increasing risk.

Keywords: Cochlear Implant, Audiologic Rehabilitation, Early activation and rehabilitation

Oral Presentation 22

Auditory Implants II
OP 22-2

Predictors of self-perceived sound quality outcomes in adult cochlear implant recipients

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Objective: Cochlear implant (CI) outcomes in adults vary widely, making accurate prognostication essential. Although the self-perceived auditory benefit of cochlear implantation has received attention, the specific outcome of sound quality remains underexplored, particularly regarding how interacting predictors shape the subjective listening experience. The aim of this study was to identify and describe predictors of self-perceived sound quality in an unselected cohort of adult CI recipients.

Method: A cross-sectional survey study was conducted, incorporating retrospective clinical data. The final study sample consisted of 277 adult CI recipients (≥ 18 years) from three CI programs, all of whom had been implanted for at least 12 months at the time of data collection. Self-perceived sound quality was evaluated using the Hearing Implant Sound Quality Index (HISQUI19). Additional information was collected via a demographic questionnaire, the reduced Speech, Spatial and Qualities of Hearing (SSQ5) questionnaire, and the Patient Health Questionnaire (PHQ-4), used to screen for depression and anxiety.

Results: Twenty-nine potential predictor variables (including demographic, audiological and device-related factors) were extracted from participant responses and clinical records and were included in the analysis. Multiple regression analyses identified seven significant predictors of self-perceived sound quality, namely technology proficiency, reliance on lipreading, music enjoyment, accent understanding, anxiety, age at CI activation and family support. The final model was significant ($F(9)=25.60$, $p<0.0001$) and accounted for 46.9% of the variance in HISQUI19 scores ($R^2= 0.469$), indicating that the predictors collectively explained a substantial portion of variance in self-perceived sound quality.

Conclusion: This study identified auditory, psychosocial and cognitive-linguistic factors that predict self-perceived sound quality outcomes in adult CI recipients. The results may inform clinical counselling and support services to better address individual variability in sound quality perception.

Keywords: Cochlear implants, Self-perceived sound quality, Hearing implant sound quality index

Oral Presentation 22

Auditory Implants II
OP 22-3

Contralateral Routing Of Signals with user-adjusted settings enhances speech intelligibility for cochlear implants users

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Objectives: The contralateral routing of signals (CROS) device was developed to redirect signals from the contralateral side to the cochlear implant (CI) to decrease the influence of the head-shadow effect and increase speech intelligibility. A CROS device increases intelligibility when speech is presented to the CROS-ear, but decreases when noise is presented to this ear. This study assessed the benefits of adjustable mixing ratios between sounds captured by CI and CROS on speech understanding in noise.

Methods: Speech intelligibility was assessed using the Dutch/Flemish Matrix test to measure speech recognition thresholds (SRTs, i.e, signal-to-noise ratio where 50% of speech is recognized correctly). Participants were presented with speech at 5 different angles, i.e. +/- 90, +/- 45, and 0 degrees, in a background of diffuse stationary noise. The two conditions tested were CI-only and CI+CROS with user-adjusted mixing ratios. Users could manually adjust the mixing ratio for each speech location according to their personal preference. Noise level was 60 dBA on average. The CROS-ear was plugged to minimize influence of residual hearing.

Participants: 16 unilateral CI users implanted with devices from Advanced Bionics.

Results: On average, participants manually set the mixing ratio to the side where speech was located. SRTs improved significantly when speech was presented to the CROS-ear for the CI+CROS condition with user-adjusted mixing ratios when compared to CI-only (3.8 dB SNR, $p < 0.001$). There were virtually no differences in SRTs (up to 0.5 dB SNR depending on the angle) found between CI and CI+CROS when speech was presented to the CI-ear ($p = 0.21$).

Conclusion: Participants were able to manually adjust the mixing ratio such that CROS was beneficial when speech was presented at variable angles on the CROS side, while also effectively mitigating the disadvantage of CROS when speech was presented on the CI side.

Keywords: Cochlear implant, Contralateral routing of signals, Head-shadow effect

Oral Presentation 22

Auditory Implants II
OP 22-4

Evaluating the benefits of integrating connected care to reshape the cochlear implant care pathway: A multicentre randomised non-inferiority study

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Purpose:
The increasing demand for cochlear implantation and the need to monitor existing patients put pressure on specialized centers, leading to a decline in care quality. A new care pathway is needed to meet current demands, improve patient service, and optimize team workload for managing the entire implanted cohort.
This study proposes two approaches to optimize the pathway:
• Integrate remote monitoring to reduce time constraints, optimize onsite visits, and increase flexibility.
• Improve the implant activation phase by promoting early activation based on objective data collected during surgery.
The primary goal is to demonstrate non-inferiority in hearing performance in noise at 12 months for patients followed with the new pathway compared to usual care.

Method:
This is a prospective, randomized, comparative, open-label, non-inferiority study conducted in six centers across France. Two patient groups will be followed for 12 months post-activation:
• Control arm: implanted patients receive standard follow-up as per their center's practice.
• Experimental arm: implanted patients follow a hybrid care pathway combining remote monitoring and hospital visits, adjusted based on hearing performance and comfort.

The primary endpoint is the hearing performance measured in noise using the Digit Triple Test 12 months after activation. This value corresponds to the signal-to-noise ratio, expressed in dB RSB, required for the subject to recognise 50% of the speech signal presented (50% intelligibility threshold in silence = SRT50 in dB RSB).

Results:
The study's results will support new recommendations for adult cochlear implant care pathways that include remote care tools of monitoring. In the short term, this aims to improve care quality through digital innovation, enhance prescription relevance, and optimize team organization, allowing more focus on patients needing in-person visits.
The study will assess the acceptability of these tools among patients and healthcare professionals and evaluate their public health cost savings.

Keywords: Cochlear implant, remote care, Care pathway

Oral Presentation 22

Auditory Implants II
OP 22-5

Low-frequency pitch sensitivity and speech perception performance in adult FS4 cochlear implant users

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Purpose Cochlear implant (CI) users may perceive pitch changes via repetition rate (RP) and place-of-stimulation (PP) coding mechanisms. This study investigated whether CI users fitted with fine structure (FS) strategies can discriminate lowfrequency (LF) pitch changes via RP and whether RP performers show better speech recognition than PP performers.
Methods Thirty postlingually deafened adult CI users (15 unilateral, 15 bilateral) participated in this study. LF pitch discrimination linked to temporal fine structure (TFS) sensitivity was assessed with the Disharmonic Intonation test (A§E psychoacoustic test suite), while speech perception was evaluated with phonetically balanced words and everyday sentences (both in quiet and noise), and the Italian Matrix test (in adaptive mode).
Results Just noticeable differences (JNDs) in RP performers were significantly better compared to PP JNDs ($p < 0.001$, $r = 0.80$). No significant differences were found between unilateral and bilateral CI users for LF pitch perception ($p > 0.05$). Within-group comparisons (better ear versus bilateral listening) revealed that better ear JNDs were not significantly different from the bilateral performance ($p > 0.05$), whereas significant bilateral benefit was observed for word recognition score (WRS) + 10 ($p = 0.016$, $r = 1.00$), WRS + 5 ($p = 0.021$, $r = 1.00$), and Matrix performance ($p = 0.033$, $r = 0.80$). Speech recognition in noise was significantly better in RP performers compared to PP performers across multiple tests, including WRS + 10 ($p = 0.002$, $r = 0.90$), WRS + 5 ($p = 0.001$, $r = 0.90$), and the Matrix test ($p = 0.03$, $r = 0.60$).
Conclusion These findings highlight the advantages of FS coding strategies in improving TFS sensitivity and speech perception in complex listening environments.

Keywords: Cochlear implant, Temporal fine structure, Temporal pitch, place pitch

Oral Presentation 22

Auditory Implants II
OP 22-6

Cochlear Implant outcomes in adults with short duration single sided deafness

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Introduction
Cochlear Implants (CI) are a well established intervention worldwide for bilateral severe to profound hearing losses. In some countries CIs are available for single sided deafness (SSD) but in most they are not. Whilst studies on outcomes for CI in SSD are available, many include adults with longer duration SSD or children with SSD not implanted until later into the developmental window (i.e. 3-4yo vs <12m) in their analysis. Adults with short duration SSD may comprise a separate sub-cohort in terms of their outcome and ability to successfully integrate a CI with their normal hearing ear, we share our experiences here.

Method
Retrospective outcome review of 15 patients with short duration single sided deafness (< 36 months) receiving a privately funded cochlear implant at a single hearing implant centre. Included are device usage, masked speech in quiet word and phoneme discrimination scores, 0 degree azimuth co-located speech in babble noise word discrimination scores, spatially separated unaided and best aided speech in noise word discrimination scores, hearing specific patient reported outcome measures: Speech and Spatial Qualities 12, GAST, and Vanderbilt fatigue scale (VFS) scores at several timepoints including 9 months post-activation.

Results & Discussion
All recipients reported excellent benefit from their CI device, were able to integrate the sound of the cochlear implant with their normal hearing ear and at their one year review were continuing to wear their cochlear implant all day every day consistently (over 10 hr/day average wear time). Recipient speech in quiet scores progressed quicker than standard recipients with longer duration hearing losses and reached significantly higher average scores. Speech in noise testing and SSQ12 and GAST and VFS scores demonstrated a significant impact on the recipients quality of life in partially restoring localisation and hearing in noise ability, thereby reducing listening effort and fatigue.

Keywords: Single sided deafness, Cochlear implant, Outcomes

Oral Presentation 22

Auditory Implants II
OP 22-7

Spatial release from masking in congenitally deaf children following sequential bilateral cochlear implantation

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Objective: Restoring binaural processing, especially the ability to benefit from spatial unmasking, is essential for optimal auditory development, learning, and social interaction. This study examines how sequential bilateral cochlear implantation (CI) supports spatial release from masking in congenitally deaf children.
Methods: 96 children implanted bilaterally in sequential procedure, 49 with interimplant delay of less than five, and 47 with interimplant delay over 5 years. The mean age at first CI was 2.2 years in the group with a shorter interimplant delay and 2.5 years in the group with a longer delay. The mean age at second CI was 5.5 and 10.9 years, respectively.
Speech perception ability was evaluated after 14 months of bilateral CI use. Speech was presented from the front. Initially, noise was also presented from the front; subsequently, it was repositioned to the sides, at azimuths +90° and –90°. The spatial release from masking was calculated twice — as the difference in SNRs between the condition with both speech and noise presented from the front and the conditions with speech from the front and noise moved to the first, and then to the second, implanted ear.
Results: In the group with an interimplant delay of less than five years, the spatial release from masking did not differ significantly when the noise was moved toward the first or the second implanted ear, yielding values of 2.8 dB and 3.2 dB, respectively. In children who received their second implant after a longer interval, the spatial release from masking was –0.6 dB when the noise was directed toward the first cochlear implant and 2.5 dB when directed toward the second implant.
Conclusion: A short interval between surgeries in sequential bilateral cochlear implantation promotes better development of spatial hearing abilities.

Keywords: Cochlear implant, Sequential bilateral implantation, Binaural hearing

Oral Presentation 22

Auditory Implants II
OP 22-8

Voice pitch perception primarily relies on amplitude modulation cues for most cochlear-implant users

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Pitch perception in cochlear-implant (CI) users is known to be severely limited. Using artificial tones, previous studies have shown that due to the limited spectral resolution of the electrode-neuron interface, place cues are rarely accessible. Instead, it has been suggested that pitch perception is primarily driven by temporal cues, which appear in the form of amplitude modulation on the individual electrodes. However, in complex, dynamic stimuli such as speech, the limited amount of steady-state segments may naturally limit the salience of temporal cues, and thus, place cues might take a larger role.
To address this question, we prepared two odd-one-out tasks using triplets of syllables uttered by a female talker, where participants had to detect the interval where the f0 had been lowered (experiment 1) or increased (experiment 2). Instead of only presenting these stimuli acoustically to the CI participants, we recorded the electrical output of implant processors fitted with the participants own configuration. We then altered the recorded electrical stimulation patterns to suppress either temporal cues, place cues, or both. These altered stimuli were subsequently presented during the experiment using direct stimulation. The obtained psychometric functions showed that most CI users indeed rely primarily on temporal cues when present and salient. However, when the temporal cues were weak — either because they were artificially suppressed through our manipulation, or when the f0 was high — place cues were still utilized. Additionally, the individual weighting of temporal and place cues varied across participants. Further investigation is required to identify the factors underlying this variability across participants and to confirm whether the same pattern occurs in other classes of natural sounds, such as tones produced by musical instruments.

Keywords: Cochlear implants, Pitch perception, Place/temporal coding

Oral Presentation 22

Auditory Implants II
OP 22-9

Programming Cochlear Implants in Very Young Children: A Practical Approach Using Objective Physiologic Measures

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Purpose:
As cochlear implantation expands to younger ages, traditional behavioral programming methods are not feasible. Infants and toddlers cannot reliably participate in loudness scaling tasks, yet early and accurate programming is critical to ensure consistent access to sound during sensitive periods of auditory development. Objective physiologic measures that capture neural and reflexive responses to electrical stimulation offer a reliable alternative. This presentation describes a structured approach for incorporating two such measures, Auditory Response Telemetry (ART Fit) and Electrically Evoked Stapedial Reflex Thresholds (ESRT), into the programming of very young pediatric cochlear implant (CI) users.

Methods:
Data driven clinical programming protocols from a large pediatric CI center are presented to illustrate how objective measures are incorporated throughout the fitting process. ART Fit data are used to gauge changes in neural response and ESRTs guide well corelated estimations of upper loudness levels (Maximum Comfortable Loudness; MCL). These data are combined with threshold testing, observation, and parental feedback to refine maps over time. Representative case examples demonstrate application in children implanted under 12 months of age.

Results:
Routine integration of ART Fit and ESRT provides reliable, physiologic anchors for programming in children unable to participate behaviorally. Incorporation of these measures improves initial map accuracy, reduces the number of necessary appointments, and supports early access to meaningful sound.

Conclusions:
Objective physiologic measures are essential to effective programming for the youngest cochlear implant recipients. Integrating ART Fit and ESRT within a structured clinical framework enhances programming accuracy, efficiency, and family confidence; ensuring that even the youngest children receive timely access to sound and optimal conditions for auditory development.

Keywords: Pediatric cochlear implantation, Electrically evoked compound action potentials, Stapedial reflex thresholds

Oral Presentation 23

Auditory Rehabilitation and Speech Perception Ⅰ
OP 23-1

A Framework of Neuroplasticity Changes via Cortical Auditory Evoked Potential Following Hearing Aids and Auditory Training Intervention in Post-Lingual Adults with Hearing Impairment

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Background: Post-lingual hearing impairment reduces auditory input to the central auditory system, resulting in cortical reorganization (primary plasticity) that negatively affects speech perception and listening effort. Although hearing aids and auditory training are known to improve audibility (secondary plasticity), the neural mechanisms supporting such improvement remain unclear.

Objective: This study proposes a conceptual framework to characterize neuroplasticity changes following hearing aids and structured auditory training intervention in post-lingual adults with hearing impairment, using Cortical Auditory Evoked Potentials (CAEPs) as an objective biomarker.

Framework: The proposed framework integrates hearing aids use and structured auditory training as complementary interventions targeting both bottom-up and top-down neuroplasticity. It hypothesizes that consistent hearing aids use restore cortical detection to sound through bottom-up secondary plasticity, while auditory training strengthens both bottom-up and top-down secondary plasticity through repeated auditory stimulation and active listening exercises. These processes enhance sensory detection, discrimination, attention skill, and memory integration, thereby reinforcing cortical reorganization. The CAEP P1–N1–P2–N2–P3 complex is positioned as electrophysiological indicators to monitor cortical neuroplasticity and auditory processing efficiency across intervention phases.

Implications: This framework offers a systematic approach to quantify functional neuroplasticity following hearing aids and auditory training intervention, bridging electrophysiological and behavioral outcomes. It provides a theoretical basis for longitudinal investigations aimed at optimizing individualized intervention strategies and improving understanding of how cortical neuroplasticity supports perceptual recovery in post-lingual adults with hearing impairment.

Keywords: Cortical auditory evoked potential, Neuroplasticity, Auditory training

Oral Presentation 23

Auditory Rehabilitation and Speech Perception I
OP 23-2

The Impact of Hearing Loss on Musical Sophistication and Psychological Well-being: Evidence from Late-Deafened Adults

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This study examined the consequences of losing music for late-deafened adults. It revealed that hearing loss does not negate the fundamental need for music, which helps support social connectivity and psychological wellbeing.
Methods: A three-stage mixed-methods approach was implemented. Stage 1 – Online Survey with 116 participants. From these, 24 purposively selected participants contributed to Stage 2 – Qualitative data; personal narrative, five still images, and a music-piece supported by a scaffold paragraph explaining their choice. Twelve respondents participated in Stage 3 - Interviews which expanded upon previous contributions. Statistical, thematic and inductive analyses confirmed consistency across stages and data formats.
Results: Musical relationships remained strong, with late-deafened adults pursuing music despite diminished perception. Hearing loss reduced music fidelity: the greater mismatch between personal importance of music, and reduced perception and enjoyment, the greater the consequences to quality-of-life. Participants experienced unacknowledged and untreated grief for music.
Conclusion: Hearing loss is far greater than just losing sound. It is a long-term sensory loss causing grief and major life-style adaptations. The study contributes to the understanding of late-deafened adults' experiences of a changing relationship with music. Results exposed gaps in current understanding of the need for music and points out healthcare may be inadequate by not considering music, potentially inhibiting a relationship with music, affecting wellbeing and quality-of-life.
Implications for Clinical Practice: There is need for acknowledgement, support and a safe space to process the significance of hearing loss and loss of music. Rehabilitation or counselling needs to be available for all. Audiologist training should include music rehabilitation tools. Hearing devices need to be programmed for music, and for musicians, programmed with their instrument. A care-plan is needed so late-deafened adults understand the 'burden of illness', the 'burden of treatment' and how hearing loss impacts on music, personal relationships and quality-of-life.

Keywords: Late-deafened adults, Music, Quality-of-life consequences

Oral Presentation 23

Auditory Rehabilitation and Speech Perception I
OP 23-3

ReDi: An Intelligent, Scalable Approach to Personalized Hearing Rehabilitation

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Advances in digital health and artificial intelligence are redefining how hearing rehabilitation can be delivered and personalized. Traditional clinical models rely on therapist-guided sessions and fixed training protocols, limiting scalability and sustained engagement. To address these challenges, MED-EL developed ReDi, an intelligent rehabilitation ecosystem that extends professional care beyond the clinic and supports individualized auditory training worldwide.

ReDi integrates two components: a user-facing mobile application that delivers adaptive listening and speech-understanding exercises, and a professional interface that enables clinicians to design, assign, and monitor training plans in real time. The platform evolves continuously through agile, clinician-in-the-loop development, ensuring both safety and responsiveness to user needs. Its AI-based modules automatically adjust task difficulty based on performance metrics, verify hardware setup, and assist in generating language-specific content through controlled generative AI workflows.

Early deployment with thousands of users worldwide demonstrates high engagement and satisfaction. Clinicians report improved insight into patient progress and enhanced continuity of care. The introduction of child-friendly, interactive content has created new opportunities for early auditory and language development, while AI-assisted localization enables rapid adaptation across languages and cultures.

ReDi exemplifies how intelligent systems can enhance—rather than replace—professional expertise, transforming hearing rehabilitation into a continuous, data-driven, and globally accessible process. By uniting ethical AI design, clinician oversight, and adaptive learning, the platform offers a sustainable model for the next generation of auditory care. Its development and early outcomes illustrate how human and machine intelligence together can broaden the reach and effectiveness of hearing rehabilitation, aligning with the vision of a more connected and inclusive audiological future.

Keywords: Artificial Intelligence, Digital Hearing Rehabilitation, Personalized Auditory Training

Oral Presentation 23

Auditory Rehabilitation and Speech Perception Ⅰ
OP 23-4

A Study of the Relationship between Auditory Developmental Stage and Cochlear Implanted Children's First Word Period Using the Japanese LittlEARS Auditory Questionnaire

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【Introduction】
D/HH children who receive cochlear implant (CI) at an early age are expected to catch up to the language level of children with normal hearing at an early age. The time when first word is observed in children with normal hearing is generally said to be around 12 months. In the case of Japanese CI children, we examined how soon they began to speak their first words and what their auditory development was like in this phase.

【Methods】
10 children who had undergone CI surgery at our department at 24 months or younger and were able to attend for auditory verbal approach sessions after June 2016 were included in the study. 7 cases had bilateral CIs, and 3 cases were bimodal. The Japanese LittlEARs Auditory Questionnaire (LEAQ) were used to track the progress of auditory development in children with CIs. We recorded the hearing age and the score of the LEAQ when the CI children were entering their first word period. We compared the hearing age and LEAQ score of the early intervention group (n=4, hearing aids under 4 months) and the delayed intervention group (n=6, hearing aids after 9 months) at the first word stage, and examined whether there were significant differences using Mann-Whitney U test.

【Results】
All children entered the first word phase within 12 hearing months. The median LEAQ score at the time of first word entry was 26 (range 21-32). There was no significant difference between the early and delayed intervention groups in the hearing age and LEAQ score at first word period, but there was a significant difference (p=0.028) in the chronological age. The early hearing aid group reached the first words (M=15 months, range 14-16) significantly earlier compared to the delayed hearing aid group (M= 24.5 months, range 23-30).

Keywords: First Word Period, Auditory Development, Cochlear Implant

Oral Presentation 23

Auditory Rehabilitation and Speech Perception Ⅰ
OP 23-5

The lived experience of hearing loss - an individualised responsibility

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Background: Hearing loss affects individuals globally and impacts more than just communication. In the United Kingdom (UK), hearing loss management includes device provision, hearing therapy, and other interventions. However, there is limited research exploring the lived experience of hearing loss.

Objective: This presentation will discuss how people have described their lived experiences of hearing loss and will introduce the first conceptual model derived from these insights.

Methods: In depth qualitative interviewes were conducted with participants with varied ages and locations across the UK to reflect diverse lived experiences. Patient and Public Involvement and Engagement (PPIE) played a central role, particularly in involving groups often underrepresented in research, such as South Asian community members, adults in residential care, and individuals with additional disabilities. Interviews were analysed following a Grounded Theory informed approach.

Results: 46 adults with hearing loss participated in this study. Four interconnected themes defined the lived experience of hearing loss and the core category of 'individualised responsibility'. These four sub-categories will be discussed in the presentation with explanation and example quotes. These four categories are: individualised auditory lifeworld (a sense of isolation and disconnect), social comparison and support (recognising differences), individualised patient centred care (approaches to help-seeking) and individualised agency and capability (managing hearing loss).

Conclusion: Individuals often carry the burden of managing hearing loss alone, even when broader support exists. This study provides new insights for audiology professionals and emphasises the need to strengthen family, peer and social support networks. The presentation will reflect on how services could minimise the invisible workload and provide practical and emotional support for patients with hearing loss.

Keywords: Hearing Loss, Audiology, Coping

Oral Presentation 23

Auditory Rehabilitation and Speech Perception I
OP 23-6

Sound Localization in Cochlear Implant Users: A Retrospective Analysis Across Cochlear Implant Configurations

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Background:
Accurate sound localization is essential for navigating complex auditory scenes, such as detecting warning signals or following speech in noise. In normal-hearing listeners, spatial hearing relies on interaural time and level differences, which are often degraded in cochlear implant (CI) users due to asymmetric hearing and technological limits. Despite major advances, spatial hearing outcomes remain highly variable and depend on factors such as implantation type, device experience, and age.

Objective:
This study assessed spatial hearing in CI users, comparing implantation types—bilateral, bimodal, and single-sided deafness (SSD)—and age groups. We also examined associations between localization accuracy and speech perception in quiet and in noise using the Freiburger monosyllabic and Oldenburger Sentence (OLSA) tests.

Methods:
Data from 241 CI users (172 adults, 69 children) were retrospectively analyzed. Localization accuracy in free field was quantified as root mean square error (RMSE). Subgroups included bilateral (n = 78), bimodal (n = 70), and SSD users (n = 93). Audiometric thresholds and speech test results were analyzed using non-parametric tests and linear models, with CI-side performance defined per implant side and averaged for bilateral users.

Results:
Bilateral users localized best (mean RMSE = 29.1° ± 13.2°), followed by SSD (38.9° ± 15.9°) and bimodal users (50.1° ± 17.8°). RMSE improved with longer implant use ($\beta = -0.075$, $p = 0.032$), particularly in SSD (interaction $p = 0.031$). Children outperformed adults overall (35.4° vs. 40.4°, $p = 0.011$), notably in the bilateral group, while bimodal children performed worse than adults. RMSE correlated with CI-ear speech scores ($r = -0.31$, $p < 0.001$).

Conclusion:
Spatial hearing depends on age and implantation type. Bilateral implantation provides the best localization, especially in children. The link between localization and speech perception suggests shared binaural processing and highlights the need for individualized strategies restoring interaural cues in bimodal users.

Keywords: Cochlear implants, Sound localisation, Spatial hearing*

Oral Presentation 23

Auditory Rehabilitation and Speech Perception Ⅰ
OP 23-7

Speech-in-Noise (SIN) Abilities in Pediatric Unilateral Cochlear Implant Users

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Purpose: Speech perception in noise (SIN) remains a significant challenge for children with cochlear implants (CIs), impacting their academic and social development. While CIs restore access to sound, their limited spectral and fine temporal cues hinder perception in noise. The aim of the study is to evaluate the speech perception in noise in Tamil-speaking children with CI (1>6 years) using various SNRs in different noise conditions. Method: A cross-sectional study design included 30 Tamil speaking cochlear implant children with an age range of 1 - >6 years categorized into three groups: group 1 (1 - <3years), group 2 (3 - <5 years), and group 3 (5 - <6 years). The speech in noise (SIN) stimulus was presented at 40dB SL, (ref: aided PTA+40dB), through a calibrated loudspeakers positioned at 45°azimuth and 1 meter away from the participant. Two-Talker Babble (TTB), was presented under four listening conditions viz, quiet, 0 dB SNR, +10 dB SNR, and +20 dB SNR. Scores were converted into percentages for analysis. Results: Kruskal-Wallis test was used and a significant main effect was observed for all four presentation conditions ($p < 0.01$). Mann-Whitney U test was carried out for pairwise comparisons. Significant difference in speech perception scores was observed when Quiet vs 0dB SNR condition and 0dB SNR vs +20dB SNR conditions were compared. Duration of CI use demonstrated strong positive correlations with SIN scores across all conditions, with group 3 (5-<6 years CI use) outperforming other groups. Aided hearing thresholds indicated significant negative correlations with SIN scores at 0 dB SNR and +10 dB SNR. Conclusion: The SIN (Speech in Noise) test is a valuable tool to evaluate long-term outcomes in CI recipients. The results of the present study will facilitate long-term auditory training to improve speech in noise, optimal device fitting, and long-term device use.

Keywords: Speech in noise, Two Talker Babble, Signal to noise ratio

Oral Presentation 23

Auditory Rehabilitation and Speech Perception Ⅰ
OP 23-8

Development of a Standardized Korean Consonant-Nucleus-Consonant Monosyllabic Word Test for Speech Recognition

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Purpose: Although Consonant–Nucleus–Consonant (CNC) monosyllabic word tests are widely used in English-speaking countries to assess speech intelligibility, Korea lacks a standardized CNC word list suitable for clinical application and cross-linguistic comparison. This study aimed to develop a fully standardized Korean CNC word list following the methodological principles proposed by Lehiste and Peterson, addressing current limitations in multicenter research consistency and international comparability.

Methods: Following the standard CNC framework consisting of 10 lists with 50 words each, we systematically constructed a Korean CNC word pool through linguistic and phonetic principles. Candidate monosyllabic CNC-structured words were selected from high-frequency Korean vocabulary. Phonemic-balance criteria were applied to match the distribution of onset consonants, vowels, and final consonants to the corpus-based phoneme frequency of contemporary Korean. Words exhibiting extreme rarity or literary usage were excluded using corpus-derived frequency metrics. The final materials underwent professional audio recording using both male and female native Korean talkers to support diverse clinical and research applications.

Results: The resulting Korean CNC test material comprises ten phonemically balanced lists of fifty monosyllabic CNC words each. The incorporation of corpus-based phoneme distribution ensures representativeness of everyday spoken Korean, while frequency-controlled vocabulary enhances reliability and reduces lexical confounds in intelligibility testing. Completion of high-quality recordings using both male and female talkers establishes a standardized auditory corpus appropriate for CI and normal-hearing listener assessment.

Conclusion: This study provides the first systematically developed and standardized Korean CNC word lists optimized for clinical audiology and international research comparability. The materials offer a reliable platform for assessing speech intelligibility in diverse listener populations, facilitate multicenter trials within Korea, and enable cross-linguistic evaluations alongside English, Arabic, and Mandarin CNC frameworks.

Keywords: Korean CNC Monosyllabic word test, Cochlear Implant, Speech perception

Oral Presentation 24

Auditory Screening and Diagnosis II
OP 24-1

A Comparison of CE-Chirp Auditory Brainstem Response Thresholds and Behavioural Hearing Thresholds in Infants and Young Children

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BACKGROUND
Auditory Brainstem Response testing (ABR) is used to estimate hearing thresholds, where a child is unable to show reliable behavioural responses to sounds. ABR results are often used to program hearing aids for these children. At Hearing Australia, the HearLab system is also used to verify all hearing aid fittings when hearing thresholds have been estimated from evoked potentials. The Children's Audiology Service (CAS) transitioned from using Tone Burst stimuli to the Narrow-Band CE-Chirp LS stimulus due to its reported ability to provide faster and clearer ABR waveforms.
Cross-verification of results from both electrophysiological and behavioural processes is a recommended practice in paediatric diagnosis. Whilst CE-Chirp ABR thresholds are strongly correlated with Tone Burst ABR thresholds, limited studies exist that have investigated the correlation between CE-Chirp thresholds and behavioural thresholds.
The objective of this study is to determine how well the CE-Chirp ABR thresholds agree with follow-up behavioural hearing thresholds.
METHOD
The participants were children diagnosed with sensorineural hearing loss identified via CE-Chirp ABR by CAS, who have completed behavioural hearing assessments either with Hearing Australia or CAS. Bland-Altman plots will be used to assess agreement between ABR and behavioural thresholds overall and by frequency. The relationship between CE-Chirp ABR thresholds and behavioural thresholds will be assessed using regression modelling. The difference between CE-Chirp and behavioural thresholds will be estimated.
RESULTS
Preliminary analyses suggest good agreement between CE-Chirp thresholds and behavioural thresholds. The findings will be discussed in light of existing literature and the program context.
CONCLUSIONS:
This model can be used to estimate correction factors to be applied to CE-Chirp thresholds to better match behavioural thresholds and to evaluate the efficacy of the inclusion of the Narrow-band CE Chirp stimulus within a diagnostic hearing program for newborns.

Keywords: ABR, Chirp, Behavioural

Oral Presentation 24

Auditory Screening and Diagnosis II
OP 24-2

Normal Values for Cervical and Ocular Vestibular-Evoked Myogenic Potentials: A Comparison of Air-Conducted (AC) and Bone-Conducted (BC) Stimuli

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Vestibular Evoked Myogenic Potentials (VEMPs) are short-latency, reflexive muscle responses elicited by sound or vibration, used to evaluate otolith organ function within the vestibular system (Colebatch et al, 1994). Two primary variants are employed: cervical VEMP (cVEMP), recorded from the sternocleidomastoid muscle to assess saccular and inferior vestibular nerve function, and ocular VEMP (oVEMP), recorded from the extraocular muscles to assess utricular and superior vestibular nerve function (Taylor et al, 2020).
Clinically, VEMP testing assists in the differential diagnosis of vestibular disorders, though ongoing research continues to refine its diagnostic value (Zhou et al, 2004; Honaker et al, 2007).
Previous studies have reported optimal cVEMP response rates (~99%) when participants are positioned supine with the head elevated and turned, and oVEMP response rates (~90%) using a nasal alar electrode montage in a seated position (Shahnaz & David, 2021). Building upon this work, the current study compared air-conducted (AC) and bone-conducted (BC) VEMP stimuli under standardized test conditions to determine which method yields superior response rates, waveform morphology, and latency characteristics for both cVEMP and oVEMP.
This study included 40 adults (aged 18–29) with normal hearing sensitivity and middle ear function. Each participant underwent comprehensive audiological screening to confirm normal hearing and middle ear status.
VEMP testing followed standardized electrode placements and participant positioning as previously described (Shahnaz & David, 2021). Both cVEMP and oVEMP responses were recorded to AC and BC stimuli, delivered at comparable stimulus intensities to ensure valid comparison across modalities.
For cVEMP, there were no statistically significant differences between AC and BC stimuli in P1 latency, waveform morphology, or response rate. However, for oVEMP, BC resulted in a significant decrease in N1 latency, improved waveform morphology, higher response rates, and reduced perceived loudness, indicating that vibratory stimulation can elicit robust vestibular responses with lower sound-intensity requirements.

Keywords: Vestibular Evoked Myogenic Potentials, Air conduction, Bone conduction

Oral Presentation 24

Auditory Screening and Diagnosis II
OP 24-3

Predicting Five-Year Hearing in Normal-Hearing Individuals: Integrating Audiometry, Deep Learning, and National Claims

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Purpose: To build deep-learning models that predict 4-frequency pure-tone average (4PTA) five years ahead in normal-hearing individuals, and to incorporate disease-specific hazard ratios (HRs) from the National Health Insurance Service (NHIS) to quantify factors associated with maintenance or deterioration of normal hearing.
Method: From a reference-standard dataset, 1,290 normal-hearing subjects were screened; 222 with exclusion flags were removed, yielding 1,051 subjects. From the Hearing Big Data Center (HBDC), 31,799 initial records were refined and followed to construct 608 ear-level pairs with "normal hearing + 5-year follow-up" The two datasets were age-band matched to create an integrated analysis set. The outcome was 5-year 4PTA (Future_4PTA). Models included DNN, 1D-CNN, and TabNet; performance was evaluated by MAE/MSE and accuracy within ±5 dB. Separately, an NHIS cohort was analyzed with Cox models to estimate 5-year HRs for vascular, metabolic, neurogenic, and other histories; disease-specific HRs were then applied as adjustment coefficients to the model predictions.
Result: The reference-standard–based model performed best across ages: accuracy within ±5 dB was ~80% in the Young group, ~70% in the Middle-aged group, and lower in the Older group, likely reflecting small samples and heterogeneity. In NHIS analyses, vascular/metabolic conditions generally showed elevated HRs (e.g, vasculitis HRs 1.138/1.057/1.095 for ages 20s/40s/60s). Rare diseases exhibited large HRs with wide CIs. After HR-based adjustment, predicted ΔdB increased slightly in most disease groups, with the strongest effects in microvascular conditions, whereas retinal vein occlusion showed a negative adjustment (ΔdB −0.68).
Conclusion: Five-year hearing prediction in normal-hearing populations is sensitive to age and data quality/balance, and HR-based adjustment improves clinical interpretability. Maintenance versus deterioration of normal hearing appears strongly influenced by vascular/metabolic histories with age-specific patterns. The proposed approach can inform counseling and prevention strategies for individuals with normal hearing.

Keywords: Audiometry, Deep Learning, Hearing Loss

Oral Presentation 24

Auditory Screening and Diagnosis II
OP 24-4

National Quantitative Assessment of Process Quality in Newborn Hearing Screening Across Different Birth Settings in Germany

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Purpose: Newborn hearing screening (NHS) was integrated into the German statutory health insurance program in 2009. Although coverage rates remain high (86.1 %), marked regional and structural disparities persist between birth settings. Building on a qualitative phase involving 18 expert interviews, this national quantitative study aims to evaluate process quality, identify key determinants, and quantify improvement potentials within different delivery settings.

Methods: A standardized online questionnaire was distributed nationwide between November and December 2025 to professionals directly involved in NHS processes, including midwives (hospital- and home-based), ENT and pediatric specialists, audiologists, nurses, and staff from screening and tracking centers. The 48-item instrument covered domains of communication, responsibilities, resource allocation, technical infrastructure, and professional training. Descriptive and inferential analyses, including exploratory and confirmatory factor analyses, will be conducted to identify predictors of screening quality and inter-setting differences.

Results: Data collection is ongoing. Final analysis will be completed before the WCA 2026 meeting.

Conclusion: This nationwide survey represents the second phase of a mixed-methods project on NHS quality in Germany. It provides the first quantitative reference data on process structures across different birth settings and contributes to developing evidence-based quality indicators and recommendations for harmonized screening procedures.

Conflict of Interest: The authors declare no conflicts of interest. The study is supported by the Lower Saxony Ministry for Science and Culture (zukunft.niedersachsen program, Volkswagen Foundation).

Keywords: Newborn hearing screening, Process quality, Interdisciplinary collaboration

Oral Presentation 24

Auditory Screening and Diagnosis II
OP 24-5

Comparison of response parameters of Electrocochleography acquired using different stimuli

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Purpose of the study: Extratympanic electrocochleography (ECochG) is a clinically useful electrophysiological test that currently uses different eliciting stimuli viz. clicks, tone bursts, broadband (BB) chirps, narrowband (NB) chirps etc. There is a dearth of literature comparing ECochG responses elicited by various stimuli. Such a response comparison across different eliciting stimuli will help identify the optimal stimuli for specific clinical applications.
Aim & Objectives: To comparatively analyse various response parameters of ECochG obtained using dfferent stimuli namely clicks, 1000 Hz Narrow Band (NB) chirps, 1000 Hz Tone Burst (TB) stimuli and to theoretically identify optimal stimulus type for identifying Meniere's disease.
Method: Extratympanic ECochG recordings were obtained using all three stimuli delivered via TIPtrodes to 36 ears of normal-hearing individuals aged 18–30 years, with no history of vestibular disorders or middle ear disease. Response parameters such as absolute latencies (SP, AP), amplitudes (SP, AP) and SP/AP amplitude ratio were computed and compared across the different stimuli.
Results: On comparison using suitable statistical tests, detection rates for SP and AP were the greatest for 1000 Hz NB chirps in comparison to clicks and tone bursts. Earliest absolute latencies of SP and AP components were produced by clicks followed by 1000 Hz chirps and 1000 Hz tone bursts. While NB chirps produced the highest AP amplitude, 1000 Hz TB stimuli produced the highest SP amplitude. SP/AP amplitude ratio was higher for 1000 Hz TB stimuli in comparison to both clicks and 1000 Hz chirps.
Conclusion: The present study provides preliminary evidence to support the use of 1000 Hz NB chirps as an efficient and convenient alternative to TB stimuli for clinical applications that demand recording of frequency specific ECochG activity.

Keywords: Electrocochleography, Optimal stimuli, Meniere's Disease

Oral Presentation 24

Auditory Screening and Diagnosis II
OP 24-6

Assessing the Effectiveness of a Tablet-Based Hearing Screening device for school hearing screening

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Introduction Hearing loss during school age can adversely impact language development, academic performance and social functioning. Early detection through accurate screening is therefore essential. However, conventional school hearing tests in Korea are limited by low sensitivity and lack of standardization. This study aimed to evaluate the validity of a tablet-based pure-tone hearing screening method implemented in real-world school settings. Methods A total of 207 students (414 ears) from elementary and high schools participated.
The screening procedure involved presenting pure-tone stimuli at 25 dB HL across four frequencies (500, 1000, 2000, and 4000 Hz) using a calibrated tablet-based device. Screening outcomes were compared to those obtained from a gold-standard clinical audiometer (Interacoustics AD629). Predictive values, Cohen's kappa, and ROC analysis were used to assess diagnostic accuracy, agreement, and discriminative ability. Results The tablet-based hearing screening demonstrated high diagnostic validity. At the participant level, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were all 100%. Sensitivity and specificity at all tested frequencies exceeded 99.8%. Cohen's kappa coefficients indicated substantial to perfect agreement (K = 0.80-1.00), with perfect agreement (K = 1.00) observed at all frequencies. The AUC was 1.00 across all frequencies, reflecting perfect discrimination. Conclusions The findings support the validity of the tablet-based pure-tone screening method for application in school-based hearing assessments. Its high diagnostic accuracy and strong agreement with the gold-standard audiometric test highlight its potential as a reliable and scalable alternative for enhancing current school hearing screening practices.

Keywords: Hearing Screening, Tablet-based device, School-aged

Oral Presentation 24

Auditory Screening and Diagnosis II
OP 24-7

Hearing Screening Among Down Syndrome Children in Malaysia: Insights from Wide Band Immittance and Otoacoustic Emissions Testing

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Background:
Children with Down Syndrome (DS) are at high risk of middle ear (ME) dysfunction and hearing loss. This study aimed to investigate hearing screening outcomes in DS children using Wideband Acoustic Immittance (WAI) and Distortion Product Otoacoustic Emissions (DPOAE) testing.

Methods:
A cross-sectional study was conducted involving 71 children with DS, aged 0–144 months (mean = 67.9 months; SD = 30.0). All participants underwent otoscopic examination, WAI, and DPOAE testing. Of 142 ears screened, 16 were excluded due to impacted wax (n=12), tympanic membrane perforation (n=2), or inability to test (n=2). The 226 Hz tympanogram was derived from WAI data.

Results:
Among 126 ears analyzed, 57.1% showed Type B tympanograms, 19.0% Type As, 14.3% Type A, and 9.5% Type C. The mean ear canal volume (ECV) for Type A tympanograms was 0.46 cm^3 (SD=0.19). No significant correlation was found between ECV and age (τ=0.053, p=0.390). Nearly all participants (98.4%) showed absorbance values outside normal limits. Agreement between 226 Hz tympanogram types and averaged wideband tympanograms (based on Jerger's classification) was low (38%). A total of 73 ears (58%) failed the DPOAE test.

Conclusions:
Consistent with previous studies, a high prevalence of ME dysfunction and reduced low-frequency absorbance was found among children with DS. The low correspondence between conventional tympanometry and WAI suggests that WAI may offer a more sensitive measure of ME status in this population. WAI provides an objective, frequency-specific assessment of ME function that may improve early identification of conductive hearing issues in children with DS. The lack of correlation between ECV and age indicates that age-predicted Real-Ear-to-Coupler Difference (RECD) values may not be applicable for DS children, highlighting the need for individualized verification during hearing aid fitting or using the WAI predicted RECD.

Keywords: Down Syndrome, Wide Band Immittance, Middle ear

Oral Presentation 24

Auditory Screening and Diagnosis II

OP 24-8

Prevalence of Ear and Hearing Concerns Among Waste Collectors in Ragama

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Waste collectors are a vulnerable occupational group exposed to environmental and occupational hazards including loud noise and infections that may adversely affect ear and hearing health. Despite these risks, data on hearing status in waste collectors in Sri Lanka are scarce. This study aimed to determine the prevalence, types, and severity of ear and hearing impairments among waste collectors in Ragama and to explore associations with demographic and occupational factors.

A retrospective descriptive study was conducted using secondary data from an ear and hearing screening program involving 80 waste collectors in Ragama. Data on otoscopic examination, pure tone audiometry results, demographic variables, and occupational history were analyzed. Hearing impairments were classified by type and severity based on audiological thresholds. Descriptive statistics summarized participant characteristics and hearing outcomes, and chi-square tests examined associations between hearing impairments and factors such as age, sex, and noise exposure.

The majority of participants were female with ages ranging from approximately 20 to 77 years. Most had clear ear canals; however, 10-15% presented with occluded ear wax. Pure tone audiometry revealed normal hearing in 50-60% of ears tested, minimal to mild hearing loss in 10-15%, and moderate to severe sensorineural hearing loss in about 15-20%. Conductive hearing loss linked to cerumen impaction was also present. Hearing aid fittings were recommended for roughly 5% of participants. Hearing loss severity correlated positively with age and duration of occupational noise exposure. Comorbidities such as diabetes and hypertension were noted among some individuals with hearing impairments. The overall prevalence of any hearing impairment was estimated between 40-50%, with moderate to severe loss around 15-20%.

This study highlights a significant burden of hearing impairment among waste collectors in Ragama, underscoring the need for regular hearing surveillance and occupational hearing conservation programs.

Keywords: Waste collectors, Hearing impairment, Occupational noise exposure

Oral Presentation 24

Auditory Screening and Diagnosis II

OP 24-9

Inter-Rater Reliability and Validation of Nurse-Administered Infant Hearing Screening: Evidence for Equitable Early Detection in LMICs

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Background: The Joint Committee on Infant Hearing recommends identification of permanent congenital and early-onset hearing loss (PCEHL) by 1 month of age. Yet, in low- and middle-income countries (LMIC), it is typically identified significantly later. This delayed identification largely stems from limited access to infant and newborn hearing screening (INHS) services, which remain concentrated in hospital-based settings. To address this gap, alternative models of early detection, such as nurse-administered INHS within primary health care (PHC) immunisation programmes, warrant exploration to enhance access and promote early identification. Thus, this study aimed to evaluate the reliability of nurse-administered INHS using distortion product otoacoustic emissions (DPOAE) screening.

Method: This was a repeated-measures study with randomly selected infants attending their six-week immunisation visits. Each infant was independently screened by two nurses and an audiologist using DPOAE technology. Cohen's kappa (κ) statistic with 95% confidence intervals (CI) was used to determine the agreement and inter-tester reliability between the audiologist and nurse-administered INHS.

Results: A total of 100 ears among 50 infants were included, and of these, 23 ears (23%) yielded refer outcomes among 17 infants (11 unilateral and 6 bilateral). All infants who failed the screening were referred for hospital-based follow-up and intervention. The analysis indicated an almost perfect level of agreement between nurse- and audiologist-administered screenings (k=0.81; 95% CI: 0.64–0.98; p<0.001).

Conclusion: These findings demonstrate high reliability of nurse-administered DPOAE screening to identify infants with PCEHL. Incorporating nurse-administered INHS into immunisation programmes could substantially improve access to early hearing detection and intervention (EHDI) services and reduce the age of HL identification to acceptable standards. Future large-scale implementation studies are recommended to assess generalisability, sustainability, and system-level integration of this approach. This study strengthens the evidence base for community-level INHS models and supports health system strategies advancing equitable EHDI in LMICs wiht limited resources.

Keywords: Nurse-led infant hearing screening, Reliability studies, Universal access

Oral Presentation 25

Auditory Implants III
OP 25-1

NeuroVoc: A Biologically Plausible Vocoder Framework for Auditory Perception and Cochlear Implant Simulation

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Background: In Cochlear Implant (CI) research, vocoders are often used as simulators to mimic how sound is processed and heard through a CI. However, vocoders do not capture all the important biophysical aspects related to perception in CI users, as they are based solely on signal processing techniques. Standard vocoders do not consider effects such as single fiber refractoriness, electrode interaction, and electrode to-neural interface. In addition, vocoder design is often specific to a given implant or speech coding strategy.

Methods: We present NeuroVoc, a flexible model-agnostic vocoder framework that reconstructs acoustic waveforms from simulated neural activity patterns using an inverse Fourier transform. The system applies straightforward signal processing to neurogram representations—time-frequency binned outputs from auditory nerve fiber models. Crucially, the model architecture is modular, allowing for easy substitution or modification of the underlying auditory models. It also allows direct comparisons between normal hearing (NH) and electrical hearing (EH) models. We evaluated perceptual intelligibility in noise using an online Digits-in-Noise (DIN) test, where participants completed three test conditions: one with standard speech, and two with vocoded speech using an established NH model (Bruce et al, 2018) and the Leiden EH model, which now includes a realistic speech processor at the input (Fidelity 120; Venema et al, 2025).

Results: The vocoder preserves distinctive features of each model; for example, the NH model retains harmonic structure more faithfully than the EH model. Both the standard DIN test and the EH-vocoded groups were statistically equivalent to clinically reported data for NH and CI listeners. On average, the NH and EH vocoded groups increased SRT compared to the standard test by 2.4 dB and 7.1 dB, respectively.

Conclusions: Although some degradation occurs, the vocoder can reconstruct intelligible speech under both hearing models and accurately reflects the reduced speech-in-noise performance experienced by CI users.

Keywords: Cochlear Implant, Vocoder, Phenomenological Model

Oral Presentation 25

Auditory Implants III
OP 25-2

Effect of frequency-to-place factors on perception and adaptation in cochlear implant users

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Sound quality in cochlear implants (CIs) remains a major challenge despite substantial progress in speech understanding. Many CI users achieve good speech recognition yet describe sounds as unnatural or distorted. A certain degree of this degradation may arise from "frequency-to-place factors" that affect how sound information is distributed along the cochlea and delivered to the auditory system - namely frequency-to-place mismatch (FTPM), neural responsiveness and current spread. Understanding these factors is crucial to optimise CI mapping and improve both sound quality and music perception.
We developed two complementary psychoacoustic tasks to assess how these factors shape perception.
(1) Vowel identification: Participants identified vowels generated from controlled combinations of the first and second formants, designed to stimulate electrodes independently. Each response included a confidence rating, enabling estimation of internal vowel maps and potential FTPM-related shifts.
(2) Chord quality: Participants compared the sound quality of chords and their inversions using paired-comparison ratings, allowing assessment of electrode-specific degradation in complex harmonic sounds.
Sixteen adult CI users (12 post-lingual, 4 pre-lingual) and normal-hearing controls were tested. One post-lingually deafened user was also followed longitudinally from switch-on to assess early adaptation. Individual X-ray and PECAP data provided physiological estimates of frequency-to-place alignment, current spread, and neural responsiveness.
Preliminary results show high test–retest reliability. Several CI users preferred slightly shifted vowels, suggesting adaptation to FTPM. Chord comparisons revealed large electrode-specific variability, reflecting ENI differences. Together, these methods offer individualised insights into CI perception and hold promise for guiding clinical fitting to enhance naturalness and musical enjoyment.

Keywords: Cochlear implant, Adaptation, Mismatch

Oral Presentation 25

Auditory Implants III
OP 25-3

Implementing Person-Centered Preoperative Counseling for Adult Cochlear Implant Candidates: A Framework and Practical Tools

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Purpose: Despite the proven efficacy of cochlear implants (CIs), uptake among eligible adults remains low. Research indicates that the preoperative counseling process is a critical factor influencing patient decision-making. This review aims to propose a person-centered care (PCC) framework for preoperative CI counseling to enhance shared decision-making, realistic expectation management, and postoperative satisfaction.

Methods: Current literature and clinical guidelines were reviewed to outline a multidimensional PCC framework. This framework integrates five key domains: (1) medical-audiological factors, (2) communication-social needs, (3) psychological factors and motivation, (4) quality-of-life and expectation management, and (5) family and social support. For each domain, evidence-based assessment tools (e.g, SSQ, COSI, CIQOL-E, HII-SOP) and communication strategies (e.g, motivational interviewing, visual aids) are recommended to facilitate individualized assessment and goal-setting.

Results: The PCC approach emphasizes eliciting patients' personal narratives, values, and goals. Using structured tools helps quantify subjective hearing difficulties, identify psychosocial barriers, align expectations with realistic outcomes, and engage family members in the rehabilitation process. This process fosters a collaborative clinician-patient relationship, empowering candidates to actively participate in decision-making.

Conclusion: A structured, person-centered preoperative counseling framework is essential for addressing non-audiological barriers to CI adoption, including communication, social, psychological, and quality-of-life-related factors. By focusing on individual needs and employing tailored tools, clinicians can improve candidacy assessment, strengthen patient preparedness, and potentially enhance long-term rehabilitation success. Future work should validate these strategies within diverse cultural and clinical settings.

Keywords: Cochlear Implants, Preoperative Counseling, Person-Centered Care

Oral Presentation 25

Auditory Implants III
OP 25-4

Simultaneous Auricular Reconstruction and Hearing Restoration using Active Bone Conduction Implants in Patients with Microtia: Part I

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Background:
Patients presenting with microtia require both aesthetic reconstruction and auditory rehabilitation. Atresiaplasty or the use of percutaneous bone-anchored hearing aids complicate subsequent auricular reconstruction. The Bonebridge (BB) system is a newly designed active transcutaneous bone conduction (BC) implant that transmits sound directly to the inner ear, offering intact skin technology and avoiding the complications associated with percutaneous abutments. We describe and evaluate the feasibility, safety, and efficacy of combining BB implantation simultaneously with complex total auricular reconstruction.

Methods:
A total of ten patients (aged 6 to 35 years) with unilateral or bilateral microtia and aural atresia/stenosis underwent BB implantation combined with auricular reconstruction at a single institution in Croatia between 2022 and 2025. Reconstruction was performed using the modified Nagata technique using an autologous costal cartilage framework (two-stage procedure). Preoperative 3D-CT scans were utilized to carefully select the optimal BB implantation site, particularly critical given the deformed temporal bones often seen in younger microtia patients. Postoperative auditory outcomes were assessed using sound field pure-tone average (PTA4), speech reception threshold (SRT), and Speech Discrimination Score (SDS) at 65 dB SPL.

Results:
No major complications were encountered during the follow-up period (mean 15.3 months). A single patient experienced minor partial skin graft epidermolysis that healed uneventfully, and another required three months of auditory acclimatization to the BB device.
Objectively measured auditory outcomes demonstrated significant functional gain: mean aided PTA functional hearing gain was 35.35 dB, mean SRT improved from 54.5 dB HL (unaided) to 28 dB HL with the BB sound procesor, while mean SDS improved from 56.2% unaided to 72.6% aided at 65 dB SPL.

Conclusion:
Simultaneous BB implantation during auricular reconstruction for microtia patients with aural atresia/stenosis is feasible and safe. This combined approach, utilizing multidisciplinary expertise, provides excellent cosmetic and auditory outcomes.

Keywords: Microtia, Bone Anchored Hearing Aids, Conductive Hearing Loss

Oral Presentation 25

Auditory Implants III
OP 25-5

Simultaneous Auricular Reconstruction and Hearing Restoration using ACtive Bone Conduction Implants in Patients with Microtia: Part 2

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Introduction/Objective: Surgery of the auricle is one of the most complex challenges in facial plastic surgery due to the great variability of malformations. Since ear malformations are associated with conductive deafness, the rehabilitation process must combine both the aesthetic and functional rehabilitation.
Methods: The standardized surgical technique is based on the modified Nagata technique. The procedure is generally performed in two main stages, commencing around the age of 10 years when sufficient autogenous rib cartilage is available. The first stage involves harvesting autogenous costal cartilage to fabricate a three-dimensional framework. Planning for size and position is executed using transparent templates. The framework is implanted, and the skin of the malformed pinna, including the lobule flap, is transposed over it.
The second stage is performed after an interval of at least 6 months. This step involves the elevation of the framework and the construction of the retroauricular sulcus. The elevated position is stabilized with an additional piece of rib cartilage buttress, which is then covered by a vascularized fascial flap and a skin graft.
Results and Conclusion: The goal is the construction of an auricle that is aesthetically natural-looking, inconspicuous, and psychosocially acceptable, capable of supporting glasses or hearing aids. In our cohort of 77 patients treated utilizing these concepts, reconstructions were carried out with satisfactory outcomes and generally without major complications.
When associated with congenital auricular atresia, aesthetic reconstruction works best when combined with auditory rehabilitation.

Keywords: Microtia, Rib cartilage, Reconstruction

Oral Presentation 25

Auditory Implants III
OP 25-6

Designing a national survey of Australian healthcare professionals in managing hearing loss in adult patients with limited benefits from hearing aids

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Purpose: Professional barriers, most notably limited understanding of cochlear implant (CI) candidacy criteria and referral pathways, contribute to the underutilisation of cochlear implantation in eligible adults. This study investigated current referral practices, CI training, and perceived barriers among Australian audiologists, audiometrists, Ear. Nose and Throat (ENT) specialists, and general practitioners (GPs).

Methods: An online questionnaire (29 items) captured demographics, CI training, self-reported referral practices, and perceived referral barriers. Participants were recruited via professional bodies, mailing lists, and social media from June to December 2025.

Results: Of 127 respondents, 83 completed the survey (66%). Disciplines represented included audiologists (n=85), audiometrists (n=8), GPs (n=8), and ENT specialists (n=5). Although 85.9% were aware of current CI guidelines, 29% reported low referral confidence and 36.4% considered their CI training inadequate or uncertain. Of those completing the clinical practice section (n=83), 82% had referred at least one adult patient for CI assessment, with patient disinterest the most frequently reported referral barrier (n=62).

Conclusions: Despite broad engagement and high guideline awareness, training gaps and low referral confidence persist across disciplines, and may contribute to delayed or missed referrals in eligible adults. These findings provide a foundation for developing targeted, evidence-based strategies to improve CI referral practice in Australia.

Keywords: Healthcare professionals, Cochlear implants, Adults

Oral Presentation 25

Auditory Implants III
OP 25-7

Does anatomy-based fitting enhance on auditory outcomes and music perception in cochlear implant users? Evidence from within-subject analysis

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Introduction: Tonotopic or anatomy-based fitting (ABF) aligns each cochlear implant (CI) electrode with the frequency range corresponding to its anatomical location. This study aimed to compare ABF with standard fitting (SF) in terms of speech tests and subjective outcomes, as well as music perception using Meludia platform in a within-subject study.

Methods: Twenty adult CI users implanted with Synchrony ST Flex28 participated. Speech tests (disyllables in silence) and sound quality (HISQUI19) were assesed after nine months with either ABF or SF, followed by one month with the alternate fitting.
Eight participants completed music tasks on Meludia's "Discovery" level, evaluating Spatialization (differentiating between lower and higher notes), Stability (perception of stability or instability), Melody (ascendant or descendant), and Density (presence of one or multiple simultaneous sounds). Each task consists of 5 levels of difficulty. Subjective music perception was assessed using MuRQoL and Munich Music Questionnaire (MuMu).

Results: Participants had a mean age of 46.6±17.5 years. Ten began with ABF, ten with SF. Speech discrimination scores were similar for ABF and SF (68.8±18.2% vs. 69.7±19.3%, p=0.687), as were HISQUI19 scores (78.5±27.7 vs. 78.0±23.4, p=0.925), indicating moderate sound quality.
In Meludia's Density task, ABF yielded significantly better scores at the first level (1.75±0.463 vs. 1.25±0.463; p=0.046), with a trend toward improvement across all levels (1.6±0.44 vs. 1.3±0.56; p=0.174). Five subjects completed MuRQoL, showing slightly higher musical activity scores with ABF (3.2±0.5 vs. 3.1±0.9, p=0.715); 80% scored better with ABF. Six completed MuMu, with 67% reporting music sounded more natural, pleasant, clearer and less tinny/reverberant with ABF.

Conclusions: ABF and SF yielded comparable speech and sound quality outcomes. However, ABF showed advantages in processing multiple simultaneous sounds, particularly in identifying middle and low-frequency components. Further research is needed to confirm ABF's benefits in speech and broader musical perception.

Keywords: Cochlear implants, Anatomy-based fitting, Music

Oral Presentation 25

Auditory Implants III
OP 25-8

RECONSTRUCTING PERCEPTUALLY INTEGRATED SOUNDS BETWEEN COCHLEAR IMPLANT AND HEARING AID EARS

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Purpose: In bimodal hearing, cochlear implants (CI) and hearing aids (HA) deliver speech information differently. CI stimulation often shifts frequency energy upward due to variable electrode insertion depth, distorting natural tonotopy. Meanwhile, HA users typically retain hearing only below 1000 Hz. The brain must integrate these mismatched spectral cues, yet no method currently characterizes how listeners perceive this integration. This study aimed to reconstruct the perceptually integrated spectral content across ears in bimodal users. Method: Adult bimodal listeners were tested using two stop consonants (/ba/, /pa/) and two vowels (/ɪ/, /æ/ as in "hid" and "had"). A reverse correlation (RC) technique was used to estimate internal spectral representations. Participants heard an original sound followed 1.5 seconds later by a randomly generated sound. They judged whether the two sounded "similar" or "not similar." After 200 trials, the average of "different" responses was subtracted from the average of "similar" responses to reconstruct the perceived sound spectrum.

Result: Reconstructed spectra differed significantly from the original stimuli, especially in the first three formant frequencies. Each listener showed a unique spectral integration pattern, and variations in formant frequencies were partially linked to residual low-frequency hearing in the HA ear.

Conclusion: RC-based reconstructions reveal how electric and acoustic inputs interact in bimodal hearing. These integrated spectral profiles offer insight into individual perceptual strategies and could inform personalized clinical fitting protocols. Understanding these interactions may enhance speech perception outcomes for bimodal users.

Keywords: Spectral integration, Bimodal hearing, Spectral interference

Oral Presentation 25

Auditory Implants III
OP 25-9

Optimizing Speech-in-Noise Perception with the Sky HS Auditory System in Pediatric Cochlear Implant Users

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Objectives:
The primary objective of this ongoing study is to evaluate the impact of different programming modes of the Sky Hearing System (Sky CI and Sky Link) on speech-in-noise perception in pediatric cochlear implant users. The main hypothesis is that the AutoSense Target mode provides superior performance compared to the Omnidirectional and mode.

Methods:
This prospective, single-center study involves children aged 6 to 16 years, divided into two groups: bilaterally implanted and bimodal users. Participants are testing three programming modes (Omnidirectional, AutoSense Clinic, AutoSense Target) after a six-month adaptation period. Speech-in-noise performance is measured using the FraSiMat test in free-field conditions, and subjective data are collected through satisfaction questionnaires.

Results:
To date, 18 participants have been enrolled (10 bilaterally implanted and 8 bimodal). Seven bilaterally implanted participants have already completed their second visit. Preliminary analyses on this subgroup show a significant benefit of AutoSense Target over the Omnidirectional mode on the FraSiMat test, with an average improvement of 18% in sentence recognition in noise ($p < 0.05$). These early results support the hypothesis that AutoSense Target can enhance speech-in-noise perception, although data collection is ongoing for the remaining participants.

Conclusion:
Preliminary findings indicate that AutoSense Target mode provides measurable improvements in speech-in-noise perception compared to the Omnidirectional setting in pediatric bilateral cochlear implant users. With continued recruitment and the inclusion of the bimodal cohort, the study is expected to confirm whether these benefits generalize across listening profiles. If validated, these results will underscore the potential of AutoSense Target as a valuable programming strategy in pediatric auditory rehabilitation.

Keywords: Programming modes, Implant cochlear, Bimodal

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-1

The Value of Co-design in Hearing Healthcare: Redeveloping the Active Communication Education (ACE) Program

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Background: Contemporary hearing services must address the holistic and psychosocial needs of adults with hearing loss. To ensure interventions remain relevant and effective, collaborative co-design with stakeholders is essential. The original Active Communication Education (ACE) program was an evidence-based, freely available intervention with proven efficacy and high satisfaction, leading to its translation into multiple languages and international implementation. After two decades of use, its content required updating to reflect current best practice and strengthen implementation within modern service models. The aim of this study was to apply and describe a multi-phase co-design process to update the ACE program, ensuring it remains evidence-based, user-centred, and feasible for implementation in hearing healthcare settings.

Methods: A four-phase co-design methodology was applied. Phase 1 involved workshops with 20 stakeholders (consumers, clinicians, researchers, and hearing support organisations). Phase 2 produced a prototype informed by preliminary research on desired content and structure. Phase 3 involved iterative refinement through stakeholder feedback (focus groups, interviews, written feedback). In Phase 4, new consumers participated in usability testing to evaluate accessibility, relevance, and practicality. Qualitative data across all phases guided program development.

Results: The process yielded ACE Your Hearing, a contemporary and flexible redevelopment of the original program. Key features include a modular structure (two core and five optional modules) supporting adaptable 2–4 session formats; updated content on wellbeing, diverse listening contexts, and hearing aid use; a refined problem-solving framework; and visually enhanced facilitator and participant materials with integrated multimedia resources.

Conclusion: An iterative, multi-stakeholder co-design process produced a user-centred, flexible program tailored to the current needs of adults with hearing loss, their families, and service providers. Co-design is essential for ensuring interventions remain evidence-based and adaptable for sustainable clinical implementation.

Keywords: Hearing rehabilitation, Co-design, Psychosocial health

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-2

Benefit of spatial, voice, and visual cues for speech recognition with competing talkers in cochlear implant recipients and typical-hearing listeners

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In situations with competing talkers, three main mechanisms are beneficial for separating the different auditory streams and extracting the speech of the intended talker: Spatial cues based on interaural time and level differences help determine the position of the talkers, voice cues help distinguish between talkers and visual cues enable to identify the talker and extract speech features over and above those submitted by the auditory channel. However, individuals with hearing loss and particularly cochlear implant (CI) recipients may be limited regarding auditory cues, but may have enhanced abilities to exploit visual speech cues.

This study aims to investigate the relative contribution of these cues in groups of typical-hearing (TH) listeners and cochlear implant users in terms of speech recognition and cognitive load. To this end, a female target talker uttering matrix sentences (name-verb-number-adjective-object) is masked with two competing talkers, who can either have the same or a different voice and can either be spatially separated by ±30° from the target or colocated. In addition, these conditions are presented with and without additional visual speech cues, provided by a virtual character that enables the visualization of arbitrary speech materials. The target sentence always begins with the name "Stephen", and the target-to-masker ratio is adaptively adjusted to achieve 75% correct word recognition. During stimulus presentation, gaze is tracked and pupil dilation is measured as a proxy of cognitive load.

It is hypothesized that the two study groups would exhibit different patterns: while the TH listeners primarily use auditory cues, CI recipients are expected to rely more heavily on visual cues and to be particularly limited regarding the benefit of voice cues. The present contribution outlines the study rationale and design and presents results for both TH listeners and CI recipients.

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Keywords: Speech recognition, Cochlear implants, Audiovisual

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-3

Understanding Patient Experience in Hearing Care: The Role of Patient-Reported Experience Measures (PREMs) and the Validation of 'My Hearing PREM'

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Background: Patient-reported experience measures (PREMs) offer a way to understand the social, emotional and practical realities of living with a health condition and receiving care. In audiology, where service success is often assessed by clinical outcomes (e.g. hearing aid benefit), PREMs offer a different perspective that centres the everyday experiences and challenges of people with hearing loss.
Objective: This presentation introduces the concept of PREMs, explaining how they differ from patient-reported outcome measures (PROMs), and their relevance for audiology. This will be followed by discussing how the My Hearing PREM was developed and validated as an example of how these measures can be designed for hearing care.
Methods: The My Hearing PREM was developed with input from people with hearing loss and validated using both traditional and modern psychometric methods. 401 participants completed the PREM and additional validated measures. Factor analysis and Rasch modelling supported the refinement of two versions: a 16-item long form and a 9-item short form.
Results: My Hearing PREM is the first validated tool of its kind in audiology. It captures three key domains: Emotional Burden, Support, and Communication. Both the long and short version showed strong internal reliability and meaningful associations with related constructs such as loneliness and communication difficulty. These findings support the measure's reliability and construct validity.
Conclusion: The My Hearing PREM can uncover aspects of hearing loss often unnoticed in standard care: emotional burden, relationship strain, or (unmet) communication needs. My Hearing PREM provides a validated way for clinicians to engage holistically with their patients' lived experience. As audiology moves towards more person-centred models of care, PREMs could be critical for shaping services that reflect what matters to patients.

Keywords: Hearing loss, Patient experience, Patient-centred care

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-4

Audiological profile and speech, communication, and verbal intelligence outcomes in hearing-impaired children with different ages of initial hearing aid fitting

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Background. Despite the implementation of universal newborn hearing screening, the initial hearing aid fitting is not reliably conducted early in life. Hearing-impaired children exhibit a wide range of speech, communication, and verbal intelligence outcomes depending on various factors.
Aim: Examination of the speech perception, the level of speech, communication and verbal intelligence development in children with hearing loss identified at different ages.
Participants: 37 hearing-impaired children (HIC) with bilateral permanent sensorineural hearing loss of moderate to severe degree (5-8 y.o.) participated in the study. Initial hearing aids fitting was performed between 3 and 84 months of age. Children with more severe hearing loss received amplification significantly earlier. 28 age-matched children with normal hearing served as a control group.
Methods: Hearing examination (pure tone audiometry, impedancemetry, aided speech audiometry in quiet and noise: word recognition, the RuMatrix-test) and assessment of speech, communication and verbal intelligence skills were utilized.
Results: The HIC group demonstrated a significant decrease in speech intelligibility compared to the control group. A significant correlation was found between speech test performance and hearing level, while no correlation was observed with the age of initial amplification. An individual audiological profile was constructed for each child based on hearing level and speech audiometry data. Significant correlations were observed between the audiological profile and speech, communication and verbal intelligence outcomes.
Discussion. In children with late hearing aid fitting a higher degree of hearing loss negatively affected speech perception. In case of prolonged auditory deprivation, the hearing level proved to be a more critical factor than the age of initial hearing aid fitting. Poor speech intelligibility resulted in worse speech, communication, and verbal intelligence outcomes.
Conclusions. Hearing-impaired children demonstrated delays in speech, communication, and verbal intelligence development. The audiological profile can be a reliable predictor for evaluating speech, communication, and verbal intelligence skills.

Keywords: Hearing-impaired children, Speech tests, Speech, communication, and verbal intelligence skills

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-5

An ICT-Based Auditory Temporal Resolution Training Application: Development and Establishment of Clinical Application Foundation

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Purpose
Auditory temporal resolution (ATR) decline due to aging and hearing loss significantly impairs speech perception. Given the significant scarcity of standardized ATR training tools, this study developed an ICT-based application capable of precise psychoacoustic control to measure ATR thresholds and establish a clinical foundation for personalized training.

Methods
The Android/Unity application utilizes a two-alternative forced choice (2AFC) task and an adaptive learning procedure converging at 70.7% correct to measure the minimum detectable temporal gap. Stimuli comprised 20 distinct conditions, crossing 5 frequencies/noise types (500, 1000, 2000, 4000 Hz Narrowband Noise, and Broadband Noise) and 4 stimulus durations (50, 100, 250, 500 ms), measured at 35 and 50 dB HL. ATR thresholds were assessed in 26 normal-hearing young adults (YAs) for standardization and 13 older adults (OAs). Test-retest reliability was confirmed, and concurrent validity was evaluated against the Gaps-In-Noise (GIN) and Random Gap Detection Test (RGDT).

Results
ATR performance in YAs systematically improved (lower threshold) with increased intensity (50 dB HL), higher frequency, and longer stimulus duration, confirming the application's robust difficulty hierarchy and compliance with psychoacoustic principles. OAs exhibited significantly poorer ATR compared to YAs across all conditions. Crucially, 33% or more of OAs performed below -2 SD of the YA mean in the critical 1000 Hz to 4000 Hz range and Broadband Noise conditions, quantitatively underscoring the high clinical necessity for targeted intervention. Measured ATR thresholds were numerically proximate to GIN and RGDT values (e.g, within 1.5 ms of GIN).

Conclusion
The ICT-based ATR application provides a highly customizable, reliable tool capable of generating a precise hierarchy of difficulty based on stimulus parameters. This supports the design of individualized training protocols and allows objective progress tracking using YA norms. Subsequent research must establish large-scale norms and validate the training's transferability to real-world speech-in-noise perception to confirm clinical efficacy.

Keywords: Auditory temporal resolution, Auditory temporal resolution training, ICT-based application

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-6

Lost in Transition: Rethinking Paediatric-to-Adult Hearing Healthcare Pathways Through Youth Voices

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Background:
The transition from paediatric to adult hearing services represents an important developmental stage that is often overlooked in clinical audiology. This study aimed to explore how young Australians who are deaf or hard of hearing experience this transition, and how clinician practices might better prepare them for independent, lifelong hearing care.

Methods:
Sixteen participants aged 16–35 years contributed creative works (art, writing, or digital media) depicting their hearing health journeys, followed by a yarning process (as an Indigenous research method) to explore their experiences, expectations and perceptions. Thematic analysis was conducted using a reflexive, inductive approach to identify shared experiences, enablers, and barriers.

Results:
Transitions were described as abrupt, confusing, and emotionally taxing. Participants valued clinicians who provided continuity and empathy but noted limited preparation for navigating adult systems, funding models, and self-advocacy. Peer connections frequently filled these gaps, enhancing hearing health literacy and confidence. Transition readiness varied widely, highlighting the need for structured guidance before age-based program exit.

Conclusion:
Hearing healthcare transitions occur amid broader life changes in education, employment, and identity. Clinicians have a pivotal role in supporting this process by embedding transition readiness discussions within paediatric rehabilitation and fostering collaboration across youth, family, and adult services. Establishing such models may improve long-term engagement and empower young people to manage hearing health across the lifespan.

Keywords: Hearing Rehabilitation, Youth Transitions, Clinical Practice

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-7

A Comparison of Remote Microphone Technologies for Pediatric Hearing Aid Users

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Introduction: Children have difficulty understanding speech in background noise, reverberation, and at a distance yet they spend a majority of their school day in these adverse listening environments. Remote microphone systems (RM) can help improve speech understanding and reduce listening fatigue. The purpose of this study was to compare the speech intelligibility in noise performance of school-age children with hearing loss using Roger remote mics and a traditional fixed directional remote microphone when in simulated traditional classroom setting and small group setting.

Methods: Twenty-five pediatric hearing aid users, ages 8-12 years, with mild to severe sensorineural hearing loss evaluated with AZ Bio Sentences in noise at a +4, +2 and –2 dB SNR without RM (no RM) and then tested with both microphones (Roger, traditional RM) in a simulated teacher condition and a small group condition. Participants were also asked to evaluate preferences based on sound quality, comfort in noise, speech clarity, and overall preference in both conditions.

Results: In the simulated classroom setting, pairwise t-test results at each level of SNR shows significant difference between devices except Roger and Traditional RM at 69/65 SNR 4dB.
In the simulated classroom setting, significant differences were found across conditions. Roger outperformed traditional RM and no RM), while the no RM conditional was significantly better than the traditional RM condition, suggesting better performance with HA alone in a small group environment.

Keywords: Remote microphone, Pediatric rehabilitation, FM system

Oral Presentation 26

Auditory Rehabilitation and Speech Perception II
OP 26-8

Tactile Assistant System for CI Users in Spatial Hearing Training

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While cochlear implants (CIs) restore access to sound and speech, spatial hearing remains severely limited. Without reliable spatial cues, CI users face not only safety risks but also reduced social interaction and communication in noisy environments. However, current rehabilitation programs rarely address spatial hearing, and real-world-based training approaches are largely missing. To address this gap, the present study establishes a laboratory-based audio-tactile spatial hearing training paradigm as a foundation for future daily-life rehabilitation.

We implement a Multimodal Repetition Suppression (MMRS) design, pairing spatially congruent auditory and tactile stimuli to reinforce spatial associations. Seven CI users completed five training sessions, each involving repeated audio-tactile sequences and auditory-only test trials across seven loudspeaker positions (–67.5° to +67.5°). EEG recordings were obtained throughout, focusing on mismatch negativity (MMN) as an objective neural index of spatial prediction and learning.

Behavioral results showed consistent improvement in localization accuracy and reduced mean absolute error, accompanied by more linear response patterns across sessions. Corresponding EEG patterns suggest enhanced neural sensitivity to spatial deviations after training.

These findings demonstrate that audio-tactile training effectively enhances spatial hearing in CI users, with measurable neural correlates of learning. The paradigm establishes a controlled yet ecologically inspired framework toward real-world, home-based rehabilitation using tactile feedback as a practical multisensory scaffold for auditory spatial relearning.

Keywords: Cochlear Implant, Spatial Hearing, Tactile Assistent System

Oral Presentation 27

Auditory Rehabilitation and Speech Perception III
OP 27-1

Audible Contrast Threshold Test: Mandarin Norms, Reliability, and Speech-in-Noise Links

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Objective: This study aimed to establish normative data for the Audible Contrast Threshold (ACT) test in young Mandarin-speaking adults. Additionally, test-retest reliability of the ACT and its associations with speech-in-noise performance were evaluated across listeners of varying age and hearing levels.
Methods: Eighty-nine participants were recruited: 36 young adults with normal hearing and 53 older adults with varying degrees of hearing levels. All completed the ACT, spectro-temporal modulation (STM) detection, Mandarin Hearing in Noise Test (M-HINT), and Mandarin 3-digit Digits-in-Noise (DIN) test. Young adults performed the ACT four times; older adults performed it twice.
Results: Young adults (age: 20.28 ± 0.28 years; better-ear PTA4: 3.33 ± 0.59 dB HL) yielded a normative ACT value of –1.05 ± 0.29 dB nCL (95% CI: [–1.64, –0.45]). Older adults (age: 61.81 ± 1.25 years; better-ear PTA4: 28.42 ± 2.17 dB HL) had a mean ACT of 3.80 ± 0.51 dB nCL. Test-retest reliability, assessed in 89 participants with two repeated measurements, was good: ICC(3,1) = .785, 95% CI [.643, .867], F(88, 88) = 9.662, $p < .001$. Across all participants, Spearman correlations showed strong associations between ACT and age (rs = .798), better-ear PTA4 (rs = .748), M-HINT (rs = .652), STM (rs = .691), DIN (rs = .740), and Reading Span Test (RST; rs = –.587), all $p < .001$. After partialling out age, ACT remained significantly correlated with M-HINT (r = .282, p = .009), STM (r = .411, $p < .001$), and DIN (r = .313, p = .004), but not RST.
Conclusions: ACT normative values in young Mandarin speakers are comparable to prior reports. The test demonstrates good test-retest reliability and robust correlations with speech-in-noise performance. Its brevity, language independence, and clinical feasibility support its application in audiological diagnostics and hearing-aid fitting optimization.

Keywords: Audible Contrast Threshold, Speech-in-noise perception, Hearing loss

Oral Presentation 27

Auditory Rehabilitation and Speech Perception III
OP 27-2

Insights on rehabilitation services from young deaf people with cochlear implants

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While several studies have demonstrated the benefits of habilitation/rehabilitation services for young people who have received cochlear implants (CI), there is limited research on how young deaf people experience these services. This presentation draws on results of a larger interdisciplinary project on the varied experiences of deafness and CI. This specific analysis aimed to understand how young deaf and hard-of-hearing people with cochlear implants make sense of the hearing services they have received and continue to receive. Twelve young people aged 14-24 and who were implanted at a young age were recruited to take part in in-depth interviews about their experiences with and without their CI, including their experience of CI-related professional services. Each interview was led by at least one audiologist and one social scientist and lasted 2.5-4 hours. An iterative and reflexive approach to inductive-deductive coding was used, supported by online mapping tools, to identify categories and themes relevant to clinical experiences. The results highlight how young people often perceive typical tests and clinical reports as disconnected from real-life. They participate in clinical encounters, but demonstrated a sense of resignation wherein they complied but had low expectations of clinical encounters. Their insights imply that they would prefer a more engaged and personalized approach. The results suggest the need for a critical reflection about current rehabilitation services for CI users. There seem to be simple ways to adapt clinical services to promote young people's engagement and confidence in clinical environments with better outcomes for clinicians and clients alike.

Keywords: Clinical services, Young people, Cochlear implants

Oral Presentation 27

Auditory Rehabilitation and Speech Perception III

OP 27-3

The Language Accessibility Index: Measuring Real-World Language Access in Children who are Deaf of Hard of Hearing

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Children who are Deaf or Hard of Hearing (CDHH) who develop spoken language are at increased risk for language delays driven by hearing-related factors (e.g, age of amplification) and reduced caregiver input due to limited audibility provided by hearing devices. Background noise further limits access to caregiver language, compounding this risk. Our previous work showed that real-world speech-to-noise ratios (SNRs) predict language outcomes in children with typical hearing, beyond the amount of talk caregivers produce. We propose that CDHH exposed to both limited caregiver input and poor acoustic access to that input face the highest risk for language delays.

This presentation emphasizes assessing the quality of CDHH children's acoustic environments using wearable audio recorders to quantify auditory experiences and their relation to language outcomes. We are recruiting 40 preschool CDHH (ages 3–6) and an age-matched control group to develop and validate the Language Accessibility Index (LAI), which integrates each child's Speech Reception Thresholds (SRT) in noise and SNRs from daylong LENA recordings. The LAI estimates the percentage of conversations with SNRs above the child's SRT, serving as a proxy for real-world language access.

Preliminary data from 20 children (10 CDHH) show that both caregiver input and LAI are significantly associated with language outcomes. We expect both to remain independent predictors after controlling for covariates in the entire sample. The LAI captures dimensions of children's environments beyond caregiver language alone and shows promise as a clinical tool to identify CDHH at risk for language delays and guide home-based interventions (e.g, remote microphone systems).

Keywords: Language Access, Children with Hearing Loss, Auditory environments

Oral Presentation 27

Auditory Rehabilitation and Speech Perception III
OP 27-4

Social support and parenting stress in cochlear implant rehabilitation of children with hearing loss

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Aims: A family-centered approach improves children's hearing and spoken language development. During the hearing rehabilitation journey, the parents' social support from spouse, family members (formal kinship), healthcare professionals, and related social organizations (parent groups) is crucial because it takes years to observe improvement. Thus, without proper social support from their support system, parents raising children with hearing loss, especially those who need cochlear implants (CI), would endure increased stress. This study investigated the forms of social support that mitigate parental stress in parents of children with CI during the hearing rehabilitation journey.

Methods: Thirty-two parents of CI children completed various online questionnaires, including the Parenting Stress Index—Short Form (PSI-SF), the Family Support Scale, and the Cochlear Implants—Parental Support, along with demographic information. The Pearson correlation and independent t-test were performed to analyze the relationships and differences among variables using JASP statistical software.

Results: Three factors, daily device usage (r=-.37), social organization (r=-.37), and formal kinship (r=-.43), exhibited significant correlations with the PSI-SF score, suggesting higher stress levels were associated with lower daily device usage and perceived less support from social organization and formal kinship. Additionally, twelve parents (37.5%) attained the clinical referral threshold from the PSI-SF scores. They scored significantly lower in social organization, formal kinship, and emotional support than parents within the normative range, suggesting that receiving adequate social support can influence parents' stress levels.

Conclusion: Differences were observed in the social support from formal kinship and social organizations among parents experiencing significant parenting stress. Meanwhile, they recognized emotional support from their support systems was insufficient in comparison to that of 'normal' parents. The findings suggest the necessity of establishing parent-to-parent support groups and incorporating formal kinship into the child's CI intervention journey, thereby providing parents with sufficient emotional support to alleviate their stress levels.

Keywords: Social Support, Cochlear Implants, Parental Stress

Oral Presentation 27

Auditory Rehabilitation and Speech Perception III
OP 27-5

Listening Comprehension in Noise: Clinical Evaluation of a New Assessment Tool for Young Children With Unilateral and Mild Bilateral Hearing Loss

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Purpose: Children with unilateral (UHL) or mild bilateral hearing loss (MBHL) often experience listening challenges in noisy environments that standardised speech and language assessments fail to capture. This study aimed to evaluate a newly developed listening comprehension (LC) test designed for children aged 4–6 years and explored its validity, effectiveness, and feasibility.

Method: Ninety-five children participated, including 42 with normal hearing (NH), 23 with MBHL (19 aided; 4 unaided), and 30 with UHL (20 aided; 10 unaided). Participants completed the Clinical Evaluation of Language Fundamentals Preschool-3 (CELF-P3; sentence comprehension in quiet), the Northwestern University-Children's Perception of Speech test (NUCHIPs; word perception in noise), and the LC tool in both quiet (LC-Q) and noise (LC-N). A subgroup of children with hearing devices were also assessed in aided and unaided conditions. The LC outcomes were (a) percentage correct score in quiet, and (b) speech reception threshold at corresponding to 75% correct in noise.

Results: The LC tool showed good validity in all children, with LC-Q correlating with CELF-P3 in quiet and LC-N with NUCHIPs in noise. In the unaided condition, LC-N performance was significantly poorer in UHL and MBHL children relative to NH peers. When tested in LC-N with devices, UHL performed similarly to NH, while MBHL showed poorer performance. No significant within-subject aided benefit was observed using LC-N or NUCHIPs. Parents and clinicians rated the tool as easy, clear, and age-appropriate to use. The outcomes were equivalent between in-person testing by audiologists and online testing by parents at home.

Conclusion: The new LC tool is a valid, feasible, and clinically relevant measure of functional listening in young children, showing greater sensitivity than the standard assessments in differentiating LC performance between children with MBHL/UHL and those with NH. Further refinement is needed to clarify its capacity to detect aided benefit.

Keywords: Children, Hearing loss, Listening comprehension

Oral Presentation 27

Auditory Rehabilitation and Speech Perception III
OP 27-6

Assessment of Music Perception (AMP) and Music Rehabilitation Program (MRP) with Web-based platform

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-Purpose: Individuals with hearing impairments face limitations in perceiving and appreciating music. This study aims to develop Assessment of Music Perception(AMP) and Music Rehabilitation Program(MRP) for analyzing and improving the music perception ability of the hearing impaired. Additionally, the developed AMP and MRP were completed as a web-based platform to minimize spatial and temporal constraints for users.

-Methods: AMP consisted of musical elements, including pitch, melody, rhythm, timbre, harmony perception tests, and emotional reaction tests. 15 normal hearing(NH) adults and 15 cochlear implants(CI) adults participated for verifing the feasibility of AMP. MRP was developed with the identical musical elements applying analytical and synthetic methods of rehabilitation. 15 adult using CI participated twice per week during two months through self-directed home training. The pre- and post- training performances were compared by utilizing AMP. In order to develop web-based platform with the AMPand MRP contents, WordPress and Labvanced were utilized.

-Results: AMP correction percentages for the NH and CI groups were 94.0% and 75.3% in the pitch test; 94.0% and 30.3% in the melody test; 99.3% and 94.0% in the rhythm test; 78.9% and 64.4% in the timbre test; 85.7% and 58.4% in the harmony test; and 96.7% and 81.7% in the emotional reaction test, respectively, showing statistical significant difference($p<0.05$). For the MRP, the results of pre- and post AMP tests revealed 61.1% and 83.8% for the pitch perception test, 72.8% and 87.8% for the timbre perception test with Korean musical instruments, 48% and 59.3% with Western musical instruments, and 55.9% and 71.1% in the harmony perception test($p<0.01$). The web-based platform containing AMP and MRP contents, https://ampnmrp2024.mycafe24.com/, is available for public use.

-Conclusion: The developed web-based AMP and MRP platform enables systematic perception evaluation and training of music and also provides user friendly access to related contents.

Keywords: Assessment of music perception, Music rehabilitation program, A web-based platform

Oral Presentation 27

Auditory Rehabilitation and Speech Perception III
OP 27-7

A randomized controlled trial of the effects of an online support program for audiological rehabilitation aimed at first-time hearing aid users

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Both new hearing aid users and patient organizations have expressed the need for more information and support during audiological rehabilitation, as well as a wider range of options to individualize the rehabilitation process. This project tested a supportive online program in a randomized controlled trial. The study aimed to assess changes and differences in the emotional and social effects of the hearing problems, self-perceived activity limitations, participation restrictions, experience with listening in complex sound environments, use of communication strategies, and perceived effectiveness and satisfaction with hearing aids in the intervention and control groups. The HHIE, SSQ12, CSS, and IOI-HA were used as outcome measures. The study used a randomized parallel-group design with two study arms. Individuals on the waiting list to try hearing aids for the first time were invited to take part in the study. Participants in the control group received hearing rehabilitation according to clinical practice, while participants in the intervention group received the same rehabilitation, plus the online support program. Outcome measures were completed at baseline and post-intervention. A total of 88 participants were initially recruited for the study. Preliminary results indicate similar outcomes in both groups for the included outcome measures. Future studies should include a larger sample size and participants from different types of audiology clinics and with various types of hearing problems. Other outcome measures, such as those focused on, for example self-efficacy and empowerment, could also be explored.

Keywords: Auditory rehabilitation, Tele-audiology, RCT

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-1

Spontaneous Resolution of Conductive Hearing Losses Following Referral from Newborn Hearing Screening – When is the best time to review?

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Background:
Otitis media is a common condition in early childhood. For children over six-months there are evidence-based-guidelines for follow-up care and recommended referral pathways for medical management. The guidelines for children under the age of six-months are less transparent. In South Australia children diagnosed with a conductive hearing loss (CHL) due to middle ear effusion (MEE) following their newborn hearing screening (NHS) are reviewed at nine-months-of-age, to allow for the child to be developmentally able to complete a behavioural assessment.

This study aimed to assess the likelihood of MEE spontaneously resolving in children diagnosed with a CHL following referral from NHS and whether the pathway to referral for medical management were appropriate and timely.

Methods:
The study used a retrospective file audit of 366 children diagnosed with a CHL due to MEE (unilaterally or bilaterally) following referral from NHS from January 2020- November 2023. The infant's diagnosis was extracted from the South Australia NHS program's database, while audiology outcomes were pulled from their electronic medical records.

Results:
From 366 children,116 were lost to follow-up (31%). Of the 260 that attended review at nine-months-of-age, 201 were found to still have MEE in at least one of the ears (77%). 123 of the children with MEE had a hearing loss and a further four were identified to have a permanent hearing loss.

Conclusions:
The results of the study have global implications for the review timeframe for this cohort of children. Children diagnosed with a CHL because of MEE on their NHS are unlikely to experience spontaneous resolution of the MEE. The recommendation is to reduce the timeframe for reviewing infants with a CHL from nine-months via behavioural testing to three months with a focus on tympanometry, to expedite the pathway to appropriate medical management where MEE is shown to be persistent.

Keywords: Middle ear effusion, Conductive hearing loss, Newborn hearing screening

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-2

Analysis of Three-Dimensional Wideband Absorbance Immittance in Patients with Otosclerosis and Development of Artificial Intelligence Models for Clinical Diagnosis

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Objective: This study investigates the use of three-dimensional Wideband Acoustic Immittance (3D WAI) to differentiate middle ear sound transmission characteristics in individuals with otosclerosis compared with a normative population, and to develop Artificial Intelligence (AI) models for automated classification and clinical diagnosis.

Methods: A total of 118 ears were analysed (59 from individuals with otosclerosis and 59 from normative subjects) using the Titan IMP440 system, covering frequencies from 226 to 8000 Hz and pressure levels from –300 to +200 daPa. Data visualisation was performed using two-dimensional pressure–frequency significance mapping and three-dimensional surface plots. Statistical analyses, including repeated measures ANOVA, MANOVA, and correlation testing, were conducted to assess group differences and identify frequency–pressure-specific absorbance patterns. Additionally, extracted 3D WAI features were used to train and validate AI-based classification models to distinguish otosclerotic from normal ears.

Results: Ears affected by otosclerosis demonstrated significantly lower ear canal volume and reduced compliance at 226 Hz, with no significant differences in resonance frequency or peak pressure. Contrary to traditional models, absorbance at ambient pressure was higher in the otosclerosis group. At peak pressure, significant reductions in absorbance were observed at 1414 Hz and 2000 Hz. Frequency–pressure significance mapping revealed that 31.4% of combinations differed significantly between groups, with the most pronounced differences occurring in the mid-frequency range under positive pressure. The AI classification model achieved approximately 90% accuracy in differentiating otosclerotic ears from normal ears.

Conclusion: 3D WAI provides enhanced diagnostic sensitivity to frequency- and pressure-specific middle ear changes associated with otosclerosis, outperforming conventional tympanometry. Mid-frequency absorbance emerged as a key diagnostic marker, and the integration of AI models demonstrates strong potential as a reliable diagnostic supporting tool for accurate, automated, and clinically applicable assessment to improve clinical diagnostics

Keywords: Three-Dimensional Wideband Absorbance Immittance, Otosclerosis, Artificial Intelligence Models for Clinical Diagnosis

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-3

Clinical Equivalence of Virtual Reality and Conventional Speech Audiometry in Normal-Hearing Listeners

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Objective: Conventional clinical speech tests often lack ecological validity, failing to reflect real-world hearing challenges. This study utilized virtual reality (VR) to create immersive, realistic scenarios through audiovisual integration, aiming to enhance the real-life relevance of speech audiometry and validate the clinical equivalence of the VR-based method.
Methods: Twenty-one normal-hearing participants (7 males, 14 females; mean age 20.38 ± 0.84 years) were recruited. The experiment was conducted in a sound-attenuated booth using standardized Mandarin speech test materials. Each participant completed both traditional (headphone-based) and VR-platform tests across five signal-to-noise ratio (SNR) conditions (-10, -5, 0, +5, and +10 dB). The order of the two test methods was randomized and counterbalanced. Audio output for the VR method (delivered via PICO 4 Pro) was calibrated to 65 dB(A) using a HEAD acoustic artificial head. Speech recognition scores were calculated in real-time.
Results: No significant overall difference in speech recognition scores was found between the VR and traditional methods (method, $F(1,4) = 1.4$, $p > 0.05$). A significant main effect of SNR was observed (SNR, $F(1,4) = 273.4$,$p < 0.05$), with scores progressively improving as SNR increased from -10 dB to +10 dB. The VR method yielded a significantly higher score than the traditional method specifically at the most challenging -10 dB SNR ($p < 0.05$). No significant differences were found between the methods at other SNR levels (-5 to +10 dB)(all Ps>0.05).
Conclusion: The study demonstrates the clinical equivalence of the VR-based speech test to the conventional method across most SNR conditions. Its superior performance at the demanding -10 dB SNR suggests a potential benefit of immersive, contextual cues in very noisy environments. These findings support VR as a valid and ecologically superior tool for speech audiometry, effectively bridging the gap between controlled clinical assessment and real-world listening situations.

Keywords: Virtual Reality, Speech Audiometry, Signal-to-noise ratio

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-4

Comparative Analysis of Click-, Tone-Burst-, and Chirp-Evoked Auditory Brainstem Responses in Young Children

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Introduction:
The chirp stimulus has recently emerged as an effective approach to enhance auditory brainstem response (ABR) amplitudes, offering a faster and more accurate alternative to the conventional click stimulus. Threshold estimations from chirp-evoked ABRs also show strong agreement with behavioral hearing thresholds. This study compared click, tone-burst, and chirp stimuli to investigate their interrelationships and assess the clinical applicability of chirp stimuli in pediatric ABR testing.

Methods:
ABRs elicited by click, tone-burst, and chirp stimuli were recorded from 11 children aged 6–36 months under chloral hydrate sedation. Wave V amplitude and latency were analyzed as main parameters for each stimulus type. Electrode placement and repetition rate were identical across conditions. Each ear was tested separately at stimulus levels of 80, 60, 40, and 20 dB nHL.

Results:
No significant correlation was found between chirp and click stimuli, nor between click and tone-burst stimuli. However, a significant correlation emerged between chirp and 2000 Hz tone-burst responses. This finding likely reflects overlapping cochlear activation regions and the spread of excitation from apical toward basal areas. The broader spectral bandwidth of low-frequency chirp stimuli may stimulate mid-frequency regions (~2000 Hz), producing comparable amplitudes and latencies.

Conclusion:
Although chirp stimuli are broadband by design, their temporal pattern allows low-frequency components to reach apical cochlear regions earlier. Consequently, chirp-evoked responses may predominantly represent mid-frequency activity, explaining their relationship with 2000 Hz tone-burst responses. These results support the chirp stimulus as a reliable and efficient clinical tool for pediatric ABR evaluation.

Keywords: Chirp stimulus, Auditory brainstem response, Tone-burst

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-5

Long-Term Hearing Outcomes in Children with a History of Recurrent Acute Otitis Media

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Purpose:
While the immediate complications of acute otitis media (AOM) are well known, its long-term audiological effects remain poorly understood. This study aimed to assess the prevalence of audiometric alterations at least five years after the onset of recurrent AOM (rAOM) and examine their relationship with clinical history.
Methods:
This study was conducted at the Audiology Clinic of the Policlinico of Milan (Italy). Children born in 2015–2016 with documented rAOM were eligible. Exclusion criteria included genetic syndromes, craniofacial abnormalities, immunological deficits, recent head trauma or ear surgery, noise exposure, ototoxic drugs, or systemic disorders.
Between May 1, 2023, and May 31, 2024—at least five years after rAOM onset—each child underwent rigorous audiological and otological assessments, including otomicroscopy, tympanometry, and pure-tone audiometry.
Results:
A total of 141 children (83 males, 58 females; mean age: 95.5 ± 5.9 months) were assessed.
Pure-tone audiometry revealed mild conductive hearing loss (CHL) in six children (4.3%). High-frequency (6000–8000 Hz) sensorineural hearing loss (SNHL) was observed in 28 children (19.9%), while 10 (7.1%) had low-frequency (250–500 Hz) SNHL. Low-frequency CHL was identified in 12 (8.5%) patients. Additionally, a 6000 Hz dip (≥10 dB compared to adjacent frequencies) was detected in 35 children (24.8%).
The most common otomicroscopic alterations were localized tympanosclerosis (22.3%), extensive tympanic membrane retraction (11.7%), and retraction pockets (10.6%).
More than eight AOM episodes correlated with high-frequency SNHL ($p = 0.03$). Chronic OME history was linked to worse audiometric and otomicroscopic outcomes ($p < 0.01$).
Conclusions:
These findings highlight the need for long-term audiological follow-up in children with rAOM. The 6000 Hz dip may represent a subclinical marker of cochlear vulnerability in this population. Our results could help reshape pediatric hearing surveillance protocols and hold global relevance for early hearing loss diagnosis, given the high worldwide prevalence of rAOM.

Keywords: Childhood hearing surveillance, Recurrent acute otitis media, Long-term audiological outcomes

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-6

Influence of External Auditory Canal Morphology on Tympanometric Classification in Young Healthy Adults

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Background:
Tympanometric Jerger–Feldman types [1,2] classify middle-ear mobility but are also affected by external auditory canal (EAC) anatomy. Type As tympanograms occasionally occur in normal-hearing adults, suggesting that anatomical variation rather than pathology may underlie reduced compliance.

Objective:
To assess the impact of ear-canal anatomy on tympanometric compliance and evaluate normalization based on tympanometric and magnetic resonance imaging (MRI) measures.

Methods:
In total, 196 ears (18–31 years) from 100 adults underwent otoscopy, 226 Hz tympanometry, audiometry, and 3D MRI of the temporal bone. From MRI, EAC entrance width, height, and length were measured analog to [3] to compute a geometric volume proxy ($V = \pi \times w/2 \times h/2 \times l$). Compliance was normalized by tympanometric ear-canal volume (ECV) and MRI-derived EAC volume. Group differences were tested with Mann–Whitney U tests. Anatomical and demographic predictors were analyzed with linear mixed-effects models (random intercept per subject). ECV–MRI correlations were assessed using Pearson's r.

Results:
Of 196 ears, 169 (86%) were Type A and 27 (14%) As (compliance < 0.3 ml). Type As ears showed lower compliance (0.25 ± 0.03 ml) than Type A (0.57 ± 0.23 ml; $U = 4561$, $p < 0.001$, $d = 1.47$) and smaller ECVs (0.90 ± 0.20 ml vs. 1.29 ± 0.33 ml). In mixed-effects models, only ECV predicted compliance ($\beta = 0.25$, $p < 0.001$); sex, ear side, and height showed no effect. After normalization by ECV or MRI volume, associations disappeared ($p > 0.1$). ECV and MRI-derived volume correlated moderately ($r = 0.60$, $p < 0.001$).

Conclusion:
Differences between Type A and As tympanograms primarily reflect ear-canal volume rather than middle-ear stiffness. Volume normalization removes this bias. MRI-based anatomy supports individualized, volume-adjusted tympanometric thresholds to avoid overdiagnosis in small but healthy ears.

References:
[1] Jerger (1970)
[2] Feldman (1976)
[3] Hennig et al. (2025)

Keywords: Magnetic resonance imaging (MRI), static compliance, ear canal volume (ECV)

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-7

Distortion Product Otoacoustic Emission (DPOAE) with Tympanometry and Conditioned Play Audiometry (CPA) protocols for preschool hearing screening: A Comparative study

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Objectives: 1) To compare the pass and fail rates of the DPOAE+ Tympanometry and CPA protocol in a preschool hearing screening. 2) To compare the time to complete the test for DPOAE+Tympanometry and CPA protocol.
Methods: A prospective cross-sectional study was done on 40 preschool children, 5-6 years old, at Santa Barbara Central Elementary School. They underwent: 1) DPOAE + Tympanometry) and 2) Conditioned Play Audiometry. The time to complete the tests was compared using a paired sample T-test. Results for both protocols were compared using the McNemar Test of Proportion.
Results: There was a significant difference ($p<0.001$) between the time to complete the DPOAE+Tympanometry protocol ($x=4.43$ min, $SD=1.11$) and the CPA protocol ($x = 5.55$ min $SD= 1.47$). The PASS rate for CPA is 77.5%, while that of the DPOAE +Tympanometry is 67.5%. The REFER rate for CPA was 22.5% while that of DPOAE+ Tympanometry is 32.5%. Fifty-eight percent of participants had a PASS result, and 13% had a REFER result on both protocols. Thirty percent of participants presented with conflicting results. The McNermar proportion test revealed insufficient evidence to reject the null hypothesis ($p=0.388$); therefore, there is no statistical difference between the results of both protocols.
Conclusion: There was no significant difference in the results of the DPOAE+Tympanometry and CPA screening protocols. The DPOAE+Tympanometry protocol is significantly faster to complete. Therefore, the DPOAE+Tympanometry screening protocol is a good alternative to screen preschool children less than 6 years old for on-site testing.

Keywords: DPOAE (Distortion Production Otoacoustic Emission), CPA (Conditioned Play Audiometry), Tympanometry

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-8

Establishment of a Nationally Standardized Korean Normal-Hearing Dataset and the Need for Accredited Calibration in Audiometry

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Accurate audiometric calibration is the cornerstone of hearing assessment and surveillance programs. Even small deviations in calibration can lead to systematic errors in threshold estimation, compromising both clinical diagnosis and national hearing health data. Despite the existence of international standards (i.e, ISO 60645 and 60318 series), calibration practices often vary across institutions, with limited awareness of the traceability chain linking devices to national metrological standards. Establishing a certified calibration infrastructure accredited by KOLAS (Korea Laboratory Accreditation Scheme) is critical for data comparability and international interoperability.

This study aimed to (1) evaluate audiometer calibration consistency across medical institutions in South Korea, (2) identify inter-manufacturer and inter-hospital variations, and (3) demonstrate the necessity of developing a nationally standardized normal-hearing reference dataset supported by accredited calibration procedures.

Calibration measurements were conducted on 30 audiometers from 21 hospitals (primary to tertiary levels) using internationally recognized equipment such as artificial ears and mastoids. All procedures followed ISO 60645 and 60318 standards. Equivalence analysis was performed using the two one-sided tests with a ±3 dB margin to assess consistency before and after calibration.

Before calibration, only 9 of 18 measured parameters (50.0%) met equivalence criteria; this improved to 14 parameters (77.8%) post-calibration. Inter-manufacturer differences persisted, with manufacturer A achieving 33.3% and manufacturer B achieving 55.6% equivalence across parameters. Bone conduction measures showed the most substantial post-calibration improvement. These results underscore the variability inherent to non-standardized calibration environments.

This study confirms that non-accredited or inconsistent calibration contributes to significant measurement variability across audiometers, undermining the accuracy of hearing threshold data. A KOLAS-accredited network and a national reference dataset are essential for ensuring results are traceable, reproducible, and comparable. Such initiatives not only advance national hearing standards but also contribute to the global harmonization of audiometric measurement systems, enabling more accurate cross-population comparisons in epidemiological and clinical research.

Keywords: Audiometer, Calibration, Measurement standards

Oral Presentation 28

Auditory Screening and Diagnosis III
OP 28-9

Exploring the perceived barriers and facilitators for accessing audiology services in Malaysia by adults with hearing loss: A qualitative study using the COM-B model

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Objective: This study explored barriers and facilitators to accessing audiology services among adults with hearing loss in Malaysia, using the COM-B model.
Design: A qualitative study with semi-structured interviews.
Study sample: Twenty-two adults with self-reported hearing loss were recruited from public hospitals, private hearing centres and community outreach across urban and rural areas, including those who had not accessed audiology services.
Results: Key barriers included lack of awareness and knowledge about hearing loss and services (psychological capability), financial constraints (physical opportunity), and stigma related to hearing aids (social opportunity). Facilitators included family support, community outreach, and availability of public funding to access hearing services.
Conclusion: Overcoming barriers requires addressing personal, social and systemic challenges. Public awareness campaigns, professional training for healthcare providers, and expanded eligibility of publicly funded care could address these challenges. Policymakers, audiologists, and healthcare professionals share responsibility for improving access to audiology services and reducing the personal and societal burden of hearing loss in Malaysia.

Keywords: Access to hearing care, COM-B model, Qualitative

Oral Presentation 29

Auditory Implants IV

OP 29-1

Feasibility of Recording Cortical Auditory Responses Using Cochlear Implant Electrodes

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Introduction
Cochlear implant (CI) fitting typically depends on recipients' subjective reports of auditory perception. Such feedback enables clinicians to adjust stimulation parameters and achieve appropriate loudness across electrodes. However, in young children or individuals unable to provide reliable feedback, objective electrophysiological measures, including stapedius reflex thresholds, electrically evoked compound action potentials, auditory brainstem responses, and cortical auditory evoked potentials (CAEPs), offer valuable information about auditory function.
We hypothesized that CAEPs could be recorded directly via the intracochlear electrode array of a CI, and that these recordings would resemble those obtained with scalp EEG electrodes in waveform morphology, latency, and amplitude.
Materials and Methods
Three adult CI users with Advanced Bionics HiRes Ultra 3D devices participated. All had normal hearing in the contralateral ear. Acoustic stimuli were delivered to the normal-hearing ear. Cortical responses were recorded simultaneously through (1) the cochlear implant electrode array using dedicated software and (2) a Synergy system with conventional surface EEG electrodes. This design enabled direct comparison of intracochlear and scalp-recorded responses.
Results
CAEPs were successfully recorded in all participants using both methods. The waveforms obtained through the CI closely matched those from the Synergy EEG system in morphology, latency, and amplitude, confirming good correspondence between the two recording modalities.
Discussion
These findings demonstrate the feasibility of recording cortical auditory responses directly from the intracochlear electrode array in CI users. The similarity to conventional EEG recordings supports the reliability of electrically recorded CAEPs (eCAEPs) as objective indicators of cortical auditory activity. Consistent with Attias et al. (2022), this approach could facilitate integration of eCAEP monitoring into routine CI fitting and rehabilitation, particularly in patients unable to provide behavioral feedback.

Keywords: Cochlear implants, Evoked potentials, Cortical auditory evoked potentials

Oral Presentation 29

Auditory Implants IV
OP 29-2

Effects of cochlear implant electrical stimulation rate in children with genetically confirmed pre- and post-synaptic auditory neuropathy

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Purpose: Auditory Neuropathy Spectrum Disorder (ANSD) affects neural transmission of auditory signals and is classified into presynaptic and postsynaptic types. Cochlear implant (CI) outcomes depend on lesion site and stimulation rate, with slower rates potentially benefiting impaired conduction.
Methods: Seventy children aged 2–7 years with genetically confirmed ANSD received the Nucleus CI system. Participants were grouped as pre- or post-synaptic and randomly assigned to three stimulation rates: 500, 900, or 1800 pulses per second (PPS). Assessments at 3 and 6 months included aided thresholds, Persian versions of the Categories of Auditory Performance (CAP) and Speech Intelligibility Rating (SIR), cortical P1 latency and amplitude, and Electrically Evoked Compound Action Potential (ECAP) via Neural Response Telemetry across apical, mid, and basal electrodes.
Result: Despite comparable aided thresholds, presynaptic ANSD cases showed consistent ECAP responses and greater improvements in P1 measures and CAP/SIR scores, particularly at low and moderate rates. ECAP amplitude increased and latency decreased over time in this group, with no significant rate–time interaction. Postsynaptic cases showed limited ECAP responses and smaller functional gains.
Conclusion: Lesion site critically influences CI outcomes in ANSD. Presynaptic children demonstrated physiological and functional improvements, especially at lower rates, consistent with preserved neural integrity. Postsynaptic cases showed restricted responses, likely reflecting demyelination. Findings support individualized CI programming guided by genetic and neural profiles.

Keywords: Cochlear Implantation, Auditory Neuropathy Spectrum Disorder (ANSD), Stimulation Rate

Oral Presentation 29

Auditory Implants IV
OP 29-3

Single Sided Deafness and Asymmetrical Hearing Loss: How Daily CI Usage Impacts Functional Outcomes

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Background: Cochlear implants (CIs) are recognised as the only device that can restore binaural hearing in individuals with single-sided deafness (SSD) or asymmetrical hearing loss (AHL). For these users, CI usage has been shown to improve hearing performance in noisy environments, enhance sound localisation, and improve quality of life (QoL). However, outcomes post-implantation remains variable. Hearing performance is closely linked to the degree of CI usage, and this may be especially important for SSD and AHL CI users, as prolonged binaural stimulation is essential for the brain to adapt and fully utilise binaural hearing benefits.

Objectives: This study aimed to explore the relationship between daily CI usage and post-operative hearing performance outcomes among individuals with SSD or AHL.

Methods: A retrospective analysis was performed on a sample of adult CI users who received CIs to rehabilitate SSD or AHL. Speech perception in noise and self-reported QoL scores were analysed in relation to daily CI usage, as captured through data logging information from the devices.

Results: SSD and AHL CI users showed an improvement in speech perception and QoL scores post-implantation. An association was observed between daily CI usage and speech perception in noise scores in both the SSD and AHL CI users. Those who wore their devices for longer hours each day demonstrated better speech perception outcomes and greater self-reported hearing benefits.

Conclusions: The findings enhance our understanding of the importance of daily CI use, which may improve hearing performance outcomes for SSD and AHL CI users post-implantation.

Keywords: Single-sided deafness, Daily use, Hearing outcomes

Oral Presentation 29

Auditory Implants IV
OP 29-4

The Relationship Between Spatial Hearing and Social Life in Cochlear Implant Users

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Purpose:
Cochlear implants are devices that significantly improve hearing thresholds and also affect individuals' daily communication skills and quality of life. However, studies that simultaneously consider objective audiological measures and patient-reported outcomes in cochlear implant users remain limited. This study aims to investigate the relationships between audiological findings, subjective auditory performance, and quality of life, highlighting the crucial role of spatial hearing in social participation among cochlear implant users.

Method:
Twenty-eight cochlear implant users aged 18–55 years participated in the study. Assessments included free-field audiometry, the Turkish Matrix Test (Quiet and Noise), the Speech, Spatial and Qualities of Hearing Scale (SSQ), and the WHOQOL-BREF quality of life scale. The Shapiro–Wilk test was used to assess data normality, and Spearman's correlation analysis was conducted to examine correlations among the variables.

Results:
A strong, positive, and statistically significant correlation was found among the SSQ subscales (Spearman's $\rho = 0.888$, $p < 0.05$), indicating the high reliability of subjective auditory performance measures.The spatial hearing subscale of the SSQ showed a moderate, positive, and significant relationship with the social relationships domain of quality of life (Spearman's $\rho = 0.459$, $p = 0.014$). Additionally, a moderate, positive, and significant correlation was observed between measurements obtained in quiet and noise conditions in the Turkish Matrix Test (Spearman's $\rho = 0.632$, $p = 0.004$).

Conclusion:
Spatial hearing was identified as a significant factor influencing the social quality of life in cochlear implant users. The strong correlations among SSQ subscales confirmed the reliability of subjective auditory performance measures. The findings also showed that spatial hearing positively contributes to social communication, and auditory performance in noise parallels that in quiet listening.

Keywords: Cochlear implant, Spatial hearing, Quality of life

Oral Presentation 29

Auditory Implants IV
OP 29-5

Assessing the Quality of Life and Subjective Ratings of the Anatomy-based Fitting Map among experienced, adult cochlear implant users

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Objective:
Anatomy-based fitting (ABF) is a relatively new cochlear implant fitting method launched to minimize frequency-to-place mismatch. This study aimed to assess the benefits of using the ABF map among experienced adult cochlear implant (CI) users regarding their subjective experiences and Quality of Life.
Methods:
This prospective observational study compared the outcome measures between the ABF and the regular conventional-based fitting (CBF) CI maps. Using selective sampling, nine ears were examined from eight experienced adult ME-DEL cochlear implant users. All participants underwent postoperative computed tomography scans, which were then analyzed using a surgical planning software called Otoplan® to determine the positions of intracochlear electrodes, their respective angular insertions, and cochlear duct length. The information from the Otoplan® was then imported into the Maestro 9.0 fitting software to generate the ABF map.
The outcome measures compared were (i) Subjective ratings of the maps concerning speech understanding, listening comfort, and preferred map; and (ii) Cochlear implant Quality of Life – 35 items (CIQOL-35). The CBF map's outcome assessment was completed before fitting the experimental ABF map. The review assessments for ABF were taken after six months of ABF use. Finally, their attitude towards the ABF map was obtained.
Results:
The shifts of the ABF center frequencies varied largely concerning the CBF map across participants, ranging from 0.46 semitones to 23.94 semitones. Subjectively, all three domains were rated better for the ABF than the CBF maps ($p<0.05$). Overall, the CIQOL-35 scores significantly improved after using the ABF map for six months, with the entertainment domain showing a significant increase in the mean difference ($p<0.05$). 87.5% of participants wanted to continue using the ABF map, indicating a positive attitude towards the ABF map.
Conclusion:
Results suggest that the ABF map could be an alternative to improve auditory experience and other QoL determinants.

Keywords: Anatomy-based fitting;, Quality of Life;, Cochlear implant;

Oral Presentation 29

Auditory Implants IV
OP 29-6

Functional And Surgical Outcomes In Subtotal Petrosectomy And Cochlear Implants In Patients With Chronic Otitis Media

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Objective: To evaluate the functional and surgical outcomes of cochlear implantation (CI) following subtotal petrosectomy (SP) in chronic otitis media (COM) and compare them with standard CI recipients.
Methods: A retrospective case-control study included 34 adults with postlingual deafness: 17 with COM undergoing SP and simultaneous CI (COM group) and 17 without middle ear disease (CI group). Audiological performance was assessed by pure-tone audiometry (PTA5= average of 250, 500, 1000, 2000, and 4000 Hz), speech recognition in quiet and in noise (Oldenburg Sentence Test, OLSA), and the Speech, Spatial, and Qualities of Hearing Scale (SSQ).
Results: All surgeries were successful, with only two postoperative complications (one external Auditory canal closure breakdown, one abdominal hematoma). Audiological results showed similar hearing outcomes between the two groups. The PTA5 was 36.6 ± 2.5 dB hearing level (HL) in COM group and 35.6 ± 1.1 dB HL in the CI group (p = 0.09). Speech recognition in quiet was 74.2 ± 20.7% in COM group and 85.0 ± 13.2% in CI group (p = 0.07). No significant difference was found in speech-in-noise (OLSA 50% SRT: 2.7 ± 2.3 dB vs. 0.7 ± 0.8 dB, p = 0.58). SSQ scores revealed no significant intergroup differences in the Speech (4.73 ± 2.7 vs. 4.80 ± 2.7, p = 0.69), Spatial (4.22 ± 2.3 vs. 4.96 ± 2.5, p = 0.50), or Qualities (5.17 ± 2.3 vs. 5.25 ± 1.9, p = 0.87) domains. There were no reported cases of disease recurrence, infection, or device extrusion during long-term follow-up (mean = 36 months).
Conclusion: Cochlear implantation after SP provides hearing and quality-of-life outcomes comparable to standard CI, confirming its safety and efficacy in COM patients.

Keywords: Hearing loss, Cochlear Implant, Chronic otitis media

Oral Presentation 29

Auditory Implants IV
OP 29-7

The time course of expended listening effort for cochlear implant users differs when listening to Matrix sentences or digit triplets

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Background: The time course of expended listening effort can be measured with pupillometry. Pupil responses among CI users vary widely depending on the type of speech material. In this group, the peak-pupil dilation (PPD) response has been shown to significantly depend on SNR when digits-in-noise (DIN) are administered, but not with Matrix sentences. The PPD reflects the peak dilation during the stimulus relative to baseline, but omits the temporal dynamics of the pupil response. The PPD thus potentially misses key aspects of cognitive demand, notably the release of effort after stimulus offset.

Objective: To assess the time course of the pupil response for CI users with DIN triplets and Matrix sentences for different SNRs.

Methods: Pupil responses from 18 CI users were collected by presenting Matrix sentences or digit triplets at three SNRs: at speech recognition threshold, where speech intelligibility (SI) was 50% (0 dB re SRT); +6 dB re SRT; and speech-in-quiet. Waveforms were analyzed with generalized additive mixed modelling.

Results: Preliminary analyses showed that Matrix sentences evoked a larger sustained pupil response after sentence offset in quiet and at +6 dB re SRT. At SRT, where speech intelligibility was identical for both speech tests, pupil waveforms did not differ significantly. For the DIN stimuli, pupil dilation was consistently and robustly larger at more challenging SNRs after sentence offset. During sentence presentation, however, SNR effects were inconsistent. For the Matrix sentences, SNR effects were less prominent, more variable, and not significant for all SNR pairs.

Conclusions: Our results support the finding that speech material profoundly impacts the SNR-dependency of the pupil response for CI users. With DIN triplets, SNR effects were robust and most consistent during the release of effort seconds after stimulus offset. This phenomenon might be overlooked when the PPD is used as an outcome measure.

Keywords: Cochlear Implants, Pupillometry, Generalized Additive Mixed Models

Oral Presentation 29

Auditory Implants IV
OP 29-8

Scalar position characteristics and scalar translocation rates of different lateral wall electrodes within the cochlear basal turn: a cone beam computed tomography study

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Purpose of the study:
Scalar translocation (STL), defined as cochlear implant (CI) electrode misplacement from scala tympani (ST) to scala vestibuli (SV), is a key form of insertion trauma linked to poorer outcomes. While lateral wall (LW) electrodes show lower STL rates than perimodiolar designs, direct comparisons among different LW electrode arrays are limited. This study aimed to systematically evaluate and compare scalar position characteristics and STL within the cochlear basal turn (CBT) on postoperative imaging.

Methods
This retrospective study was approved by the local ethics committee and included patients implanted with Advanced Bionics SlimJ (ABSJ), Cochlear Slim Straight (CSS), or MED-EL FLEX (MFX) electrode arrays, who underwent postoperative cone-beam CT (CBCT). Cochlear dimensions (distances A and B) and angular insertion depth (AID) were measured by two observers. Scalar position within CBT was graded at 90°, 180°, 270° and 360° by three observers using a five-point scale (1-2=SV, 3=central, 4–5=ST). Electrode positions were classified as Class A (ST retention), Class B (basilar membrane elevation/rupture) or Class C (STL).

Summary
148 morphologically normal cochleae were included (ABSJ n=51; CSS n=51; MFX n=46). Cochlear dimensions were comparable across groups, while AID was greater for MFX (507° ± 58) than for CSS (426° ± 53) or ABSJ (436° ± 46; p<.001). STL occurred in 12/148 ears (8.1 %): 4 ABSJ (7.8 %), 8 CSS (15.7 %), 0 MFX (0 %) (p=.012). ST retention was 92.2 %, 78.4 %, and 100 %, respectively (p<.001). Median scalar scores were highest for MFX at all angles (p<.001). No correlation was found between scalar position, cochlear dimensions, or AID.

Conclusion
The MFX electrode arrays demonstrated the most stable ST retention within CBT. Differences in scalar behaviour do not appear to be related to CBT dimensions and may instead reflect the inherent physical properties of the arrays.

Keywords: Cochlear implants, Scalar translocation, Cone-beam computed tomography

Oral Presentation 30

Auditory Neuroimaging and Tinnitus
OP 30-1

Auditory-Spatial Perceptual Limitations and Audiovisual Weighting Adjustment in Cochlear Implant Users Under Conditions of Audiovisual Conflict

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Objective: The interaction of multiple sensory information enriches people's cognition. For cochlear implant users, the ability to skillfully use their cochlear implants, integrate visual and reconstructed auditory information, and thus coordinate reconstructed hearing with the multi-sensory system to ultimately integrate well into social life is of great significance. This study explores whether cochlear implant recipients can utilize their multi-sensory system to form accurate spatial perception in simulated audiovisual interaction scenarios, especially in audiovisual conflict situations.
Methods: 29 bilateral cochlear implant recipients aged 5 years and older, along with age-matched healthy participants, were followed up and divided into a case group and a control group. A forced-choice spatial localization paradigm was used, with both a unimodal paradigm (visual spatial localization and auditory spatial localization) and a bimodal paradigm (audiovisual spatial localization) set up, while EEG signals were collected simultaneously. Stimuli included temporally synchronized, spatially synchronized, or asynchronous responses, and subjects were required to report the location of the stimuli based on provided options. Reporting error values and audiovisual weighting indices were calculated.
Results:The results showed that the errors for the audiovisual paradigm were all intermediate between the reporting errors for the visual and auditory unimodal paradigms. Comparison of audiovisual weighting indices revealed that the overall visual weighting was higher in the case group. Specifically, the visual weighting increased with increasing visual-auditory angle, while the auditory weighting increased in the control group.
Conclusions: Both the case and control groups were able to integrate audiovisual information to obtain more accurate target location judgments. However, when audiovisual conflict increased, i.e, the audiovisual angle increased, the sensory weight in the case group shifted towards vision, suggesting an adjustment in their spatial decision-making strategy and changes in neural plasticity.

Keywords: Neuroplasticity, Spatial hearing, Cochlear implant

Oral Presentation 30

Auditory Neuroimaging and Tinnitus
OP 30-2

Investigating neural responses to active noise cancellation during auditory tasks in noisy environments using fNIRS

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Purpose:
This study aimed to investigate the neurophysiological benefits of active noise cancellation (ANC) technology during auditory tasks in noisy environments using functional near-infrared spectroscopy (fNIRS).

Methods:
Forty-one adults with normal hearing completed an auditory decision-making task under ANC-ON and ANC-OFF conditions while prefrontal cortical activity was measured using fNIRS. Changes in oxyhemoglobin concentration (Δoxy-Hb) were analyzed to assess neural responses related to concentration. Subjective concentration and listening comfort were rated using a visual analog scale (VAS), and behavioral measures of task accuracy and reaction time were recorded.

Results:
Participants reported significantly greater concentration in the ANC-ON condition ($p < 0.001$). Correspondingly, ANC-ON elicited higher prefrontal activation, particularly in right-lateralized channels (e.g, Ch05 and Ch07), suggesting enhanced engagement of attentional control regions. No significant differences were observed in behavioral accuracy ($p = 0.129$) or reaction time ($p = 0.652$).

Conclusion:
These findings indicate that ANC might support more efficient cognitive resource allocation, thereby mitigating cognitive fatigue and enhancing attentional control.

Keywords: Active Noise Cancellation, Funtional near-infrared spectroscopy, Concentration

Oral Presentation 30

Auditory Neuroimaging and Tinnitus
OP 30-3

Characteristics of Tinnitus Patients in an Audiology Clinic and the Effectiveness of Cognitive-Behavioral Therapy (CBT) and Mindfulness Techniques: Reflections from a 4.5-Year Clinical Practice

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Purpose
To describe the clinical characteristics of tinnitus patients seen in a routine audiology practice and to evaluate real-world outcomes of a structured Cognitive-Behavioral Therapy (CBT) and mindfulness-based tinnitus management program over a 4.5-year period.

Method
Between mid-2021 and the end of 2025, 307 patients presenting with tinnitus were managed in an audiology clinic. All patients underwent comprehensive audiological assessment, including pure-tone audiometry; 43% demonstrated clinically normal hearing thresholds. Psychological screening using validated measures (Generalized Anxiety Disorder-7, Patient Health Questionnaire-9, and Perceived Stress Scale) indicated that over 95% of patients reported clinically meaningful anxiety, depressive symptoms, or chronic stress. A subset of 114 patients participated in a structured five-session CBT and mindfulness-based intervention integrated within routine audiology care. This intervention was not offered universally; patients whose tinnitus was primarily hearing-loss driven and non-bothersome were typically managed with auditory-based interventions alone. Outcome measures included the Tinnitus Handicap Inventory (THI), with post-treatment scores of ≤16 considered clinically non-bothersome, and session-by-session Visual Analog Scale (VAS) ratings of tinnitus bothersomeness. Changes in psychological measures were also monitored.

Results
Among the 114 patients who participated in CBT and mindfulness interventions, 84 patients (74%) achieved successful outcomes (THI ≤16), 7 patients (6%) were classified as non-responders, and 23 patients (20%) discontinued treatment before completion. When analysis was limited to evaluable cases, the observed success rate exceeded 90%. Repeated VAS ratings demonstrated early and progressive reductions in tinnitus bothersomeness in many patients, often preceding normalization of THI scores. In several cases, improvement reached a level no longer perceived as clinically significant, leading to voluntary early discontinuation. Improvements in tinnitus distress were commonly accompanied by reductions in anxiety, depression, and perceived stress.

Conclusion
Across 4.5 years of clinical practice, bothersome tinnitus was more strongly associated with psychological factors than with hearing status. A structured CBT and mindfulness-based program was effective in reducing tinnitus-related distress, supporting the integration of psychological approaches within routine audiology-based tinnitus care.

Keywords: Tinnitus treatment, Cognitive Behavioral Therapy (CBT), Mindfulness

Oral Presentation 30

Auditory Neuroimaging and Tinnitus
OP 30-4

Psychotherapeutic Interventions in Tinnitus Management: Cognitive-Behavioral and Mindfulness Approaches

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Introduction: Tinnitus is a complex symptom extending beyond auditory perception, significantly impacting quality of life (Henry et al, 2005; Langguth, 2015). Emotional, cognitive, and behavioral factors influence symptom perception and maintenance (Cima et al, 2019), highlighting the need for interdisciplinary management, including Cognitive-Behavioral Therapy (CBT) and Mindfulness-based interventions (Fuller et al, 2020; Gans et al, 2022).

Objective: To examine the role of psychotherapeutic interventions as complementary strategies in tinnitus management, emphasizing integration into audiological practice.

Methods: A narrative literature review and clinical observations of patients with chronic tinnitus were conducted, focusing on CBT, mindfulness, and psychoeducational interventions (Zhong et al, 2025; Bardy et al, 2024). The influence of anxiety and depression on symptom severity and quality of life was considered (Burton-Harris et al, 2023).

Results: CBT- and mindfulness-based interventions reduce distress, promote cognitive restructuring of tinnitus perception, and improve quality of life (Fuller et al, 2020; Gans et al, 2022; Zhong et al, 2025). Clinical observations support these findings, showing that addressing psychological components enhances adherence and treatment efficacy (Bardy et al, 2024; Burton-Harris et al, 2023). CBT interventions showed an average reduction of 10.9 points on the Tinnitus Handicap Inventory (THI) after 3–22 weeks of treatment (Fuller et al, 2020).

Conclusion: Psychotherapeutic interventions are a valuable resource in tinnitus management, promoting a biopsychosocial model of care. Integrating audiological and psychotherapeutic practices is essential to optimize patient outcomes (Cima et al, 2019).

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Keywords: TINNITUS, COGNITIVE-BEHAVIOR THERAPY, QUALITY OF LIFE

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-1

Validating the Lateralized Readiness Potential as an Objective Measure of Nonorganic Hearing Loss

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Background: This paper introduces the Lateralized Readiness Potential (LRP) as an electrophysiological measure for detecting nonorganic (functional) hearing loss. Two studies examined whether the LRP can reveal simulated hearing loss in an audiometric context where participants were instructed to selectively withhold responses. Study 1 investigated whether the LRP could be recorded within a single testing block, while Study 2 explored the use of low-intensity, near-threshold auditory stimuli relevant to cases where hearing loss is wilfully exaggerated.

Methods: Participants responded to the side of stimulation with a keypress on Go trials and withheld responses on NoGo trials, thus simulating hearing loss. In Study 1 (n = 10), we compared a Go-only condition to one where an intensity difference in 1000 Hz tones cued Go (79 dB HL) and NoGo (73 dB HL) trials. In Study 2 (n = 10), 500 Hz and 4000 Hz tones were presented at near-threshold intensities.

Results: In Study 1, group-averaged waveforms showed that suppressed (NoGo) responses diverged from performed (Go) responses around 300 ms post-stimulus. LRPs were comparable whether recorded in a Go-only condition or in a mixed Go/NoGo condition. Study 2 found that LRP amplitude did not differ between the three stimuli used, and logistic regression on single-trial data yielded a mean classification accuracy of approximately 0.7.

Conclusion: Recording LRPs within a single testing block using near-threshold stimuli has negligible impact on waveform characteristics. Stimulus frequency (500–4000 Hz) had little effect on LRP amplitude. The response can also be obtained with transient stimuli, allowing concurrent measurement of other electrophysiological responses such as the ABR. Given these attributes, the LRP seems a viable addition to the test battery for investigating suspected nonorganic hearing loss.

Keywords: Nonorganic hearing loss, Lateralized Readiness Potential, ABR

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-2

Comparative Study of Click-Evoked Auditory Brainstem Response vs. Auditory Steady-State Response Hearing Thresholds – A Systematic Review And Meta Analysis

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Objectives: To compare the electrophysiologic hearing thresholds provided by Click-evoked Auditory Brainstem Response (c-ABR) and Auditory Steady-State Response (ASSR) across various frequencies in pediatric population
Methods: A systematic review was conducted using Google Scholar, ProQuest, PubMed, and ScienceDirect, focusing on correlation coefficients between c-ABR and ASSR thresholds across various frequencies. The review included 21 observational studies. Meta-analyses were conducted using random effects models, with subgroup analyses based on various factors.
Results: The overall correlations between c-ABR and ASSR thresholds were strong and significant across different frequencies. The random effects model indicated a correlation coefficient (COR) of 0.73 (95% CI: 0.45 to 0.88) at 1 kHz (4 studies), 0.82 (95% CI: 0.71 to 0.90) at 2 kHz (9 studies), 0.82 (95% CI: 0.72 to 0.88) at 4 kHz (9 studies), 0.84 (95% CI: 0.71 to 0.92) for 1-4 kHz (10 studies), and 0.84 (95% CI: 0.72 to 0.92) for 2-4 kHz (15 studies). Substantial heterogeneity was observed (I^2: 86.2% - 97.1%). The high fail-safe N values suggested robustness against publication bias. Subgroup analyses revealed significant differences based on ABR instruments, while other factors such as countries, sample sizes, and publication dates did not show significant differences. ASSR stimuli of modulated tones provided stronger correlations with c-ABR thresholds compared to chirp stimuli. Despite this, ASSR notably lacks the ability to recognize Auditory Neuropathy Spectrum Disorder.
Conclusion: This meta-analysis demonstrates that ASSR provides reliable frequency-specific information that correlates well with c-ABR thresholds, making it valuable for pediatric audiology. ASSR's limitation prompts clinicians to combine it with other audiological tests. The findings are particularly relevant for resource-limited settings, where ASSR can offer a practical solution for detailed hearing assessments. Despite high heterogeneity, the results are robust and highlight the need for further research to explore contributing factors.

Keywords: Auditory brainstem response, Auditory steady state response, Pediatric hearing screening

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-3

Theoretical Analysis of Wideband Tympanometry Absorbance: Identifying and Modeling the Contribution of Ear Canal Acoustics

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Wideband Tympanometry (WBT) is a diagnostic method developed as an alternative to conventional tympanometry (TM) for middle ear disorders. WBT uses a wideband click stimulus (typically 226–8000 Hz) to measure absorbance, defined as the ratio of sound energy absorbed by the middle and inner ear to the sound energy incident on the ear canal entrance. Although WBT is expected to enable more accurate diagnosis of middle ear pathologies, it is currently applied in clinical practice without a clearly defined diagnostic basis.

This study aims to clarify the diagnostic foundation of WBT by constructing theoretical impedance models of the external and middle ear. We compared numerical absorbance analysis results with measured data to correlate theoretical model parameters with features observed in clinical measurements. We hypothesized that individual variations in measured absorbance originate from both middle ear and external ear canal properties. To isolate the latter, we measured the absorbance of tubes simulating the ear canal, varying their shapes and materials, and used these results to develop a refined theoretical formula.

Our findings reveal that absorbance is significantly influenced by the impedance of the ear canal wall. Furthermore, the damping characteristics of the auditory system are also anticipated to have a considerable impact. In conclusion, while absorbance changes due to middle ear disorders, its susceptibility to the vibratory characteristics of the external ear canal suggests that caution is required when diagnosing middle ear pathologies based on WBT measurements.

Keywords: Wideband Tympanometry, Absorbance, Theoretical Analysis

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-4

Modeling digit-specific correction levels for monotic and dichotic stimulation: Implications for developing new language versions of the Digit Triplet Test

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The Digit Triplet Test (DTT) measures speech-in-noise recognition with spoken digits. Its dichotic, antiphasic variant (diotic noise with speech inverted 180° across ears) leverages binaural unmasking, increasing sensitivity to interaural asymmetries and supporting screening use. A closed digit set, minimal semantic context, and a standardized measurement procedure make the test well suited to cross-language comparisons and to expanding language coverage.
Binaural unmasking is promoted by long, low-frequency voiced segments with minimal modulation. Consequently, the speech reception threshold (SRT) improvement is expected to vary across digits and to yield different correction levels—parameters that equalize SRT across items and thus determine test efficiency.
We compared digit-specific correction levels across 18 languages (180 digits), estimated from 202,712 monotic and 94,711 dichotic tests conducted using the Hearing Test™ app. Differences >2 dB were observed for 30% of digits (54/180). Monte Carlo simulations showed that these differences increase the test's standard error by 0.12 dB on average across languages (largest: 0.25 dB for Italian; smallest: 0.05 dB for English).
Given these differences, we developed two predictive SRT models using (i) speech features linked to intelligibility in noise, (ii) cues relevant to binaural unmasking, and (iii) Gabor wavelet descriptors. We identified eight features most strongly correlated with monotic thresholds and twelve with dichotic thresholds; as expected, binaural-unmasking features appeared only in the latter set. Model performance was evaluated with 10-fold cross-validation. Prediction accuracy, measured by Pearson's r, was 0.77 for the monotic and 0.63 for the dichotic condition; mean absolute error (MAE) and root mean square error (RMSE) were 1.53/2.06 dB (monotic) and 1.50/2.04 dB (dichotic).
The study confirms that level corrections are stimulus-dependent; it may be beneficial to account for them in current and future implementations to maximize efficiency. Modeling validated their predictability and informed the development of 10 new language versions.

Keywords: Digit Triplet Test, Binaural unmasking, Cross-language SRT modeling

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-5

Assessment of Ambient Noise Effects on Kiosk-based Automated Audiometry and Its Superior Clinical Utility for Screening

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Objective
This study quantified the impact of ambient noise on the KOLAS-validated (Korea Laboratory Accreditation Scheme) Kiosk-based Automated Audiometry (KAA) digital health system and evaluated strategies for stimulus intensity adjustment. We aimed to demonstrate the system's superior clinical utility and robust function for hearing screening purposes despite the background noise.

Methods
Experiments were conducted in the Department of Otorhinolaryngology at Wonju Severance Christian Hospital. Three experiments were performed to evaluate the influence of ambient noise:
•Experiment I: Measured environmental noise levels (low, mid, high).
•Experiment II: Used an artificial ear to simulate human listening under three test setups (headset/open-field).
•Experiment III: Compared KAA with conventional audiometry to determine threshold deviations.

Results
Equivalent noise levels fluctuated most during outpatient hours in Experiment I, ranging from 66.6 to 75.6 dB SPL. Artificial ear results indicated higher noise with the headset applied, and a gradual spectral decline from low to high frequencies in Experiment II. In Experiment III, pure-tone thresholds in KAA were elevated around 0.5–1 kHz compared to traditional audiometry, which is a key point of note attributed to the relatively high low-frequency noise. However, in the 40dB HL screen condition, KAA showed better screening function with high sensitivity (88.14-94.37%) and specificity (77.42-94.74%) at 2-8kHz. Furthermore, the measurement results showed a high correlation across all five frequencies ($r \geq 0.45$).

Conclusion
This study firstly quantified environmental noise levels and evaluated passive noise reduction, and then compared KAA system with traditional audiometry. The KAA system showed a strong correlation with traditional audiometry at all frequencies, even in the presence of background noise. Although high-frequency noise contributed to elevated thresholds at 0.5-1 kHz, the strong correlation indicates that masking or noise-compensation algorithms will be highly reliable for further studies. Our KOLAS-validated technology is excellent for audiological screening, regardless of external noise.

Keywords: Automated Audiometry, Ambient noise, Kiosk

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-6

New Evidence-Based Approach for Hearing Screening of Preschool and School Children

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Historically, pure tone techniques have been used for hearing screening of preschool and school age children. Multiple serious limitations of pure tone hearing screening of these pediatric populations are well-documented, including: 1) Concerns about ambient noise in the test venue, 2) The need for experienced and skilled screening personnel, 3) Test time typically exceeding four minutes per child, 4) Inability to conduct screenings or questionable validity of screening outcome young school age and preschool children, 4) Insensitivity of pure tone screening to conductive hearing loss secondary to middle ear dysfunction and 5) Pediatricians' distrust of pure tone hearing screening outcome and their subsequent reluctance to refer children for diagnostic audiological assessment.

Research evidence is presented in support of a feasible, efficient, and effective hearing screening approach that combines multiple objective auditory measures rather than traditional reliance on pure tone hearing screening. Specifically, the application of distortion product otoacoustic emissions (DPOAEs) plus tympanometry for hearing screening of children under the age 7 years circumvents each drawback associated with the pure tone technique. Optional addition of an ipsilateral acoustic reflex screen rules out auditory neuropathy spectrum disorder. For children aged 7 years and older, pure tone hearing screening for test frequencies of 1000, 2000, 4000, and 6000 Hz is appropriate. Addition of the 6000 Hz test frequency contributes to identification of noise and music induced auditory dysfunction in adolescents and high school students.

The session includes recommendations for hearing screening equipment and protocols, and a proven plan for training non-audiologist hearing screening personnel.

Keywords: Hearing screening, Distortion product OAEs, Tympanometry

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-7

Hearing screening results of medical students at the University of Benghazi: A Project Report

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Background: Noise-induced hearing loss (NIHL) is an increasingly recognized concern among young adults due to excessive use of personal listening devices (PLDs) and exposure to environmental noise. Despite being preventable, NIHL remains a leading cause of sensorineural hearing loss. Medical students, in particular, may be at risk due to prolonged headphone use, and limited awareness.

Aims: This study aimed to identify University of Benghazi medical students with potential hearing impairment, raising awareness about hearing conservation and promoting safer listening habits.

Methods: A cross-sectional screening was conducted over two days in early 2025, targeting medical students across different academic years. Participants completed a survey addressing demographics, PLD use, and auditory symptoms. Pure-tone audiometry screening was performed using standardized hearing screening protocol.

Results: Out of 89 participants, 87.6% were PLD users. Tinnitus (56%), ear pain (34.6%), and hyperacusis (30.8%) were commonly reported, with higher prevalence among PLD users. Audiometric screening identified 13 students (14.6%) who failed hearing screening, Although the differences in symptoms between PLD users and non-users were not statistically significant, smoking showed a significant association with hearing screening results ($p = 0.007$).

Conclusion: The findings suggest that a considerable number of medical students may exhibit early signs of NIHL, with PLD use and smoking as potential risk factors. Incorporating extended high-frequency audiometry and regular screenings in university health programs could enhance early detection. Preventive strategies such as educational campaigns on safe listening practices are essential to reduce the risk of NIHL in this population.

Keywords: Noise Inducing Hearing Loss (NIHL), Personal Listening Devices (PLDs), Medical Students

Oral Presentation 31

Auditory Screening and Diagnosis IV
OP 31-8

Validation of A Filipino Word List Used for Adult Speech Recognition Test

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Background and Significance of the Study. Studies have shown that language has a significant impact on word recognition test scores, hence the need for the creation of a more "linguistically-sensitive" speech materials. In some reputable Hearing Centers in the Philippines, a Filipino word list - with unknown source and validity, is being used for speech audiometry. Research Objective. The first objective of the study is to assess the homogeneity of the Filipino words being used for speech recognition testing. The second objective is to compare the strength of correlation between PTA and SRT using an English word list versus using a Filipino word list. Lastly, the study aims to compare the strength of correlation between PTA and SRT with a male speaker versus a female speaker. Methodology. A cross-sectional study was implemented to assess the validity of the Filipino word list for clinical application. A total of 60 Filipino spondees were gathered. There were 61 normal-hearing participants included in the study. Results. Only less than 50% achieved homogeneity within the Filipino word list. Spearman correlation analysis was done and revealed a weak to moderate correlation factor for both English and Filipino words used for SRT. The effects of speaker gender showed little effect on the SRT performance scores. When using the mean difference to correlate PTA from SRT, the Filipino word list shows a better approximation of the participants' hearing thresholds even at lower intensities when using live voice. Conclusion. Performing speech audiometry can still have valid results with using live voice with either a male or a female voice. Using Filipino spondees resulted to a mean difference that corresponds well with the PTA scores at even lower thresholds, making the Filipino words list a better choice of material for speech recognition threshold testing.

Keywords: Speech Audiometry, Speech Recognition Threshold, Filipino word list

Oral Presentation 32

Auditory Implants V
OP 32-1

Steady-State Evoked Potentials Reveal Altered Multisensory Processing in Cochlear Implant Users

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Previous behavioral work comparing hearing controls (HC) and cochlear implant (CI) users revealed that, despite well-documented deficits in pitch perception among CI users, rhythm perception—a core component of everyday functioning underpinning complex motor behavior such as gait and athletic performance—remains comparatively preserved. Our findings also pointed to a shift in audio-visual integration in CI users, suggesting that auditory cortical reorganization following auditory deprivation or implantation may disrupt the convergence of temporally precise auditory input from the implant with concurrent visual signals.

The present study investigates the neural mechanisms underlying multisensory integration of auditory and visual inputs in CI users. Steady-state evoked potentials (SSEPs) were recorded to assess unimodal and multimodal processing of auditory and visual stimuli in CI users relative to HC, using temporally congruent audio-visual stimuli to examine simultaneous sensory integration, and incongruent audio-visual stimuli to probe potential group differences in resolving interference generated by conflicting sensory cues.

SSEP topographies revealed significant differences between HC and CI users. In the multimodal AV asynchronous condition, no differences were observed in the processing of visual information, whereas auditory processing differences mirrored those of the unimodal auditory condition. In the multimodal AV synchronous condition, differences between groups were marked in the passive task but substantially reduced in the active task, suggesting a modulatory role of motor activation on multisensory integration in CI users. A similar pattern was observed in the unimodal visual condition, where group differences were also significant, with a pronounced effect in the passive task, again implying that motor activation may support sensory integration in CI users, as their SSEPs are much closer to those of NH individuals. Topographical analyses in the unimodal visual and multimodal AV conditions also highlighted that CI users recruit auditory cortical regions to support visual information processing.

Keywords: Cochlear implants, Steady-state evoked potentials, Multisensory integration

Oral Presentation 32

Auditory Implants V
OP 32-2

Long-Term Outcomes of Cochlear Implantation in Children with Cochlear Nerve Deficiency: Auditory Speech Performance and Predictive Factors Over 5 Years

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Purpose: While cochlear implantation (CI) is increasingly offered to children with cochlear nerve deficiency (CND), long-term outcomes and their predictors remain understudied. We evaluated 5-year auditory-speech performance and identified factors influencing outcomes.
Methods: A retrospective review of the UKM Cochlear Implant Program (2007-2024) included 12 children with CND (CI aged 14 – 62 months). Primary outcomes measured were unaided/aided hearing thresholds, Categories of Auditory Performance II (CAP-II), Speech Intelligibility Rating (SIR) scores preoperatively and at 1/3/5 years post-CI. Repeated measures ANCOVA was conducted on each outcome with cochlear implant age as a covariate and cochlear anomalies, amplification status and visibility of the cochlear nerves as fixed factors.
Results: 11/12 children achieved CAP-II ≥ 5 (understanding phrases without lipreading); 7/12 attained SIR ≥ 3 (intelligible speech with lipreading) at 5-year post-CI. Earlier implantation correlated with better hearing thresholds ($p < 0.05$). Higher baseline CAP-II/SIR scores predicted superior outcomes ($p < 0.05$). Visible cochlear nerves (vs. absent) were associated with higher 5-year CAP-II/SIR scores ($p < 0.05$).
Conclusion: CI provides significant long-term benefits for children with CND, with outcomes influenced by age at implantation, preoperative function, and nerve visibility. These factors should guide candidacy and parental counselling, reinforcing CI's viability even in radiologically severe CND.

Keywords: Cochlear nerve deficiency, Cochlear implant, Paediatric

Oral Presentation 32

Auditory Implants V
OP 32-3

Cochlear implantation in children with acute onset single sided deafness

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Background:
Single sided deafness results in difficulties with speech-understanding in noise, sound localisation and impaired quality of life. Previous studies have shown beneficial effects of cochlear implantation (CI) in children with congenital or late onset SSD for all these domains.
Aim:
To investigate the effect of CI in children with acute onset SSD (ABR threshold > 90dBnHL in the affected ear).
Results:
Nine children were unilaterally implanted with a Medel Synchrony (n=8) or Cochlear Nucleus electrode (n=1). Duration of deafness varied from 12 days to 8 months and age at implantation ranged from 9 months to 17.5 years. The cause of SSD was labyrinthitis (3), pneumococcal meningitis (3), sudden deafness (2) and temporal bone fracture (1). Full insertion could be obtained in all cases (7 round window approach, 2 cochleostomy). An insertion probe was used in six cases. Direct auditory stimulation was used postoperatively and all patients were included in a rehabilitation program. Postoperative pure tone average in the implanted ear varied between 30 and 55dBHL. A sound localisation test was performed in five patients and performance with the CI on and was within the normal range in all cases. Six patients are full time users, two are limited users and one patient is a non-user.
Conclusions:
Cochlear implantation in pediatric acute SSD comes along with several challenges:
1) the need for prompt referral and decision making in favour of CI after the onset of deafness; 2) complete insertion of the electrode can be difficult and an insertionprobe should be at hand during the procedure 3) postoperative rehabilitation is demanding and requires highly motivated patients and caregivers to achieve optimal treatment adherence.

Keywords: Cochlear implant, Single sided deafness, Children

Oral Presentation 32

Auditory Implants V
OP 32-4

Spectral Ripples in Normal and Electric Hearing Models

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Devising a psychophysical test to assess spectral resolution has not been easy. Two tests that have been used previously are the spectral ripple test and the spectral- temporally modulated ripple test (SMRT). Over time, questions have been raised about the validity of these tests. We introduce a new computational electric hearing (with a cochlear implant, CI) model that can simulate how sound is transferred through a speech processor and is received by the cochlear nerve fibers. With this electric hearing model and a normal hearing model, we investigated if the known limitations of these tests can be detected. For the spectral ripple test, we could show the limitations in the output of the CI, the information conveyed to the cochlear nerve, to estimate the threshold, and show the benefit of current steering. In addition, we reproduced the aliasing effect with normal hearing in the SMRT, as well as the reduced ripple resolution in CI users. Our computational modeling framework can serve as a first-step assessment of the validity of new psychophysical tests. Moreover, it could be used to test new speech coding strategies.

Keywords: Neural modeling, Psychophysics, Cochlear implants

Oral Presentation 32

Auditory Implants V
OP 32-5

Application of the CROS system in cochlear implant users

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Background: Unilateral cochlear implantation in individuals with bilateral deafness, although highly beneficial, often leaves users with certain functional limitations. Implementing a CROS (contralateral routing of signal) system, which transfers acoustic input from the deaf ear to the side equipped with the speech processor, may help reduce these limitations and improve auditory performance in challenging listening environments.
Objective: The aim of this study was to evaluate the benefits of CROS system use in cochlear implant recipients.
Methods: The study included 15 cochlear implant users presenting with severe-to-profound hearing loss in the contralateral ear. All participants had used their implants for more than nine months. To assess binaural benefits - summation, squelch, and head-shadow effects - speech-in-noise audiometry was performed under three listening conditions, both with the CROS system activated and deactivated.
Results: The findings indicated significant improvements in speech discrimination when the CROS system was activated in some of the tested listening conditions.
Conclusions: The CROS system may offer meaningful benefits to cochlear implant users who, for various reasons, are not candidates for bilateral implantation. Proper counselling is essential to inform potential users about the specific listening situations in which CROS use is advantageous, as well as those in which it provides limited benefit.

Keywords: CROS, Contralateral technology, Cochlear implant

Posters

Auditory Screening and Diagnosis
PD 001

The Co-occurrence of Auditory Neuropathy and Friedreich's Ataxia and its Implications in Audiological and Balance Assessment in a Pediatric Patient: A case report

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Purpose: Discussion of a paediatric patient's auditory (audiological and electrophysiological) and balance assessment in a genetically diagnosed Friedreich's Ataxia patient. The goal is to emphasise diagnostic complexity and the need for a complete test battery for rehabilitation.
Method: The 5-year-old female patient underwent a complete audiological evaluation, including pure-tone and speech audiometry,tympanometry. The electrophysiological study included the Auditory Brainstem Response (ABR) with click and chirp stimuli, while the electroacoustic study included transient and distortion product otoacoustic emissions. Standardised oculomotor testing (saccades, pursuit, gaze holding, optokinetics, and vestibulo ocular reflex suppression) and bitermal air caloric stimulation assessed vestibular function and Balance was assessed using The Pediatric Balance Scale.
Result: Audiometry showed normal thresholds, otoacoustic emissions, ABR-click altered with cochlear microphonics, and ABR-specific frequency (chirp) with normal minimum response levels at 500, 1000, 2000, and 4000Hz. Oculomotor testing showed normal horizontal and vertical saccades with latency, accuracy, and peak velocity. Gain was normal without corrective saccades in smooth pursuit. No gaze-evoked nystagmus occurred during gaze holding. Symmetrical optokinetic responses. Vestibulo-ocular reflex suppression was normal. Bitermal air caloric stimulation reduced bilateral responses, indicating vestibular hypofunction. The Berg Balance Scale showed the child could stand for 3 seconds. The remaining tasks showed severe balance issues due to this limitation.
Conclusion: Auditory neuropathy and Friedreich's Ataxia co-occurrence requires a detailed audiological and electrophysiological evaluation to distinguish cochlear from neural alterations. Present OAEs/absent or altered ABR are pathognomonic of auditory neuropathy. Peripheral neuropathy and auditory neuropathy-induced cerebellar changes affect balance, making balance investigation crucial. Peripheral neuropathy and auditory neuropathy-induced cerebellar changes affect balance, making balance investigation crucial. These findings suggest auditory rehabilitation for speech discrimination and balance to improve patient quality of life.

Keywords: Children, Hearing, Balance

Posters

Auditory Screening and Diagnosis
PD 002

Analysis of auditory electrophysiological responses in an adolescent with language and learning disorders

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Purpose: This case study describes the electrophysiological manifestations of hearing in an adolescent with co-diagnosed developmental language disorder (DLD) and specific learning disorder (SLD).
Method: A 15-year-old male patient was evaluated using different modalities. The neuropsychological assessment investigated verbal and non-verbal intellectual functions and processing speed. The language assessment included subsystems such as semantics, phonology, syntax, as well as phonological awareness, phonological memory, rapid automatic naming, decoding skills, fluency, reading comprehension, spelling, and text production. The complete audiological assessment included tonal audiometry, speech audiometry, and immittance audiometry. The electrophysiological investigation consisted of the click-Auditory Brainstem Evoked Potential (cABR), Middle Latency Auditory Evoked Potential (MLAEP), Long Latency Auditory Evoked Potential (P300), and the Frequency Following Response (FFR).
Result: The neuropsychological assessment demonstrated integrity in intellectual functions and processing speed. The language assessment indicated deficits in all areas except the phonological profile and rapid automatic naming. The click- ABR confirmed the integrity of the auditory pathway up to the brainstem. The MLAEP revealed a subcortical processing dysfunction, with a significant ear effect and asymmetry. The P300 analysis showed a prolonged latency in the left ear and an absence of a response in the right ear. The FFR responses confirmed that the perception of speech sounds is impaired, and the neurophysiological responses do not correspond to the elicited stimulus.
Conclusions: The study demonstrated that the electrophysiological assessment of the auditory system provided objective evidence of the neurobiological bases for the persistent deficits in an adolescent with DLD and SLD. The study warns that in cases of comorbidity, it is vital to investigate the linguistic and auditory systems through a multidisciplinary approach.

Keywords: Auditory evoked potentials, Specific language impairment, Comorbidity

Posters

Auditory Screening and Diagnosis
PD 003

The use of self-administered smartphone-based hearing screening among older adults with mild cognitive impairment

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Purpose: Hearing loss is the largest potentially modifiable risk factor for dementia, but it is often overlooked in memory clinics, contributing to misdiagnosis and delayed intervention. Although smartphone-based hearing screening has demonstrated high accuracy in various populations, evidence among older adults with cognitive impairment remains scarce. This gap is further compounded in non-English-speaking settings, as most available tools are developed in English. Therefore, this study aimed to (1) validate a newly developed Thai-language smartphone-based hearing screening in a normal-hearing population and (2) evaluate its diagnostic accuracy among older adults with mild cognitive impairment (MCI).

Method: Participants were (1) normal-hearing adults without ear problems (n=40) and (2) an MCI group diagnosed a ICD-10 criteria (n=102). Demographic data, including age, sex, and MoCA scores, were collected. Hearing was assessed with the self-administered "EarTest by Eartone" application (iOS and Android), which offered a Thai-language interface. Tests were conducted in a quiet office with automatic noise monitoring. Only the normal-hearing group completed both platforms. All participants also underwent standard pure-tone audiometry.

Result:
In the normal-hearing group, thresholds from the app showed nearly 100% agreement within 10 dB with audiometry, with strong correlations ($r > 0.85$) and reliability (ICC up to 0.82). iOS and Android thresholds also demonstrated excellent reliability (ICC up to 0.96). Among MCI participants, the app showed perfect agreement within 10 dB across frequencies, high correlations ($r \geq 0.97$), and robust diagnostic accuracy for disabling hearing loss (≥35 dB HL): sensitivity 100%, specificity 89.3%, AUC 1.0, with diagnostic performance improving further at higher thresholds.

Conclusion: A self-administered, Thai-language smartphone-based hearing screening app provides accurate and reliable results in both normal-hearing individuals and older adults with MCI. Its integration into memory clinic workflows may improve access to hearing evaluation and support better cognitive outcomes.

Keywords: Hearing screening, EHealth, Cognitive impairment

Posters

Auditory Screening and Diagnosis
PD 004

An audit of hearing diagnoses amongst babies with a cleft palate seen for diagnostic testing 2014-2023

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Background:
Children born with a cleft palate are prone to experiencing persistent middle ear effusion and associated hearing loss, primarily due to changes in anatomy and physiology of the Eustachian tube. Additionally, when the cleft palate occurs as part of a syndrome, there can be increased risk of additional permanent hearing loss. Early diagnosis of both conditions is important to inform appropriate management strategies. Understanding the hearing outcomes profile of children with a cleft palate can also help to inform resource allocation for diagnostic appointments. This project therefore aimed to examine the numbers and hearing outcomes of children with a cleft palate seen for diagnostic testing between 2014 and 2023; to examine the influence of cleft palate type on hearing outcomes and; to analyse patterns of clinical results and reporting for children with a cleft palate.

Methods:
A retrospective file audit was conducted using an established database of hearing outcomes for newborns referred for diagnostic hearing assessment following newborn hearing screening. Results were statistically analysed using appropriate inferential and descriptive statistics.

Results:
The outcomes of analyses showed a decline in numbers of children with a cleft palate accessing diagnostic services over time. Conductive hearing loss was a common finding amongst this population, while just under 10% were found to have some degree of permanent hearing impairment. Significant differences were noted between the hearing outcomes profile for children experiencing cleft palate as part of a syndrome, compared to those whose cleft palate was non-syndromic. There were significant inconsistencies in reporting the type of cleft palate and number of appointments required to establish a reliable hearing diagnosis.

Conclusions:
This research has provided a better understanding of hearing outcomes profiles for children with a cleft palate, supported allocation of appropriate appointment times and clinician skillsets and better informing family education activities.

Keywords: Cleft palate, Hearing Loss, Diagnostic hearing testing

Posters

Auditory Screening and Diagnosis
PD 005

Automated speech audiometry using open-source automatic speech recognition

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The digits-in-noise (DIN) test is widely used to assess speech perception in noise for adults and children. In the typical clinical setup, clinicians run the DIN test and score participants' spoken responses. In the online version, participants manually enter the heard digits via a keypad. We propose a third, alternative setup: a simple system for automating the DIN test scoring using a widely available automatic speech recognition (ASR) toolkit. We used the adaptive DIN test with 24 digit-triplets presented in noise at varying intensity levels, with native Dutch normal-hearing adults (n=30, age range 19-64 yr). Participants' spoken responses were automatically scored after being decoded by the Dutch instance of the open-source, pre-trained ASR toolkit Kaldi, Kaldi-NL.
Kaldi-NL performance was evaluated for how accurate it was in correctly decoding the spoken digits via the word error rate (WER, ratio between the sum of insertions, deletions and substitutions, and the total number of recorded spoken digits). The average WER was 5.0% (range 0-13.5%, SD = 3.6%), excluding an outlier whose WER was 48%. We found an average of three triplets with Kaldi-NL decoding errors per participant. Following, we evaluated how the Kaldi-NL decoding performance could affect the DIN test score, expressed in speech reception threshold (SRT). Previous research indicates 0.70 dB as typical within-subjects variability for NH adults. Using this as a criterion, bootstrapping simulations showed that up to four triplets with decoding errors produce SRT variations within this range, suggesting that our proposed setup could be feasible for clinical applications, saving clinician's time and enabling remote collection of data.
Further steps include the testing and customisation of the system for it to be usable by different populations; i.e, children, hard-of-hearing individuals, and non-native individuals.

Keywords: Hearing test, Automatic speech recognition, Speech audiometry

Posters

Auditory Screening and Diagnosis
PD 006

Exploring the transition between tone burst and narrow-band CE-Chirp stimuli within an infant diagnostic service

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Background: Tone-burst stimuli have been consistently used to obtain frequency-specific information when threshold-seeking using Auditory Brainstem Response (ABR) testing for several decades. Narrow-band CE-Chirps provide an alternate frequency specific stimuli, with some studies suggesting these stimuli facilitate a faster test time and increased clinician confidence through enhancing the amplitude and morphology of Wave V response within the ABR. The Children's Audiology Service (CAS) is the sole public provider of diagnostic hearing assessments to newborns referred for further assessment following newborn hearing screening in South Australia. Here, we aim to describe the process, impact and learnings obtained from a project facilitating the transition from using tone-bursts to Narrow-band CE-Chirps for ABR testing within an infant diagnostic service.

Methods: Our preparation phase included a literature review, business case and clinician engagement activities. Our implementation phase included upskilling clinical leadership, adapting clinical procedures, creating new software protocols, theoretical and practical workshops for clinicians and undertaking a certification process for clinicians, including interpretation exercises, simulations, observations and remote support. We used an online survey to measure clinician confidence in acquiring and interpreting ABR results before and after changing stimuli. We also measured appointment times and amount of information obtained within appointments pre and post implementation as further indicators of the impact of changing stimuli.

Results: Overall, we found a slight decrease in self-perceived clinician confidence across the implementation timeframe. We also found that the Narrow-band CE-Chirp appeared to reduce test times, though there were many potential confounding factors. The amount of information collected within appointments appeared to remain stable throughout the process.

Conclusions:
Key lessons learned included suggested improvement to the project preparation phase, the significance of engagement with internal and external stakeholders and strategies to identify and manage challenges associated with conducting a long-term implementation and evaluation project.

Keywords: Auditory Brainstem Response (ABR), Narrow-band CE Chirp, Diagnostic Hearing Testing

Posters

Auditory Screening and Diagnosis
PD 007

Pattern Analysis of Eustachian Tube Function in Healthy Subjects Using Tubotympanoaerodynamic Graphy (TTAG)

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Eustachian tube (ET) tests include TTAG, sonotubometry, the nine-step test, and the inflation–deflation test. TTAG is relatively independent of membrane integrity, and waveform morphology may help discriminate ET phenotypes, though evidence remains limited. We characterized TTAG heterogeneity and distribution in adults self-reporting normal ET function to inform normative interpretation.
Participants were adults without complaints of ET dysfunction who, on endoscopy, showed that the ET orifice could be opened by a modified Valsalva maneuver. The cohort included 35 men and 37 women (mean ages 36.48 and 38.51 years, respectively). Testing used the JK-05A ET function system (RION Co, Ltd.), and ears were classified into four groups: obstructive, patulous/open, positive-pressure normal, and negative-pressure normal. In total, 142 ears were analyzed.
This study grouped all ears by Eustachian tube opening threshold, latency, and whether a brief negative pressure was detected before opening. Of the 142 ears, 94 were classified as normal (66.2%), comprising 59 positive-pressure normal (41.5%) and 35 negative-pressure normal (24.6%). Additionally, 47 ears were obstructive (33.1%), and 1 ear was patulous/open (0.01%).
In adults with self-reported normal ET function, TTAG demonstrates normal yet heterogeneous phenotypes. While most ears were normal, 33.1% did not reach the operational opening threshold, potentially reflecting maneuver technique, posture, or nasal patency. TTAG, being independent of tympanic membrane status and offering waveform-based patterns, is a useful tool for observing ET dynamics; ET assessment should nevertheless integrate symptoms, history, endoscopy, and complementary objective tests.

Keywords: Eustachian tube testing, Eustachian tube function, Tubotympanoaerodynamic Graphy

Posters

Auditory Screening and Diagnosis
PD 008

Preschool Hearing Screening: Identifying Undetected Middle Ear Dysfunction and Hearing Loss

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Objectives: Preschool hearing screenings play an important role in supporting children's communication, learning, and overall well-being. However, such screenings are not routinely conducted in Australia. This study aimed to identify previously undetected middle ear dysfunction and/or hearing loss among preschool-aged children through a targeted hearing screening initiative in Melbourne, Australia.
Methods:
Between 2020 and 2025, 339 children aged 4-5 years participated in a preschool hearing screening program. Audiological assessments included tympanometry, air-conduction play audiometry (500 Hz–4000 Hz), and speech discrimination testing using the Kendall Toy Test. Children with abnormal tympanometry results were advised to consult their general practitioner and return for a follow-up hearing assessment in approximately three months. Those identified with hearing loss and normal tympanometry were referred for a comprehensive diagnostic evaluation.
Results:
Of the participants, 58% (n = 196) presented with at least one risk factor for hearing loss, including family history, recurrent ear infections parental concerns regarding hearing or delayed speech and language development. Abnormal tympanometry results were observed in 30% of children. Hearing loss was observed in 14% of children, while 3% of children failed the speech discrimination testing. Overall, 30% of children were recommended for medical follow-up, and 4% of children were referred for a comprehensive diagnostic audiological assessment.
Conclusion:
This study highlights the prevalence of previously undetected middle ear pathology and hearing loss among preschool-aged children. Implementing a nationwide preschool hearing screening program could enable the early identification and management of hearing issues, thereby supporting optimal language, cognitive, and social development as children transition to school.

Keywords: Preschool hearing screening, Middle ear dysfunction, Hearing loss

Posters

Auditory Screening and Diagnosis
PD 009

A fast-track hearing diagnosis system in northern Thailand: Overcoming barriers in a resource-constrained hospital

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Background:
Timely identification of hearing loss in newborns is essential to prevent delays in speech, language, and cognitive development. In resource-limited hospital settings, conventional screening and diagnostic pathways often lead to delayed diagnosis due to equipment shortages, limited personnel, and fragmented follow-up systems. This study evaluated the effectiveness, challenges, and sustainability of a newly implemented fast-track diagnostic referral system at Chiangrai Prachanukroh Hospital, Thailand.
Objective:
To assess the impact and feasibility of a fast-track diagnostic system aimed at improving early diagnosis and intervention for newborn hearing loss.
Methods:
The intervention study was conducted with 2,250 newborns: 1,124 under the routine protocol (July–September 2022) and 1,126 under the new fast-track protocol (July–September 2023). Quantitative data on diagnostic age were analyzed with t-tests, while follow-up rates were assessed using chi-square tests.
Results:
The mean age at diagnosis was significantly reduced from 5.95 ± 1.27 months (routine) to 3.33 ± 0.52 months (fast-track) ($p < 0.001$). Follow-up return improved slightly from 43.42% to 50.60%. Key challenges included equipment shortages, early discharge policies, limited staff availability, and inconsistent parental compliance. Sustainability was supported by government reimbursement policies, interdisciplinary collaboration, and potential integration of mobile ABR services.
Conclusion:
The fast-track system demonstrated improved diagnostic timeliness and is feasible in a resource-limited hospital setting. However, long-term sustainability requires continued policy support, infrastructure investment, and active parental engagement strategies. This model offers a replicable framework for similar healthcare environments facing diagnostic delays.

Keywords:
Newborn hearing screening, fast-track diagnosis, implementation barriers, sustainability

Posters

Auditory Screening and Diagnosis
PD 010

QUALITY INDEX OF THE NEONATAL HEARING SCREENING PROGRAM OF A PUBLIC HOSPITAL IN BRAZIL

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Introduction: Early detection and diagnosis of hearing loss in newborns are extremely important, as they enable adequate prevention, treatment and rehabilitation, allowing for a better prognosis and ensuring a better quality of life. Thus, universal neonatal hearing screening becomes a means of identifying hearing disorders in the first days of the infant's life, following the quality indicators established by the Multidisciplinary Committee on Hearing Health and the Joint Committee on Infant Hearing, since the effectiveness of the program interferes withthe diagnosis and intervention process. Objective: To analyze the quality indicators of the universal neonatal hearing screening program of a public hospital in Brazil. Methodology: Retrospective study, in which the database of the universal neonatal hearing screening of the hospital was analyzed. It included the screenings performed in the Joint Accommodation and neonatal ICU of live newborns from 2011 to 2023. These data were compared with the quality indicators proposed by the Joint Committee and the Multidisciplinary Committee on Hearing Health. Results: The total study sample consisted of 7,537 newborns submitted to the Neonatal Hearing Screening program. The data were analyzed quantitatively and qualitatively according to the quality indexes through pertinent statistical analysis and also regarding the program during the COVID-19 pandemic period and the main risk factors for hearing loss. Conclusion: The program meets the standards established by the Joint Committee on Infant Hearing (2019) and the Multidisciplinary Committee on Hearing Health (2010), and it is within the expected target for most of the established indicators, except for retest attendance and risk indicators for hearing impairment.

Keywords: Neonatal screening, Hearing, Quality indicators in health care

Posters

Auditory Screening and Diagnosis
PD 011

Cross-Cultural Adaptation and Validation of the Revised Hearing Handicap Inventory-Screening (RHHI-S) into Spanish

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Purpose: Pure-tone audiometry has limitations in assessing the real-life impact of hearing impairment on daily functioning and quality of life. The Revised Hearing Handicap Inventory-Screening (RHHI-S) is a validated 10-item screening tool applicable to adults of all ages, eliminating the need for age-specific questionnaires. However, no validated Spanish version exists for approximately 500 million Spanish speakers worldwide. This study aimed to translate, culturally adapt, and validate the RHHI-S into Spanish.

Methods: Cross-cultural adaptation follow guidelines through forward-backward translation, expert committee review, and field testing. The Spanish RHHI-S was administered to 162 adults (mean age 47.2 years, SD 23.7, range 18-88 years), including 76 with normal hearing and 86 with hearing loss. Participants completed pure-tone audiometry, tympanometry, and Spanish versions of RHHI-S and Speech, Spatial and Qualities of Hearing Scale (SSQ12). Structural validity was assessed through exploratory factor analysis, internal consistency via Cronbach's alpha, construct validity through known-group comparisons and correlations, and discriminative ability via ROC curve analysis.

Results: The Spanish RHHI-S demonstrated excellent internal consistency ($\alpha = 0.928$) and unidimensional structure (67.4% variance explained, factor loadings 0.74-0.86). Significant differences were found between normal hearing and hearing-impaired participants ($p < 0.001$, $r = 0.45$). Correlations with hearing thresholds ($r = 0.52$-0.54) and SSQ12 ($r = -0.672$) were significant ($p < 0.001$). ROC analysis showed good discriminative ability (AUC = 0.77-0.79) with optimal cutoff ≥7 points.

Conclusion: The Spanish RHHI-S is a reliable and valid screening tool with excellent psychometric properties, providing clinicians with a standardized instrument applicable across all adult age groups for Spanish-speaking populations. Unlike previous versions, this single instrument eliminates the need for age-specific questionnaires, simplifying clinical assessment while maintaining strong discriminative ability.

Keywords: Hearing Handicap, Hearing Screening, Hearing loss

Posters

Auditory Screening and Diagnosis
PD 012

Comparison of Auditory Brainstem Evoked Response (ABR) Test Results in Infants Screened for Neonatal Hearing Loss

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Objective
This study aimed to evaluate the outcomes of Auditory Brainstem Evoked Response (ABR) tests in infants who received "refer" results from Automated Auditory Brainstem Response (AABR) screenings, focusing on false positive rates and the necessity of follow-up testing.

Materials and Methods
The study retrospectively analyzed 71 infants under 1 year of age who underwent AABR screening and follow-up ABR testing from January to December 2021. Infants were divided into unilateral (n=49) and bilateral (n=22) refer groups. ABR thresholds were categorized as normal (<30 dBnHL), mild-to-moderate (30–70 dBnHL), and severe-to-profound (≥70 dBnHL).

Results
Among the 71 cases, 38 (54%) showed ABR abnormalities. In the unilateral group, 24 infants (49%) had ABR thresholds ≥30 dBnHL, while in the bilateral group, 14 infants (64%) showed abnormal thresholds. Transient conditions like otitis media with effusion accounted for most mild-to-moderate cases, which improved with intervention.

Conclusion
Although AABR is an effective screening tool, it may not be necessary to conduct numerous tests before confirming hearing impairment, considering the relatively low probability of meaningful improvement. When a unilateral ear exhibits abnormal results, this tendency becomes even more accentuated.

Keywords: Hearing, AABR, Screening

Posters

Auditory Screening and Diagnosis
PD 013

Characterizing Distortion Product Otoacoustic Emission Components using Variable Stimulus-Frequency Ratios

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Distortion product otoacoustic emissions (DPOAE) are clinical tools for assessing and monitoring cochlear integrity, particularly in pediatric populations. DPOAE in clinical protocols are measured using a fixed f2/f1 ratio of 1.22 across all test frequencies in both adults and children. Previous studies have shown that DPOAE amplitudes are greatest when the f2/f1 ratio is optimized according to known cochlear physical and mechanical properties. However, little is known regarding how the stimulus ratio affects the individual components of DPOAE in children. Here we measured DPOAEs for two stimulus frequency ratios (f2/f1 = 1.16 and 1.18) in 3 children (aged 10-11 years). Using a swept-tone paradigm, f2 was presented between 1 and 14 kHz at 55 dB FPL with f1 swept simultaneously at 40 dB FPL. 96 ear canal recordings were made using the Etymotic Research ER10X OAE probe system. Ear canal recordings were averaged and sent through a least-squares-fitting based frequency analysis. A strict signal-to-noise ratio criterion of 9 dB was utilized before component separation. DPOAE components were separated using continuous wavelet transform (CWT)-based filtering. We found remarkable inter-subject variability in level and phase behaviors of DPOAEs measured with the two ratios, the explanations for which will be discussed in detail and are likely due to small sample size and low stimulus levels used in this pilot study. Future studies are needed with additional stimulus frequency ratios and levels to fully characterize the influence of stimulus parameters on diagnostic and screening accuracy in pediatric populations.

Keywords: Otoacoustic emissions, Ratio, Stimulus

Posters

Auditory Screening and Diagnosis
PD 014

A VR-Based Sound Localization Test Incorporating Personalized Recordings for Realistic Spatial Assessment

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Sound localization, a key aspect of auditory spatial perception, relies on interaural time differences (ITD), interaural level differences (ILD), and spectral cues. Individuals with single-sided deafness (SSD) have limited access to binaural cues, resulting in difficulties in directional hearing. However, clinical evaluation of localization remains rare due to the need for costly facilities. This study aimed to develop an optimal auditory stimulus for a virtual reality (VR)-based localization test system that overcomes such limitations while maintaining clinical accuracy.
Twenty participants with normal hearing (NH) and fourteen with SSD (7 right, 7 left) underwent localization tests in a sound field (SF) and VR environments. Seven speakers were placed at 30° intervals within the frontal hemifield. Three noise types—broadband (BB), low-pass (LP, cutoff 1,500 Hz), and high-pass (HP, cutoff 3,000 Hz)—were presented at 55, 60, and 65 dB HL. Each 500-ms stimulus was tested under three VR conditions: Unity-based directional audio (VRA), KEMAR-recorded audio (KR), and personally recorded audio (PR). Root mean square errors (RMSE) were compared across conditions.
PR and KR provided similar spatial cues, while VRA exaggerated them. For NH participants, localization error was smallest in SF and largest in VRA, whereas PR yielded the most consistent results (RMSE ±0.55) and closely matched SF performance. SSD participants showed larger interindividual variability but similar patterns. Applying the ICF framework confirmed PR as the most reliable and representative stimulus (70.6%).
These findings highlight the clinical potential of VR-based localization tests, particularly those using personalized recordings, for realistic and accessible spatial hearing assessment.

Keywords: Sing side deafness, Sound localization, Spatial hearing

Posters

Auditory Screening and Diagnosis
PD 015

Clinical Evaluation of the Korean Digits-in-Noise Test in Comparison with the Hearing in Noise Test

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Objective: The Digits-in-Noise (DiN) test assesses speech in noise (SiN) perception using digit sequences via web or smartphone, while the Hearing in Noise Test (HINT) measures SiN perception using recorded sentences. This study compares speech reception thresholds (SRTs) of DiN and HINT across varying degrees of symmetric hearing loss (HL) to determine whether the DiN yields results comparable to the HINT supporting its use for SiN assessment.
Method: Eighty-three participants (63 with bilateral symmetric sensorineural HL, 20 with normal-hearing) completed the Korean DiN test via headphones and Korean HINT test via a loudspeaker. Both tests used adaptive procedures to determine SRTs at the 50% correct response. Spearman's correlation examined relationships between the DiN-SRTs for both ears, left noise right speech (LNRS), and left speech right noise (LSRN) and the HINT-SRTs in various noise conditions including front, left, right, and composite (NF, NL, NR, NC) for the HL and NH groups.
Results: In the K-DiN test, spatially separated configurations showed significantly better SRTs than co-located ones across all groups (DiN-LSRN vs DiN-L; DiN-LNRS vs DiN-R, $p < 0.001$). Similarly, the K-HINT test showed significantly better SRTs for spatially separated conditions except moderately severe group (HINT-L vs HINT-NF; HINT-R vs HINT-NF, $p < 0.001$). DiN-B showed strong correlations with HINT-NF ($r = 0.88$, $p < 0.001$) and HINT-NC ($r = 0.91$, $p < 0.001$). Additionally, strong correlations were found between matched noise conditions; DiN-LNRS with HINT-NL ($r = 0.75$, $p < 0.001$) and DiN-LSRN with HINT-NR ($r = 0.73$, $p < 0.001$).
Conclusion: Improved SRTs with spatial separation and strong correlations with K-HINT demonstrate that K-DiN reliably reflects both overall and spatial aspects of SiN perception. These findings indicate that the K-DiN test can serve as a reliable predictor of K-HINT performance, offering potential advantages for clinical efficiency and accessibility.

Keywords: Digits-in-Noise Test, Hearing in noise test, Symmetric hearing loss

Posters

Auditory Screening and Diagnosis
PD 016

Normal Hearing Thresholds in Korean Adults Aged 20–70 Years: Establishing Reference Values and Comparison with ISO 7029:2017

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Purpose: This study aimed to establish age-specific normative hearing thresholds for Korean adults aged 20–70 years and evaluate their divergence from the ISO 7029:2017 reference medians. This multicenter cross-sectional study (2021–2024) performed ear-specific audiometry at standard frequencies (250–8,000 Hz) with calibrated equipment.
Method: A total of 1,409 participants (382 males, 1,027 females) with otologically normal hearing, as defined by ISO 7029:2017 criteria, were included.
Results: Significant interaural asymmetry was observed in adults aged 20–60 years, with right-ear thresholds higher than left-ear thresholds by an average of 2.8 dB in females and 1.7 dB in males ($p<0.05$). Median hearing thresholds in Koreans diverged significantly from ISO 7029:2017 median, exceeding reference values by +2.0 to +19.0 dB across ages and frequencies ($p<0.05$).
Conclusions: Our findings challenge the ISO 7029:2017 combined-ear approach, suggesting that separate ear assessments improved the threshold estimation precision. These elevated thresholds may reflect generational shifts in noise exposure or biological factors, indicating the importance of updating international standards with contemporary population data.

Keywords: ISO 7029, Hearing threshold, Korean data

Posters

Auditory Screening and Diagnosis
PD 017

Neural Network-Based Surveillance for Childhood Listening Difficulties: The KLiP Checklist

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Purpose: This study developed and validated a neural network-based Kid's Listening Performance (KLiP) checklist to monitor listening difficulties in children aged 3-6 years and evaluated its effectiveness as a surveillance tool in real-world settings.

Methods: Development followed a systematic multi-phase process including literature review, content validity evaluation, inter-rater reliability assessment between parents and teachers, and discriminant validity testing. The neural network model was trained on data from 341 children (202 with typical hearing, 139 with hearing loss). Real-world validation included 71 parent-child pairs who completed both KLiP and hearing screening.

Results: The finalized KLiP checklist comprises eight discriminating behavioral items and six risk factors. The neural network model achieved 90% sensitivity and 97% specificity in distinguishing between children with and without hearing loss. In real-world testing, high KLiP scores (≥0.5) effectively flagged children requiring further audiological attention, while low scores (<0.5) indicated typical hearing abilities in children.

Conclusions: KLiP demonstrates strong potential as a surveillance tool for identifying listening difficulties in preschool children. Its implementation as an online platform with automated risk assessment and educational resources promotes awareness of listening difficulties among parents and teachers, supporting early identification within the pediatric hearing healthcare framework. KLiP complements rather than replaces formal hearing screening, serving as an accessible solution particularly for regions without established preschool hearing screening infrastructure.

Keywords: Artificial intelligence-based tool, Hearing surveillance, Listening difficulty

Posters

Auditory Screening and Diagnosis
PD 018

The Influence of Sex and Ear on Auditory Brainstem Response: A Large-Scale Analysis of Latency and Amplitude

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Background: The clinical interpretation of Auditory Brainstem Response (ABR) relies on precise normative data. While our previous work (Sanfins et al, 2022) confirmed sex-based differences in ABR latencies in a normative sample (N=73), a larger-scale investigation is essential to validate these findings and explore other potential sources of variability, such as wave amplitude and interaural asymmetries. This study aimed to expand upon our initial findings by using a substantially larger clinical sample.
Method: This retrospective, cross-sectional study was approved by the Research Ethics Committee performed with 244 participants (134 men, 110 women) with normal hearing thresholds and no hearing problems. All underwent basic audiological and electrophysiological evaluation (click ABR). ABR wave latencies, interpeak intervals, and amplitudes were analyzed. Non-parametric statistics were employed: the Mann-Whitney U test for comparisons between sexes and the Wilcoxon signed-rank test for interaural comparisons. A significance level of $p < 0.05$ was adopted.
Results: The results robustly confirmed our previous findings on a larger scale: women presented with significantly shorter latencies for waves III and V, as well as for all interpeak intervals ($p \leq 0.001$). In a novel exploratory analysis, no statistically significant sex-based differences were found for wave I and V amplitudes. Furthermore, the analysis of interaural differences, which was not addressed in the previous study, revealed significant asymmetries for wave V latency and the I-III and I-V intervals ($p < 0.05$).
Conclusion: This study not only validates the significant influence of sex on the temporal parameters of ABR with greater statistical power but also provides new evidence suggesting this influence does not extend to wave amplitudes. The identification of significant interaural asymmetries introduces another critical variable for clinical consideration. These findings reinforce the imperative to use sex-specific, and potentially ear-specific, normative data to maximize diagnostic accuracy in audiology.

Keywords: Evoked potentials, References values, Electrophysiology

Posters

Auditory Screening and Diagnosis

PD 019

Universal Methodology, Local Refinement: Multi-Language Validation of an Adaptive Speech-in-Noise Test

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Objective: To address the global need for accessible and standardized speech-in-noise tests, this study validated an adaptive Speech-in-Noise (SIN) triplet-of-words model across diverse languages using a unified methodology, focusing on cross-linguistic performance and the need for language-specific item difficulty adjustment.
Methods: The adaptive SIN test (SoNoise/triplet-of-words model), utilizing synthetic voice and calibrated headphones, was applied to English (US/UK), French, Spanish, Italian, Hebrew, Greek, Arabic, and Khmer. Speech Reception Threshold (SRT) and Binaural Intelligibility Level Difference (BILD) were measured in native, normo-hearing adults. Validation included analyzing confusion matrices and psychometric curves to assess inter-item recognition variability and determine word-by-word equalization.
Results: Despite phonetic and syntactic differences, global psychometric outcomes showed remarkable consistency:
Global Performance Similarity: Mean SRTs for Diotic (Do) conditions were consistently -9.5 to -11.5 dB SNR, DcA conditions were -16.5 to -18.5 dB SNR, and normative BILD values were stable (6.5 to 8.5 dB) across languages.
Universal Need for Equalization: Significant, systematic variance in individual word recognition difficulty was observed before equalization, far exceeding inter-language differences in mean SRT. Equalization dramatically reduced item-specific SRT standard deviation, ensuring accurate clinical assessment.
Conclusion: A unified, globally scalable methodology using synthetic voice and adaptive DcA presentation provides fast and reliable SIN test results (SRT and BILD) with similar normative values across languages. However, language-specific psychometric equalization remains essential for clinical fairness and accuracy across the multinational portfolio, neutralizing inherent phonetic, lexical, and positional biases.

Keywords: Speech-in-Noise (SIN) Tests, Cross-Linguistic Validation, Psychometric Equalization

Posters

Auditory Screening and Diagnosis

PD 020

A systematic review of mobile phone-interfaced paediatric hearing screening tools/devices

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Introduction:
Despite the proven effectiveness of the traditional screening devices for the Early Hearing Detection and Intervention (EHDI) programs, the costs of these instruments are high to be implemented as a sustainable solution for Low- and Middle-Income Countries. mHealth hearing screeners are an alternative solution to support EHDI programs (Frisby et al, 2022). Therefore, demand is increasing for accessible, affordable, and scalable alternatives to traditional screening devices. This review will report on the validity, categorize, and discuss the reported cost and commercial availability of the mHealth screeners available globally for the paediatric population.
Method:
A systematic search on PubMed, Scopus, and Google Scholar was conducted. Articles published from 2014 and study populations of 0-18 years screened using mHealth applications were eligible. Data on study design, screening modality (objective/subjective), validity measures, and commercialization were extracted.
Results and Discussions:
Thirty-eight studies met the inclusion criteria. A total of 28 screeners were identified. Three validated objective screeners, OAEbuds, hearOAE, and off-the-shelf OAE were identified. Twenty-five subjective screeners were identified, mainly using pure tone audiometry, game-based, and speech-in-noise. Subjective screeners predominantly targeted children above the age of 3 years. Sensitivity and specificity were comparable to traditional screeners, though the methodologies of validation varied. Only one objective screener was available commercially. Few screeners were available free of cost and as open-source. When compared to previous reviews on mHealth devices (Abbey & Douglas, 2021; Frisby et al, 2022), this review captured the objective hearing screeners. The included articles had heterogeneity, and hence meta-analysis was not done.
Conclusions:
mHealth screeners demonstrated comparable validity and lower costs than traditional hearing devices. The review outlined the need for more mHealth-based screeners for lower age groups, particularly for infants and toddlers, as most of the identified screeners catered to an older population of more than 3 years of age.

Keywords: MHealth, Paediatric hearing screeners, Good health and well-being, child health, innovation —mHealth, Systematic review

Posters

Auditory Screening and Diagnosis
PD 021

Duplicated External Auditory Canal

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Purpose / Objective: Congenital anomalies involving the first branchial cleft are uncommon and may occasionally present as a duplicated external auditory canal. These developmental disruptions, stemming from incomplete closure of the cleft during embryogenesis, can result in symptoms such as chronic otorrhea, recurrent external ear infections, and varying degrees of hearing impairment.
Case Presentation:We describe a male infant, aged 18 months, who exhibited an accessory external auditory canal along with a cutaneous tag near the right ear opening. Audiological assessments, including auditory brainstem response (ABR), identified mild conductive hearing loss in the right ear and moderate to severe mixed-type hearing loss on the left. These findings highlight the diagnostic value of early hearing evaluations in patients with rare congenital ear malformations.
Conclusions:Duplication of the external auditory canal is a rare but clinically significant condition with potential for substantial auditory compromise. Prompt recognition and regular hearing assessments are essential to guide appropriate interventions. Depending on the anatomical and functional severity, management options may include surgical correction and hearing rehabilitation strategies.

Keywords: Duplicate External Auditory Canal, ABR, Hearing Sensitivity

Posters

Auditory Screening and Diagnosis
PD 022

Bridging the Gap: Linking Online Hearing Screening to Care with Audiology Phone Consults

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Background:
Hearing loss is prevalent among older adults yet often untreated, despite evidence that intervention reduces the risks of social isolation, dementia, and health decline. Baycrest, a leader in geriatric healthcare and research, aims to incorporate The World Health Organization (WHO) recommendations for universal hearing screening for older adults linked with audiological follow up. Typically, post hearing screening interventions in literature are limited to hearing specialist referrals or hearing aids. Limited evidence demonstrates the effectiveness of offering optional, complimentary audiologist phone consults as a strategy to motivate individuals to seek hearing help, thereby improving healthcare access.
Objective:
To evaluate the benefit of offering a phone conversation with an audiologist on completion of online hearing screening in motivating individuals to pursue hearing care.
Methods:
Participants from Baycrest programs, online platforms, and the community completed online hearing screenings and were offered an optional, complimentary audiologist phone consult. Data was collected from the scripted phone consultation and anonymous feedback surveys.
Results:
Since July 2022, a total of 3007 screenings were completed. 191 phone consult responses and 78 feedback surveys were collected. During the consult, 75% of participants were ready to seek hearing help. Among the 25% initially not ready, 68% were motivated by the consult. Participants rated the consult as effective (4.8/5), informative (4.7/5), and helpful in taking next steps toward improved hearing (4.7/5).
Conclusion:
This study demonstrates that linking online hearing screening with a complimentary audiologist phone consult can motivate individuals to pursue hearing care. Positive participant feedback demonstrates the consult's effectiveness in promoting education, motivation, and hearing loss treatment uptake in older adults, helping to address the associated risks of untreated hearing loss including social isolation and cognitive decline. Future research aims to develop a sensory screening tool incorporating online hearing screening, vision screening, and the Cogniciti brain health screening.

Keywords: Screening, Hearing Loss, Geriatrics

Posters

Auditory Screening and Diagnosis
PD 023

Development and Validation of a Dual-Task Paradigm for Assessing Listening Effort in Kannada

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Purpose: The assessment of listening effort is crucial for comprehensive audiological evaluation, yet validated tools are scarce for regional Indian languages. This study addresses this gap by describing the systematic development and validation of the Word Identification and Recall Test (WIRT), a dual-task paradigm for assessing listening effort in Kannada-speaking populations.

Methods: A set of 176 trisyllabic words was selected from the lexical database with over 750,000 Kannada words based on frequency, familiarity and item difficulty assessment. These words were used to construct a dual-task paradigm using custom MATLAB scripts. The primary task is to identify each word presented in the presence of multi-talker babble at the SNR50 of the participant. The length of words increased from a two-word set to a nine-word set. The secondary goal was to recall all the words presented in a set. Hence, the task starts as simple and increases in complexity, demanding effortful listening.

Results: The systematic development process yielded a psychometrically robust set of 176 Kannada word stimuli with high familiarity. The MATLAB-based WIRT paradigm provides standardised stimulus preparation, automated response collection, and precise experimental control. Preliminary data from a pilot study (n=10) found that hearing-impaired individuals underperformed compared to normal-hearing individuals, especially in noisy conditions. Notably, there was a clear upward shift in recall performance for both groups as word set length increased, and the performance gap between the groups widened with increased task complexity, confirming the paradigm's ability to measure listening effort.

Conclusion: The WIRT provides a culturally and linguistically appropriate tool for assessing listening effort in Kannada-speaking individuals. Its standardised, automated implementation makes it suitable for both clinical applications in auditory rehabilitation and research on listening effort. This methodology is a framework for developing similar validated tools in other regional languages, promoting more inclusive audiological practices.

Keywords: Listening effort, Effortful listening, Dual task paradigm

Posters

Auditory Screening and Diagnosis
PD 024

Association Between Cleft Palate and Hearing Loss in Children

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Background:
Orofacial clefts occur in about 1 in 700 live births. Cleft palate only (CPO) is the least common type, forming one-third of oral clefts and appearing more often in females. CPO may occur with other anomalies or syndromes, or independently.
Due to Eustachian tube dysfunction, children with CPO have a high risk of otitis media with effusion (OME) and conductive hearing loss, with OME incidence reaching 90%. Untreated cases can delay speech and language development.

Objective:
To evaluate the hearing status of children with cleft palate from birth to six years of age and determine the prevalence and characteristics of conductive hearing loss in this population.

Methods:
A total of 88 children (47 males and 41 females) with repaired or unrepaired cleft palate, aged between birth and 6 years, were included in this retrospective study. Comprehensive audiological evaluation was performed using tympanometry, otoscopy, and age-appropriate hearing tests (ABR, OAE, or behavioral audiometry). The results were analyzed to identify the type and laterality of hearing loss.

Results:
Overall, 64 of 88 participants (72.7%) presented with conductive hearing loss: 35 (39.8%) bilateral and 29 (32.9%) unilateral. The mean air-conduction threshold across speech frequencies was 34.7 ± 9.6 dB HL, significantly higher than controls (13.2 ± 4.1 dB HL; $t = 15.8$, $p < 0.001$). Tympanometry revealed Type B or C curves in 66 children (75%), indicating middle ear pathology consistent with OME. No sensorineural hearing loss was detected.

Conclusion:
Conductive hearing loss is highly prevalent among children with cleft palate during early childhood, underscoring the importance of regular audiological follow-up and early management of middle ear conditions to support optimal speech and language development.

Keywords:
Cleft palate, conductive hearing loss, otitis media with effusion, tympanometry, pediatric audiology

Keywords: Cleft palate, Pediatric audiology, conductive hearing loss

Posters

Auditory Screening and Diagnosis
PD 025

Comparative Analysis of the Reference Values of P1, N1, P2, and N2 Components of the LLAEP: Influence of Acquisition and Marking Methods

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Introduction: Long-Latency Auditory Evoked Potentials (LLAEPs) are bioelectrical responses related to auditory perception and cognition, recorded between 80–600 ms after acoustic stimuli. The P1,N1,P2,N2 and P3 components are essential for studying auditory and cognitive functions, being influenced by factors such as neuropsychological conditions and attention. The assessment of LLAEPs follows standardized protocols to ensure result accuracy, considering variations in component marking. These approaches are fundamental for understanding neurological and auditory conditions.
Method: Twenty-five participants (8 males,17 females) underwent anamnesis, otoscopy, immittance testing, pure-tone and speech audiometry, and LLAEP. The anamnesis collected clinical history data, such as auditory complaints and use of ototoxic medications; otoscopy checked for obstructions in the external auditory canal; immittance testing assessed the mobility of the ossicular chain and acoustic reflexes; pure-tone audiometry identified auditory thresholds, and speech audiometry evaluated speech recognition. In the LLAEP test, stimuli of 1kHz (frequent) and 2kHz (rare) were used to record cortical responses, and the individual should count rare stimuli that appeared randomly between frequent stimuli (oddball paradigm). The analysis was performed by two evaluators.
An inferential analysis of latencies and amplitudes between recordings was performed, considering $p<0.05$ as significant. The project was approved by the Institutional Research Ethics Committee (protocol number 86746825.3.0000.0068).
Results: Statistically significant differences were observed between wave marking for the latencies of components P2 and N2, with lower values found on the frequent wave than those of the rare wave. No significant differences were observed for components P1 and N2,or amplitudes P1-N1 and P2-N2.
Conclusions: This finding suggests that the brain processes predictable, frequently occurring sounds more quickly, likely due to neural adaptation mechanisms. Overall, these results contribute to understanding how the auditory system and cognitive processes interact in response to sound regularity, reinforcing the importance of standardized LLAEP assessments for studying auditory and neurological functions.

Keywords: Audiology, Electrophysiology, Auditory Evoked Potential

Posters

Auditory Screening and Diagnosis
PD 026

Association Between Unilateral Renal Agenesis and Hearing Loss: A Comparative Study

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Background:
Renal agenesis is a congenital malformation characterized by the absence of one or both kidneys due to disrupted morphogenetic signaling between the ureteric bud and the metanephric mesenchyme. While renal agenesis may present as part of broader congenital anomaly syndromes—such as Branchio-Oto-Renal (BOR) syndrome—where renal abnormalities and hearing loss can co-occur, it may also occur as an isolated finding. Despite this potential syndromic association, the auditory profile of patients with isolated unilateral renal agenesis remains insufficiently characterized, and the relationship between isolated renal agenesis and hearing function has not been clearly established.

Objective:
To investigate the hearing status of children with unilateral renal agenesis and compare their auditory performance with age- and sex-matched healthy controls.

Methods:
Ten children (6 males, 4 females; age range 8–12 years, mean ± SD: 10.3 ± 1.34 years) with confirmed unilateral renal agenesis and no syndromic features were enrolled. Comprehensive audiological assessment was performed, including pure-tone audiometry, tympanometry, otoacoustic emissions (OAE), and auditory brainstem response (ABR). Results were compared with a control group of 10 healthy children with normal renal function.

Results:
All participants with renal agenesis demonstrated normal hearing thresholds, normal OAE responses, and normal ABR waveforms, comparable to the control group. No statistically significant differences were observed between groups ($p > 0.05$).

Conclusion:
Children with isolated unilateral renal agenesis do not appear to have an increased risk of hearing impairment. These findings suggest that renal agenesis alone, in the absence of syndromic associations, is not linked to auditory dysfunction.

Keywords:
Renal agenesis, single kidney, hearing loss, auditory function, otoacoustic emissions, ABR

Keywords: Renal agenesis, Auditory function, ABR

Posters

Auditory Screening and Diagnosis
PD 027

Balancing Accuracy and Safety: A Review of Sedation Methods in Pediatric Auditory Brainstem Response Assessment

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Sedation is commonly used during Auditory Brainstem Response (ABR) testing in infants and children to ensure stillness so that accurate recordings can be obtained. However, sedation carries clinical risks. Despite its widespread use, there is no global consensus on best practices, and sedation protocols vary significantly across countries and clinical settings.

This review aims to critically evaluate international sedation techniques used in ABR testing, with a focus on safety, efficacy, and applicability in pediatric audiology, especially in resource-constrained settings. The following analysis will be provided:
• Synthesis of international evidence on sedation techniques used during ABR testing.
• Evaluation of safety profiles of commonly used agents (e.g, melatonin, midazolam, dexmedetomidine).
• Identification of gaps in standardization, documentation, and ethical considerations.
This is important to understand the risks and benefits of sedation agents , and to help audiologists and paediatric teams make informed decisions. This will be helpful in reducing adverse events and improving patient outcomes. This review can also potentially inform national guidelines, especially in countries like South Africa where sedation practices are inconsistently documented and monitored.

Keywords: Auditory brainsterm response, Sedation, Paediaric safety

Posters

Auditory Screening and Diagnosis
PD 028

Posters

Auditory Screening and Diagnosis
PD 029

Neural correlates of spatial release from masking: Towards objective measures of binaural hearing

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Cochlear implants (CIs) restore access to sound and speech for individuals with severe-to-profound hearing loss, particularly in quiet environments. However, speech understanding in noise remains considerably poorer for CI users than for normal-hearing (NH) listeners. A major limitation lies in the degraded transmission of binaural cues—interaural time (ITDs) and level differences (ILDs)—that are essential for spatial hearing and speech segregation. In bilateral CI (BiCI) users, independent signal processing across devices further disrupts binaural cue encoding, leading to poor localization and limited benefit in complex acoustic scenes.

Binaural advantages such as binaural masking level differences (BMLDs), binaural intelligibility level differences (BILDs), and spatial release from masking (SRM) are robust in NH listeners but reduced and highly variable in CI users. This variability underscores the need for objective neural measures that capture binaural processing beyond behavioural testing.

In this study, we investigate neural correlates of SRM in NH listeners using electroencephalography (EEG). Ten participants were tested with the Flemish Matrix Test and natural Dutch speech stories under two spatial configurations: collocated (S0N0) and spatially separated (S0N90). EEG recordings were analysed to quantify neural tracking of the speech envelope under masked and unmasked conditions.

Preliminary results indicate differences in neural tracking across spatial configurations, particularly at challenging signal-to-noise ratios, suggesting that EEG measures may reflect the perceptual advantages of spatial separation. We hypothesize that behavioural SRM corresponds to enhanced neural tracking of the target speech envelope, especially when spatial or spectral information is degraded. This approach bridges behavioural and electrophysiological assessments of spatial hearing and provides a framework for objective evaluation of binaural benefit. Future work will extend this paradigm to NH listeners exposed to CI-simulated speech and to CI users, enabling systematic investigation of how device processing influences binaural cue transmission and speech understanding.

Keywords: Neural Tracking, Binaural Hearing, Objective measures

Posters

Auditory Screening and Diagnosis
PD 030

Audiological Monitoring of Children with Diabetes: Insights from a Scoping Review and Protocol Development

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Children with diabetes are at increased risk of developing progressive sensorineural hearing loss, underscoring the importance of standardized protocols for audiological monitoring. Early identification and intervention are critical to mitigating the impact of hearing loss on communication, language development, academic achievement, and overall quality of life. This presentation provides a comprehensive overview of findings from a scoping review examining the current evidence on the identification and management of hearing loss in children with Type 1 diabetes. This review synthesized literature using the Joanna Briggs Institute methodology to describe existing clinical approaches and identify gaps in current audiological care practices. Findings underscore the importance of integrating hearing healthcare professionals within pediatric diabetes care teams to facilitate early identification and timely intervention. Despite growing recognition of the relationship between diabetes and hearing loss, inconsistencies in diagnostic testing recommendations, limited information around referral processes to hearing healthcare services, and/or a lack of integration of interdisciplinary involvement in comprehensive care models persist.

Keywords: Hearing, Diabetes, Audiological monitoring

Posters

Auditory Screening and Diagnosis

PD 031

Exploring the Acoustic and Mechanical Properties of Middle ears with Cholesteatoma Using Wideband Tympanometry

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Cholesteatoma remains to be a serious medical problem in children with middle ear disorders. In India identifying it early has many challenges included poor access to radilogical investigation and or endoscopy of the ear. Therefore, reliance of audiological test battery is higher. WBT promises to be useful tool in identifying CSOM but its sensitivity and specificity for cholesteatoma being not fully evaluated. Aim of the study was to evaluate absorbance values in a series of patients with Cholesteatoma in a public health hospital.

Method: All consecutive cases seen in ENT-audiological tertiary care center for CSOM between January and August 2025, were subjected WBT along with routine audiological battery of tests. A total of 25 participants were identified and thier audiological findings, demographic details, medical reports including CT scan report were noted.

Results : Results shows age of participants varied between 14years to 35 years.

The participants medical findings grouped them into retraction pocket group and cholesteatoma group. WBT findings we were reduced sound absorbance at mid-frequencies compared to normal ears, likely reflecting altered middle-ear mechanics. Absorbance values were more pronounced for cholesteatoma group than retraction pocket. The results correlated with degree of hearing loss on audiogram and Air Bone gap. higher the Air conduction thresholds, poorer the absorbance. Abnormal absorbance values in presence near normal audiogram or minimal to mild degree of low frequency hearing loss should alert the audiologist and ENT towards CSOM/ retraction pocket. WBT findings revealed significantly reduced absorbance at mid frequencies (800–2000 Hz) in both groups, with the lowest values noted in cholesteatoma ears. The pattern suggested stiffness-dominated pathology, with abnormal energy reflectance indicating reduced compliance of the middle ear system.

Conclusion: WBT shows promise as a sensitive, noninvasive tool for early detection of cholesteatoma and related middle ear pathology, especially in resource-limited settings.

Keywords: WBT, Cholesteatoma, Tympanometry

Posters

Auditory Screening and Diagnosis

PD 032

Reconstructing Speech from EEG with Large Language Models

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Understanding how the brain encodes and reconstructs sound is central to hearing science and clinical audiology. Traditional EEG decoding methods, such as the envelope following response, have revealed important aspects of neural speech tracking but remain limited by their linear assumptions and restricted sound representations. These approaches capture only part of the complex, non-linear neural dynamics that support natural sound perception.

Here, we introduce a new framework that applies a Large Language Model (LLM) architecture to decode EEG signals and reconstruct the corresponding sound. We adapted a pre-trained NeuroLM model - derived from GPT-2 and trained on large-scale EEG datasets -to predict neural representations of acoustic tokens. EEG signals from the SparrKULee dataset (105 normal-hearing participants, 64-channel recordings during audiobook and podcast listening) were converted into discrete "EEG tokens," while the associated stimuli were tokenized using an EnCodec model at bitrates from 1.5 to 6 kbps. NeuroLM variants (254 M to1.7 B parameters) were fine-tuned to map EEG sequences to sound tokens, enabling continuous audio reconstruction from neural activity.

Reconstructed signals were assessed using objective acoustic measures (mel-spectrogram correlation, PESQ, phase coherence) and subjective tests (intelligibility and MUSHRA ratings). The best-performing models produced intelligible and perceptually recognizable reconstructions, even for participants unseen during training.

Beyond its methodological innovation, this work highlights the potential of LLM-based neural decoding as a clinical research tool. This approach could help evaluate and refine hearing technologies and investigate how individual factors - such as electrode placement or neural health - shape cortical representations of speech in cochlear implant (CI) users. It may also reveal how CI users compensate for degraded information or support EEG-based diagnostics, advancing understanding of auditory perception in both typical and impaired hearing.

Keywords: Electroencephalography, Large language model, Speech Reconstruction

Posters

Auditory Screening and Diagnosis
PD 033

Optimising Hearing Assessment in Difficult to Test Children: Objective Testing During Natural Sleep Without Sedation

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Timely diagnosis of hearing loss is integral to the implementation early intervention strategies and long-term communication outcomes. However, the accurate measurement of hearing thresholds in older babies and children who are difficult to test can present a significant challenge. Many paediatric audiologists resort to sedation techniques - such as Chloral Hydrate or even general anaesthesia - to obtain objective measurements beyond 6 months of age. These resources, however, are often only available in tertiary hospitals and can have long wait times, delaying early diagnosis and intervention.

At the Royal Children's Hospital in Melbourne, Australia, we aim to perform these objective tests in natural sleep, whenever possible. This presentation will outline our clinic's protocols, supported by case studies that demonstrate the feasibility of testing without the use of sedation.

We aim to empower other paediatric audiologists to adopt a similar approach. By conducting objective tests in natural sleep, we advocate for a more accessible, family-centred model of care that enables timely intervention for children with suspected hearing loss.

Keywords: Paediatric, Diagnostic, Complex

Posters

Auditory Screening and Diagnosis
PD 034

Review of Audiological Assessment Methods used for Children with Cerebral Palsy

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Background:
Hearing loss significantly affects all domains of child development, including cognitive, socio-emotional, and academic functioning. Children with cerebral palsy (CP) are particularly vulnerable to communication challenges, due to neurological and motor impairments that can hinder both communication and the accurate assessment of auditory function. Despite this, evidence regarding hearing assessment approaches and the incidence of hearing loss in this population has not been systematically synthesised.

Aim:
This scoping review aimed to describe the hearing assessment methods employed and to summarise the reported incidence and characteristics of hearing loss in children with CP.

Methods:
A scoping review was conducted following the framework of Arksey and O'Malley (2005). Electronic databases were searched for peer-reviewed studies published between 2015 and 2025 that examined hearing assessment in children with CP. Data were charted, to collate key findings related to hearing impairment across the included studies.

Results:
The type and severity of CP influenced both the incidence and degree of hearing impairment, with children with greater motor impairment demonstrating higher prevalence rates. Sensorineural and conductive hearing losses were the most frequently reported types. Sensorineural loss was commonly associated with neurological injury affecting the auditory pathways. Assessment methods included Auditory Brainstem Response (ABR), Otoacoustic Emissions (OAE), pure tone audiometry, and tympanometry. However, substantial variability in protocols and reporting limited comparability. Intervention strategies included hearing aids and cochlear implants, with cochlear implantation producing variable but often positive improvements in hearing and language outcomes.

Conclusion:
Hearing assessment in children with CP requires a multimodal, multidisciplinary approach to ensure accurate diagnosis and timely intervention. Regular, comprehensive monitoring should be integrated into clinical management to optimise communication and developmental outcomes. Findings from this review will guide future research and inform the development of standardised assessment and management strategies for hearing loss in children with CP.

Keywords: Cerebral Palsy, Hearing Assessment, Hearing Impairment

Posters

Auditory Screening and Diagnosis
PD 035

Vibrotactile Responses among Deaf Students in a Nigerian School for Persons with Special Needs

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Introduction: In profoundly Deaf individuals going through pure-tone bone-conduction audiometry procedures, vibrotactile sensations can confound true hearing thresholds. Vibrotactile thresholds tested on the mastoid using bone conduction transducer upsurge with frequency from approximately 125 to 500 Hz, indicating that clients may feel rather than hear the stimulus. Results may appear as an erroneous air-bone gap that may falsely imply conductive component to hearing loss (HL). When tactile responses are erroneously recorded on the audiogram, it appears on the audiogram as mixed HL, possibly resulting in unjustified surgery.

Materials and Methods: A descriptive cross-sectional study conducted among Deaf Students in a School for Persons with Special Needs, Osogbo, Osun State, Nigeria. Demographic data were collected from the participants and from the school records using sign language which is their mode of communication. All the participants went through otoscopic examination and audiometry for the determination of their hearing thresholds. Analysis was done through SPSS 26 using descriptive statistics such as mean, standard deviation and percentages.
Results
Out of 194 participants, there were 108 (55.7%) males and 86 (44.3%) females with a mean age of 17.6 years. 162 (83.5%) had vibrotactile responses while the remaining 32 (16.5%) did not. Audiometry results revealed that only 1 participant (.5%) had mild HL, only 1 participant (.5%) had severe HL, while the majority of the participants 182 (99%) had profound HL.
Conclusion: Audiologists should always suspect vibrotactile responses during bone conduction testing in the low frequencies. A procedure should be applied if a severe conductive component or if the ABG is secondary to tactile stimulation in order to avoid unjustified surgery. The procedure is based on the fact that bone conduction auditory thresholds are higher on the forehead than the mastoid, whereas vibrotactile thresholds are lower on the forehead than the mastoid for the low frequencies.

Keywords: Vibrotactile Response, Deafness, Special Needs

Posters

Auditory Screening and Diagnosis
PD 036

A Mathematical Approach to Calculate the Magnitude of Air–Bone Gap Using Tuning Fork Time Measures

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Introduction:
The frequency of a vibrating rectangular bar, such as a tuning fork prong, is expressed as
$f = (k\,t^2 / L^2)\,\sqrt{(E/\rho)}$,
showing proportionality to thickness squared and inverse proportionality to length squared. Calibrated tuning forks display the letters A, B, and C, indicating decay rate for air conduction, decay rate for bone conduction, and stem-transmission factor, respectively. Beyond qualitative assessment of conductive versus sensorineural loss, tuning forks can also be applied quantitatively to estimate the degree of hearing loss.
Objective:
To quantify the magnitude of the air–bone (AB) gap by measuring the time difference between cessation of air conduction (AC) and the duration of bone conduction (BC) using tuning fork testing.
Methods:
This study included 32 ears (age 26–58 years). Otoscopy was followed by tuning-fork testing at 256 and 512 Hz by an examiner with 15 years of experience. The 1024-Hz fork was excluded due to inadequate sustain (high damping, lower Q factor). Patients indicated when AC tone ceased, after which the fork base was placed on the mastoid and BC duration was timed. Decay rate was calculated using
$y = 2\pi f / 2Q$
and decay time using
$t = Q / \pi f$.
BC duration was compared with decay characteristics to estimate conductive loss using:
$CdHL = 3(c + t/B)$.
All subjects underwent standard audiometry for comparison.
Results:
At 256 Hz, calculated AB gap averaged 36.7 dB versus 38.12 dB audiometrically ($p < 0.006$). At 512 Hz, calculated AB gap averaged 42.96 dB versus 42.18 dB ($p < 0.057$), showing strong agreement.
Conclusion:
Although Rinne testing is traditionally qualitative, this study demonstrates that timing BC after AC cessation allows quantitative estimation of the AB gap in conductive hearing loss.

Keywords: Tuning fork, Decay rate, Q factor

Posters

Auditory Screening and Diagnosis
PD 037

Prevalence of Hearing Loss among Neonates delivered in Dhulikhel Hospital

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INTRODUCTION
Hearing is essential for normal speech and language development. Congenital hearing loss is a significant health concern in the pediatric population and often remains unnoticed until a child reaches an age when communication delays become apparent. Because early-life hearing loss may not present with obvious clinical signs, early detection followed by timely intervention is crucial to prevent or minimize long-term disability. Universal newborn hearing screening has been widely recognized as an effective strategy to reduce the negative impact of undiagnosed congenital hearing impairment.
AIMS
This study aimed to assess the outcome of hearing screening using Oto Acoustic Emission (OAE) and Automated Auditory Brainstem Response (AABR) in newborns delivered at Dhulikhel Hospital.
METHODS
A prospective study was conducted among neonates born at Dhulikhel Hospital, Kathmandu University Hospital in 2024. Hearing screening was performed using OAE and AABR within 48 hours of birth. Neonates who failed the initial screening were retested at approximately 2 weeks. Those failing the second screening were referred for comprehensive audiological assessment.
RESULTS
The screening coverage was 97.4% of total deliveries. Among 1774 live births, 1728 neonates were screened. Of these, 1615 passed screening, and 113 failed the test. Out of 113 failed screening 15 did not come for second screening. Overall referral rates were 6.54%.
CONCLUSION
OAE and AABR is an effective tool for early hearing screening and should ideally be performed for all neonates. Screening should occur before one month of age, and infants with confirmed hearing loss should receive early intervention and appropriate follow-up care.

Keywords: OAE, AABR, UNHS

Posters

Auditory Screening and Diagnosis
PD 038

Development and Validation of a Korean Adaptation of AzBio Sentence Test (KoBio)

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Purpose: The goal of this work was to develop and validate an international Korean version of the English AzBio sentence test (KoBio).

Methods: A corpus of 1,000 Korean sentences was generated. These sentences were recorded with four talkers using neural text-to-speech synthesis and then processed through a five-channel cochlear implant simulation. A separate perceptual evaluation was conducted with a panel of raters consisting of speech-language pathologists and researchers in cochlear implant (CI) rehabilitation; they confirmed that the AI talkers were not inferior to human talkers as test materials. The mean intelligibility for each sentence was computed based on responses from 15 normal-hearing listeners. For each talker, 165 sentences were selected so that their mean score was 85%, and these were sequentially assigned to 33 lists of 20 sentences. Each list contained five sentences from each talker. All lists were presented to 20 CI users in order to verify their equivalency.

Results: The list equivalency validation showed no significant differences in percent correct scores across the 33 KoBio sentence lists for either normal-hearing listeners or cochlear implant users. A binomial distribution model was used to estimate 95% critical differences for each potential percentage correct score. Normative data from normal-hearing listeners showed mean performance in the high percent correct range with low standard deviations, and KoBio reduced ceiling effects in high performing cochlear implant users compared with existing Korean sentence materials.

Conclusions: KoBio provides a set of 33 psychometrically equivalent sentence lists that offer researchers and clinicians a standardized measure for Korean CI users. Its alignment with internationally used test-development principles enables cross-linguistic comparability, supporting broader benchmarking of CI outcomes.

Keywords: Korean AzBio sentence lists, Cochlear implant, Speech perception

Posters

Auditory Screening and Diagnosis
PD 039

Development of the Korean Quick Speech-in-Noise Test (K-QuickSIN)

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Purpose: Standard audiometry in quiet fails to adequately predict communication challenges in noisy real-world settings. To address the need for a rapid and accessible clinical measure of Signal-to-Noise Ratio (SNR) Loss, this study developed the 'Korean Quick Speech-in-Noise (K-QuickSIN)' test. Following the principles of the original QuickSIN™, this study incorporated Korean linguistic features and verified the psychoacoustic equivalence of sentence lists in normal-hearing adults.

Methods: Low-context sentences were selected from the National Institute of Korean Language corpus to minimize cues, recorded by a female speaker with Korean 4-talker babble to ensure ecological validity. Standardization proceeded in three phases: (1) measuring SNR50 and adjusting the root mean square (RMS) of sentences to a –2 dB SNR target; (2) constructing fifteen preliminary lists with difficulty-equated sentences; and (3) evaluating list equivalence in 29 normal-hearing adults using SNRs decreasing in 5 dB steps (+20 to –5 dB).

Results: Eleven test lists and three practice lists were finalized. The mean SNR50 was –2.10(±0.48) dB SNR, aligning closely with the target, while the psychometric slope of 18.38(±8.99)%/dB indicating high sensitivity. No significant differences existed in SNR50 or total scores among the lists ($p > .05$), confirming acoustic and statistical equivalence. Phoneme frequency distribution was balanced across all lists. Consequently, the Korean SNR Loss formula for normal-hearing listeners was established as '24.5 – Total Correct'.

Conclusion: The K-QuickSIN was confirmed to be a standardized tool with high list equivalence, tailored to Korean linguistic characteristics. Its ability to measure SNR Loss in approximately one minute without specialized equipment demonstrates significant clinical utility. These findings provide a baseline for speech-in-noise assessment and support the future application of K-QuickSIN for evaluating individuals with hearing loss.

This work was supported by the 2023 National R&D Program (Project Number: 20023694) funded by the Ministry of Trade, Industry and Resources (MOTIR, Korea)

Keywords: Korean Quick Speech-in-Noise, Psychoacoustic equivalence, Speech perception in noise, Signal-to-noise ratio loss

Posters

Auditory Screening and Diagnosis
PD 040

Features of forms of hearing impairment identified during universal screening of newborn hearing, Republican specialized scientific and practical medical center of pediatrics

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Materials and Methods: This study included 1,481 newborns who did not pass the primary stage of newborn hearing screening over the course of one year. The research was conducted at the Republican Specialized Scientific and Practical Medical Center of Pediatrics and regional children's medical centers, where the second stage of screening was performed. Among the 1,481 children, 869 (58.67%) were boys and 612 (41.32%) were girls. All the children underwent otoacoustic emission screening and auditory brainstem response (ABR) tests.

Results: Following the second stage of universal newborn hearing screening, 1,417 children (95.6%) were found to have normal hearing in both ears. A hearing impairment was detected in 64 children (4.43%). Of these, 57 cases involved bilateral hearing impairment, and 7 involved unilateral hearing loss. Among the 57 children with bilateral hearing impairment, 11 had symmetrical mixed impairments, and 46 had symmetrical sensorineural impairments. For the 7 children with unilateral hearing impairment, all cases were determined to be sensorineural hearing loss. Of the 64 children with hearing impairments, 7 had syndromic causes, including 2 cases of Waardenburg syndrome and 5 cases of Down syndrome. Additionally, 6 cases of hearing impairment were associated with congenital cleft palate (CCP), and 3 cases involved prematurity.

Conclusion: The preliminary findings of this study show that 95.6% of children with normal hearing passed the second stage of screening. This suggests a potential issue with the functioning of the first stage of the newborn hearing screening process. Of the detected hearing losses, 71.9% were bilateral, and 82.8% were sensorineural in nature. Unilateral hearing loss accounted for 10.9%, with all cases being sensorineural.

Keywords: newborn hearing screening, deafness, congenital deafness

Posters

Auditory Screening and Diagnosis
PD 041

Developing and Validating Monosyllabic Speech Materials with Psychometric Homogeneity for Young Adult Turkish-Azeri Speakers in Iran and Compiling the Equivalent Word Lists

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Introduction and Background: An audiological examination typically includes pure-tone and speech audiometries. One of the key measures in speech audiometry is the Word Recognition Score (WRS), which is essential for diagnosing peripheral and central hearing disorders, prescribing and adjusting hearing aids, and assessing rehabilitation needs and progress. Reliable word recognition tests require effective diagnostic abilities and homogenous word lists with phonetic balance. Carhart's guidelines emphasize recognizable words to minimize instructional variability and phonetic balance for equivalency across lists. Egan's criteria stress monosyllabic structure, uniform difficulty between and within lists, and phonetic balance with commonly used words, as frequent words show enhanced recognition. Homogeneity relates to matching difficulty and intelligibility as a function of sound intensity, established by plotting psychometric performance-intensity functions. The 50% threshold is the intensity for 50% correct recognition, while the slope indicates the rate of change in recognition with intensity, denoting consistency of difficulty across materials. Iran exhibits significant linguistic diversity, with Azeri speakers comprising approximately 24% of the population, mainly in northwestern regions (Tabriz, Urmia, Ardabil, Zanjan). The Turkish-Azeri language in Iran, with Tabriz dialect as standard, has 33 phonemes (24 consonants, 9 vowels). Despite this, no standardized Turkish-Azeri WRS materials existed, forcing clinicians to use Persian lists, leading to inaccurate scores and suboptimal hearing aid fittings. The purpose of this study was to develop standardized Turkish-Azeri monosyllabic word lists for WRS to provide audiologists in Iran with accurate tools for Azeri-speaking individuals.

Methods: This cross-sectional/comparative study for test development was approved by the medical ethics committee of Iran University of Medical Sciences. Common monosyllabic words (CVC and CVCC structures) were extracted from Azeri language books using basic design rules for speech materials, excluding digits, conjunctions, prepositions, unusual or non-cultural terms, and improper names, yielding 1,152 frequent words. Four experts from major Azeri dialects (Tabriz, Urmia, Ardabil, Zanjan) selected the most common and familiar words. For content validity, 523 words were assessed by eight audiologists and speech-language therapists for familiarity, clarity, and appropriateness using a Likert scale. Content Validity Ratio (CVR) and Index (CVI) retained 289 words. Phoneme prevalence in daily Azeri speech was measured from samples of Azeri TV/radio programs, movies, and social media contents; the percentage occurrence of each sound was calculated (Table 1), and four phonetically balanced 25-word lists were developed. Lists were recorded in a double-walled soundproof acoustic chamber at Tabriz University using a cardioid condenser microphone (Audio-Technica AT2020), windscreen, Steinberg UR12 power supply, Adobe Audition 2022 software (44,100 Hz sampling, 16-bit), by one male and one female native Azeri speaker pronouncing each word four times. Two audiologists judged recordings for voice quality, accent, and pronunciation; the superior male version was selected, digitally edited, and normalized to a 1,000-Hz calibration tone for equal average intensity. Forty normal-hearing young adults (mean age 21.62±1.35 years, 18–25 range; 20 males/20 females) with pure-tone thresholds ≤20 dB HL (250–8,000 Hz), static admittance 0.3–1.4 mmhos, peak pressure –100 to +50 daPa, and no ear disease/surgery history participated. Lists were presented binaurally at 0–40 dB HL in 10 dB steps; after two weeks, responses were re-recorded. Psychometric functions (50% threshold, slope 50%, slope 20–80%) were derived using third-degree polynomial and logistic regression for homogeneity. Face, content, and construct validity (factor analysis), plus reliability (split-half, Cronbach's alpha, difficulty coefficient, test-retest) were analyzed in SPSS v.16 ($p<0.05$).

Results: Each list contained 23 CVC and 2 CVCC words with equal vowel distribution. Mann-Whitney U test showed no significant gender differences in scores. Content validity: 216 words had CVR=1, 73 had 0.75; CVI=0.96, 0.99, 0.98, 1 for lists 1–4. Face validity (Cooper's equation): 95%, 100%, 92.5%, 95%. Cronbach's alpha and split-half >0.9 for all lists, indicating excellent internal consistency. Construct validity: factor analysis confirmed one-dimensional variance (77.9%, 80.0%, 79.9%, 88%) with single-factor solution. Test-retest reliability (Pearson): 0.94, 0.97, 0.97, 0.96.

Conclusion: The four developed Turkish-Azeri word lists exhibit phonetic balance mirroring daily speech, psychometric homogeneity with identical thresholds (~18 dB HL) and slopes (~4.8%/dB), and superior validity/reliability. They are clinic-ready for precise monosyllabic word recognition evaluation in young adults at hearing centers in Azeri cities of Iran, addressing a critical gap in multilingual audiology and supporting equitable rehabilitation.

Posters

Auditory Screening and Diagnosis
PD 042

System- and Service-Level Determinants of Providing Equitable Infant Hearing Screening in South African Primary Care

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Background In South Africa (SA), more than 17 infants are born with or acquire permanent congenital and early-onset hearing loss (PCEHL) each day. Despite this considerable burden, hospital-based infant and newborn hearing screening (INHS) remains limited, resulting in delayed identification, at around 30 months, significantly later than the recommended best-practice guidelines. Consequently, the late detection and intervention of PCEHL negatively impact communication, cognitive, and psychosocial development. Given that a substantial proportion of SA infants receive their early postnatal care in primary healthcare (PHC), integrating INHS into PHC services offers a potentially sustainable and equitable approach.

Methods: This is a sequential mixed-methods study which examines the current status and identifies the barriers and opportunities for providing INHS in PHC clinics in SA. The quantitative component involved a cross-sectional survey to document the presence and nature of existing INHS practices across PHC clinics, while qualitative semi-structured interviews explored perceived barriers, facilitators, and contextual factors affecting implementation within KwaZulu-Natal Province. Random sampling was used to select 21 PHCs for the quantitative survey, while purposive sampling was used to select 12 nursing managers for the semi-structured interviews.

Results: None of the surveyed PHC clinics offered formalised INHS services. Reported barriers included the absence of screening equipment, insufficient training of nursing staff, and limited awareness among healthcare providers and caregivers regarding the importance of early hearing detection. Nonetheless, several enabling factors were identified, including positive attitudes towards INHS, informal screening initiatives by motivated staff, and existing collaborative relationships between PHC nurses and audiologists at referral hospitals.

Conclusion: The absence of structured INHS programmes in PHC clinics highlights systemic gaps of early hearing detection in SA. Strengthening system capacity through equitable resource allocation, workforce training, and supportive policy frameworks is critical to improving early detection and reducing the long-term burden of childhood hearing loss in SA.

Keywords: Permanent congenital and early onset hearing loss, Universal infant hearing screening, Primary Health Care

Posters

Auditory Screening and Diagnosis
PD 043

Feasibility of integrating nurse-administered infant hearing screening into an immunisation programme at a primary healthcare clinic in South Africa: A Hybrid Type 2 trial

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Background:
In South Africa (SA), permanent congenital and early-onset hearing loss (PCEHL) is identified considerably later than the recommended international and national guidelines, primarily due to the lack of systematic infant and newborn hearing screening (INHS) services in most public healthcare facilities. Delayed identification often results in missed opportunities for early intervention, which has lifelong implications for communication, educational and employment outcomes. To address this critical gap, there is an urgent need to develop and evaluate evidence-based, preventive, and contextually appropriate models of hearing screening that can be integrated into existing maternal and child health platforms.

Methods:
This hybrid Type 2 implementation-effectiveness trial assessed the feasibility of integrating nurse-administered INHS within an existing immunisation programme at a primary healthcare (PHC) clinic in KwaZulu-Natal, SA. The intervention involved training PHC nurses and equipping the clinic with otoacoustic emission screening devices. INHS was offered alongside routine sixth-week immunisation visits. Data were collected through structured observations, reviews of routine clinical records, and quantitative surveys evaluating implementation feasibility domains, including acceptability, practicality, fidelity, and integration.

Results:
During the implementation period, 95.2% of infants with a mean age of 6.5 weeks who were attending scheduled immunisations received INHS, demonstrating high coverage and feasibility. Four infants (mean age: 6.8 weeks) failed the INHS and were successfully referred for diagnostic assessment and intervention at the local hospital. The programme was characterised by strong nurse engagement, consistent procedural fidelity, and positive caregiver acceptance. Notably, participating nurses expressed willingness to continue offering INHS post-study, provided that equipment maintenance and training support were sustained.

Conclusion:
These findings show that integrating nurse-administered INHS into routine immunisation services is feasible, contingent upon resource allocation and training. This approach promotes equitable access to early detection, reduces delayed diagnosis and intervention, and offers a sustainable hearing healthcare model within PHC settings in underserved communities.

Keywords: Permanent congenital and early-onset hearing loss, Universal infant hearing screening, Primary healthcare

Posters

Hearing Disorders
PD 044

Auditory Neuropathy Spectrum Disorder in Friedreich's Ataxia: A Case Study on Behavioural and Subjective Validation of Amplification

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Friedreich's Ataxia (FRDA) is one of the most common autosomal recessive ataxias, caused by a GAA triplet repeat expansion that disrupts mitochondrial function. This progressive neurodegenerative disease typically presents in adolescence, and hearing loss due to auditory neuropathy spectrum disorder (ANSD) is a recognised complication. However, research on the most effective audiological interventions for these patients is limited.

We conducted comprehensive auditory and vestibular assessments in a New Zealand woman with genetically confirmed FRDA. Evaluations included pure-tone, speech, and immittance audiometry; auditory and vestibular evoked potentials; and video head impulse testing. The patient was fitted with binaural hearing aids and a remote microphone system. Aided benefit was assessed using both behavioural measures and patient-reported outcome tools.

Testing confirmed ANSD and bilateral vestibulopathy. Aided testing showed improved speech discrimination in quiet, with limited benefit in the presence of background noise. Notably, the patient experienced reduced fatigue and reported additional unique hearing benefits that extended beyond speech clarity, highlighting the importance of subjective validation in this population.

This case illustrates the importance of expanding audiological care to include rare neurogenetic conditions, such as FRDA. It demonstrates how amplification, even in the context of ANSD, can lead to meaningful improvements in quality of life and overall well-being. Clinicians should consider hearing aid trials in populations with complex needs, supported by both behavioural and subjective outcome measures to capture the full spectrum of benefit.

Keywords: Friedreich's ataxia, Auditory Neuropathy Spectrum Disorder, Hearing aid

Posters

Hearing Disorders
PD 045

Transient Disappearance of Otoacoustic Emissions After Conventional Hearing Aid Use in OTOF-Related Auditory Neuropathy

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Aim
Auditory neuropathy spectrum disorders (ANSD) due to OTOF mutations are characterized by prelingual hearing loss, absent auditory brainstem responses (ABR), and preserved otoacoustic emissions (OAEs). However, the long-term stability of OAEs in OTOF-related ANSD is variable, and the disappearance context of the OAEs remains unclear. Hearing aids could impact on the outer hair cell function and alter the OAEs.

Methods
We report two cases of patients with genetically confirmed OTOF-related profound hearing loss (HL). Audiological features such as hearing thresholds, ABRs, OAEs, age at hearing aid fitting, and OAE evolution were analyzed. We conducted a literature review on the long-term evolution of OAEs in OTOF-related ANSD. Among the 30 articles reviewed, three provided longitudinal data on OAE monitoring.

Results
In our cases, OAEs disappeared 6 to 12 weeks following the hearing aids setting. Upon discontinuing hearing aids, OAEs re-emerged respectively 4 and 6 six weeks after, though Case 2 showed only partial recovery of the OEAs. Literature review showed 3 publications highlighting the OEAs decrease in children with OTOF- related ANSD with time.

Discussion:
The transient loss and recovery of OAEs after hearing aid use raises concerns about early cochlear overstimulation, and highlights the need to reconsider amplification strategies in OTOF-related ANSD. These findings support the hypothesis of a sound-toxicity within few weeks after use especially in severe to profound hearing loss in OTOF-related ANSD.

Close audiological monitoring is needed to prevent OEAs disappearance. Fitting should take in account the etiology of the HL and adapt consequently the gain from the beginning. Moreover, for OTOF-related ANSD, preserving cochlear integrity is particularly relevant in view of emerging gene therapy approaches, which require preserved inner ear function. In those cases, for optimal efficacy, it may be needed to postpone hearing aids.

Keywords: Otoferlin, auditory neuropathy, Otoacoustic emissions, Hearing aids

Posters

Hearing Disorders
PD 046

Immunological basis of sensorineural hearing impairment in patients with chronic rhinosinusitis: A review of the literature

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Purpose: The association of chronic rhinosinusitis (CRS) and sensorineural hearing loss (SNHL) is one of the least researched areas in otorhinolaryngology. In this review of the literature, we aimed to discuss the pathogenesis of SNHL in patients with different clinical forms of CRS, with special reference to the connection between the immune response of the nasal and middle ear mucosa and inner ear structures.
Methods: Articles for this review were identified using PubMed and Google Scholar databases.
Results: Different phenotypes of CRS may be associated with impaired function of the inner and outer cells of the organ of Corti. This is primarily the tetrad, which includes CRS with nasal polyps, non-allergic asthma, hypersensitivity to nonsteroidal anti-inflammatory drugs (NSAIDs), and so-called eosinophilic otitis media. Toxic substances of bacterial origin, as well as mediators of inflammation, can diffuse through the oval and, especially round window of the middle ear to the inner ear structures (perilymph, endolymph, membranous labyrinth) and damage the receptor cells of the sense of hearing and balance. Also, secondary forms of CRS, which occur within systemic diseases, such as granulomatosis with polyangiitis (GPA) and eosinophilic granulomatosis with polyangiitis (EGPA), can be associated with SNHL.
Conclusion: Previous studies suggest that disrupted harmony between the immune response in the nasal and middle ear mucosa and inner ear structures may contribute to the development of SNHL in CRS patients. This especially applies to CRS as part of NSAID-exacerbated respiratory disease and systemic necrotizing vasculitis, including GPA and EGPA. However, the exact mechanisms of the development of SNHL in different forms of CRS have not been sufficiently investigated, and new studies are necessary soon. Apart from the pathophysiological basis of SNHL, different therapeutic approaches in the clinical phenotypes of CRS have also been noted.

Keywords: Chronic rhinosinusitis, Sensorineural hearing loss, Immunological response

Posters

Hearing Disorders
PD 047

Cellular study of the protective effect on sensorineural hearing loss using cyclophilin D inhibitor

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Mitochondria are important organelles that not only produce bioenergy but also control apoptosis and calcium homeostasis. When a stressful environment leads to an imbalance in calcium homeostasis in cells, calcium is transported from the endoplasmic reticulum to the mitochondria. Under conditions of calcium overload and increased reactive oxygen species (ROS) production in the mitochondria, mitochondrial permeability transition pores (mPTPs) open to release mitochondrial calcium as well as proapoptotic factors, leading to cell death. One of the diseases resulting from mitochondrial calcium overload and ROS overproduction is sensorineural hearing loss, which can be an adverse effect of the chemotherapeutic drug cisplatin. Because cisplatin is a widely used anticancer drug, I investigated the use of a drug that inhibits cyclophilin D (cypD), which regulates mPTP function, to protect against cisplatin-induced ototoxicity and apoptosis. The drug showed a protective effect of approximately 40% against cisplatin-induced apoptosis, and I confirmed a reduction in the increased level of total ROS and restoration of the mitochondrial membrane potential. Thus, I concluded that cisplatin-induced apoptosis was reduced, and cypD inhibition exerted a protective effect against ototoxic hearing loss.

Keywords: Cyclophilin D, Sensorineural hearing loss, Mitochondria

Posters

Hearing Disorders
PD 048

Treatment Outcomes of Intratympanic Steroid Alone versus Combined Therapy in Unilateral Idiopathic Sudden Sensorineural Hearing Loss

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We aimed to compare the treatment outcomes of intratympanic steroid (ITS)-only and combined treatment(ITS+systemic steroid) protocols. We assessed 264 patients with unilateral idiopathic sudden sensorineural hearing loss (ISSNHL). Of the 264 patients, 82 patients received ITS-only as a primary treatment while the other 182 patients received combined treatment. We performed a 1:1 propensity score matching analysis for both groups using parameters such as sex, age, initial hearing threshold level, hearing loss pattern, onset of treatment, comorbidities. The rate of hearing recovery was determined by comparing the matching propensity score between the ITS-only and combined treatment groups according to Siegel's criteria. Of the 264 ISSNHL patients, 31.1% received ITS-only and 68.9% of patients were managed with combined treatment. Of the total patients, 49.6% had hearing recovery according to Siegel's criteria (CR+PR), while 50.4% had no hearing recovery (SR+NI). Before propensity score matching, the combined treatment was statistically significantly better than ITS-only in both hearing gain threshold(13.7 ± 23.7 vs 24.1 ± 24.4, p=0.001) and recovery rate(25.6% vs 40.7%, p=0.018). However, after propensity score matching, there was no statistically significant difference between the two groups in both hearing gain threshold(15.2 ± 26.4 vs 21.8 ± 26.8, p=0.242) and recovery rate(44.4% vs 48.9%, p=0.673). Treatment strategies of ITS-only and combined treatment did not differ significantly in clinical outcomes of ISSNHL.

Keywords: Sudden Hearing Loss, Intratympanic Steroid, Prognosis

Posters

Hearing Disorders
PD 049

The Role of Blood Labyrinth Barrier in Various Hearing Loss Animal Model

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This study aims to comprehensively present observations on the severity of hearing loss and the accompanying pathophysiological alterations in the cochlea using various animal models, including those of noise-induced and ototoxic hearing loss, as well as systemic metabolic disorders such as diabetes, chronic kidney disease, obesity, and metabolic dysfunction–associated steatohepatitis. Particular emphasis is placed on elucidating the early pathophysiological events occurring in the cochlear lateral wall, especially the structural and functional changes in the blood-labyrinth barrier, which are believed to play a pivotal role in initiating and propagating cochlear injury.

Keywords: Hearing Loss, Blood Labyrinth Barrier, Animal Model

Posters

Hearing Disorders
PD 050

Beyond the Audiogram: Interacting Effects of Cumulative Noise Exposure and Ageing on Hearing Loss, Speech-in-Noise, and Tinnitus in Palestinian Workers

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Background:
Noise-induced (NIHL) and age-related (ARHL) hearing loss share convergent cochlear pathologies, yet population-level evidence on their interaction remains limited, particularly in under-regulated occupational contexts. This study examined how lifetime noise exposure interacts with ageing to affect audiometric thresholds, speech-in-noise (SPiN) performance, and tinnitus prevalence in Palestinian workers.

Methods:
A pre-registered protocol (Open Science Framework; https://osf.io/v2c9z) guided recruitment and analysis. Ninety-eight adults aged 18–75 from high- and low-noise industries across the Palestinian Territories completed standard (0.25–8 kHz) and extended high-frequency (EHF; 10–14 kHz) audiometry, and Arabic diotic and antiphasic digits-in-noise (DIN) testing. Lifetime noise exposure was quantified using an Arabic version of the Noise Exposure Structured Interview (NESI). Tinnitus was identified through a structured questionnaire. Linear and logistic regression models assessed age, noise, and their interaction, controlling for sex and education, with Bonferroni–Holm correction for multiple comparisons.

Results:
An age × noise interaction for standard pure-tone averages (PTA) showed a trend toward poorer thresholds (β = 0.23 dB, 95% CI 0.03–0.42, p = 0.02), which did not survive correction. Exploratory analyses indicated that noise exposure predicted higher PTA thresholds in older adults (≥44 years) but not in younger participants (<44 years; β = 8.1 dB per ten-fold lifetime noise increase, 95% CI 2.5–13.6, p = 0.005). Significant main effects of age were found for EHF and both diotic and antiphasic DIN thresholds, without age × noise interaction effects. No main or interaction effects for lifetime noise exposure were found for tinnitus prevalence.

Conclusion:
Findings suggest an age-dependent vulnerability to cumulative occupational noise exposure, reflecting additive cochlear injury manifesting with age. Clinically, this highlights the need for early screening and hearing conservation among midlife workers. Public health efforts should prioritise occupational noise regulation, surveillance, and education in developing nations to mitigate preventable hearing loss.

Keywords: Noise-induced hearing loss, Occupational noise exposure, Age-related hearing loss

Posters

Hearing Disorders
PD 051

The Effect of varying signal-to-noise ratio on speech perception in noise of normal hearing young adults with noise exposure

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Purpose
Individuals with noise exposure may develop hidden hearing loss, which can cause difficulties with speech understanding in noise, even with normal hearing. This study aimed to compare speech perception in noise by varying signal-to-noise ratio (SNR) in young adults with or without noise exposure, to characterize the clinical usefulness of the speech-in-noise test for screening at risk groups for 'hidden' hearing loss.

Method
Eighteen young adults with normal hearing participated in this study. They were divided into two groups based on a history of noise exposure (e.g, harmful noise during military service or band noise): the noise exposure group(n = 9) and the control group(n = 9). A speech-in-noise test was conducted in a sound-treated booth, with a speaker located 1 meter from the subject. Speech stimuli (monosyllabic words, sentences) were presented at 60 dB HL, and noises were presented from the same speaker, while 3 SNR conditions (0dB, -3dB, -5dB SNR) were varied. Data were compared between groups and analyzed using non-parametric statistics.

Results
Monosyllabic word test scores were significantly lowered when SNR conditions got worse in both groups(ρ = .001 for both). In the sentence test, this trend was not maintained in the noise exposure group(ρ = .159), whereas the control group showed significantly lower scores in the poor SNR condition(ρ = .037). When compared between groups, the noise exposure group showed significantly lower performance in the monosyllabic word test at –3dB SNR(ρ < .001) and –5dB SNR(ρ = .019) compared to the control, whereas this was not consistent in the sentence test.

Conclusions
This study revealed that speech-in-noise tests may offer clinical benefits for proactive screening of individuals at risk of hidden hearing loss. Data collection is ongoing, and further analysis may provide additional information on optimal parameters for developing screening protocols for hidden hearing loss.

Keywords: Speech-in-Noise Test, Signal-to-Noise Ratio(SNR), Hidden Hearing loss

Posters

Hearing Disorders
PD 052

Sudden Traumatic Noise Exposure Induces an altered wave I in the Auditory Brainstem Response in Human

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Introduction: Noise trauma may induce auditory symptoms and temporary or permanent shifts in hearing thresholds, assessed with a tone audiogram. Until recently it has been assumed that primary changes after noise trauma exclusively represent damage to the sensory hair cells. Contrary, animal studies have now shown early alterations in auditory brainstem response (ABR) characteristic of auditory neuropathy (AN), as reduction or absence of wave I, following noise trauma.
AN involves a variety of disease mechanisms in the cochlea and auditory nerve, affecting the synaptic encoding and/or neural transmission of auditory information.
The aim of this study was to evaluate whether patients exposed to noise trauma exhibit click ABR alterations characteristic of AN.
Method: Thirty-one adult patients who attended an ear-nose and throat clinic, after a noise trauma, were included and an age- and gender-matched control group of 31 adults was constructed. To evaluate audiologic hearing impairment pure tone audiometry, click ABR and transient evoked otoacoustic emissions (TEOAE)/cochlear microphonics (CM) were performed. A full linear mixed model including the interaction between sex and group was tested.
Results: Our study showed that individuals exposed to sudden and distinct traumatic noise exhibit a statistically significant reduction (81.1 nV, $p < 0.001$) in the amplitude of wave I in ABR.
Conclusion: We suggest that the hearing investigation after sudden traumatic noise exposure should therefore be expanded with ABR to confirm or exclude AN.

Keywords: Auditory brainstem response, Auditory neuropathy, Sudden and traumatic noise exposure

Posters

Hearing Disorders
PD 053

Efficacy of Salvage Intratympanic Steroid Therapy Following a Two-Week Course of Full-Dose Systemic Corticosteroid Treatment in Refractory Idiopathic Sudden Sensorineural Hearing Loss: A Retrospective Analysis

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Objective:
To evaluate the clinical efficacy of salvage intratympanic steroid (ITS) therapy in patients with refractory idiopathic sudden sensorineural hearing loss (ISSNHL) who showed incomplete recovery after a two-week course of full-dose systemic corticosteroid treatment.

Methods:
This retrospective study included 505 patients diagnosed with ISSNHL between 2017 and 2022, according to the 2019 AAO-HNS guideline. All patients received a 14-day course of full-dose systemic corticosteroids. Patients with incomplete recovery, defined as an interaural mean hearing threshold difference of ≥10 dB across 500, 1000, 2000, and 4000 Hz, underwent salvage ITS therapy consisting of four intratympanic dexamethasone injections (5 mg each) administered within two weeks. Pre- and post-treatment audiometric outcomes were compared.

Results:
Among 505 patients who completed systemic therapy, 183 (36.2%) with incomplete recovery underwent salvage ITS. The mean hearing threshold improved from 65.06 ± 27.17 dB to 63.69 ± 26.59 dB (mean change: 1.37 ± 12.99 dB; $p = 0.157$). Overall, 18.6% of patients achieved a >10 dB hearing gain ($p = 0.011$) and 2.2% achieved a >30 dB hearing gain ($p = 0.316$). Greater gains were observed at lower frequencies (250, 500 and 1000 Hz). According to the modified Siegel's criteria, 6.0% of patients achieved complete recovery, 7.6% partial recovery, and 6.0% slight improvement. No major complication or further hearing deterioration occurred.

Conclusion:
Four courses of salvage ITS therapy administered within six weeks of hearing loss onset, following a two-week systemic corticosteroid regimen, provided only limited additional hearing recovery in patients with refractory ISSNHL. However, functional improvement was observed at low frequencies essential for communication. Given its favorable safety profile, salvage ITS may be considered an optional adjunctive treatment. These findings highlight the importance of shared decision-making and underscore the need for further research to determine the optimal timing and patient selection for salvage ITS therapy.

Keywords: Refractory idiopathic sudden sensorineural hearing loss, Salvage intratympanic steroid therapy, Hearing outcome

Posters

Hearing Disorders
PD 054

Diagnostic Accuracy of the Audible Contrast Threshold Test and the Quick Speech-in-Noise Test for the Detection of a Speech Recognition in Noise Disorder

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Background and Objectives

In the U.S. the California Peace Officers Standards and Training (POST, 2001) commission is currently using the Hearing in Noise Test or HINT (Nilsson et al, 1994; Vermiglio, 2008) as a measure of speech perception in noise to screen candidates for the police department. Based on its relatively good ability to detect the presence and absence of a speech recognition in noise disorder (Vermiglio et al, 2018), the HINT has been used as a gold standard.

The objective of the present study was to determine the accuracy of the Audible Contrast Threshold (ACT) test and the Quick speech-in-noise (QuickSIN) tests (or index tests) to determine the presence and absence of a speech recognition in noise disorder (target disorder). The HINT was used as the "gold" or reference standard test.

Patients and Methods

A total of 86 adults participated in this study. The mean age was 29.4 years and the range was 19 – 69 years. The participants included those with normal pure-tone thresholds (less than or equal to 25 dB HL) and those with elevated pure-tone thresholds.

Results

The sensitivity of the QuickSIN for the detection of the presence of a speech recognition in noise disorder was 10.81%, the specificity was 89.90%. It incorrectly classified 38/86 or 44% of the participants.

The sensitivity of the ACT for the detection of the presence of a speech recognition in noise disorder was only 13.51%, while the specificity was 100%. It incorrectly classified 32/86 or 37% of the participants.

Conclusion

The study revealed that the QuickSIN and ACT tests are poor predictors of a speech recognition in noise disorder when using the HINT as the gold standard

Keywords: Hearing in Noise Test, Audible Contrast Threshold Test, Quick Speech in Noise Test, Speech Recognition in Noise (SRN) Disorder, Index tests, Target Disorders, Peace Officers Standards and Training

Posters

Hearing Disorders
PD 055

The Path to Hearing Restoration: Quantifying Neural Health for Cell Therapy Trials

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Background
Neural hearing loss is a critical contributor to auditory dysfunction yet is often overlooked in audiological assessment and is not addressed by conventional devices such as hearing aids and cochlear implants (CIs). With no approved treatments currently available, regenerative cell therapies offer a transformative opportunity to restore auditory function. Rincell-1, a first-in-class regenerative cell therapy, targets spiral ganglion neurons (SGNs) and represents a major step forward in therapeutic development. However, progress toward clinical application is constrained by the absence of reliable, quantifiable measures of neural health. This study aimed to validate a battery of three tests to assess neural health in preparation for a first-in-human (FIH) trial of Rincell-1.
Methods
Three measures involving direct stimulation of SGNs were evaluated in six experienced adult CI users. Panoramic Electrically Evoked Compound Action Potentials (PECAPs) assessed neural excitation patterns of SGN responsiveness across the electrode array. Inter-Phase Gap (IPG) effects examined changes in SGN responses with varying stimulus IPG. Polarity effects evaluated current level changes at behavioural threshold and comfort levels in response to cathodic- and anodic-leading asymmetric stimuli. Each measure was repeated up to five times per participant to assess test-retest reliability.
Results
All three measures demonstrated high test-retest reliability. They did not consistently yield convergent estimates of neural function across participants and electrodes, suggesting differential sensitivity to different aspects of SGN health.
Conclusion
This validated test battery offers a promising framework for quantifying auditory neural health and is well-suited for use in upcoming clinical trials, including the FIH Rincell-1 study. Next steps include investigating changes in the three measures following cochlear implantation in a longitudinal study. As regenerative therapies for neural hearing loss advance, reliable neural health metrics will be essential to demonstrate efficacy and guide therapeutic development.

Keywords: Spiral Ganglion, Auditory Neural Health, Cell- and Tissue-Based Therapy

Posters

Hearing Disorders
PD 056

Exploring the Attitudes of Malaysian Youth Toward Noise Exposure Using the Malay Youth Attitude Towards Noise Scale

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Introduction:
Recreational noise exposure is increasingly common among youth, raising concerns about long-term hearing health. Understanding youth attitudes toward noise is essential for developing effective hearing conservation strategies. This study aimed to evaluate youth attitudes toward noise exposure in Malaysia using the Malay version of the Youth Attitude Towards Noise Scale (YANS-M), a validated adaptation of the original Youth Attitude Towards Noise Scale (YANS).

Methodology:
A cross-sectional study was conducted involving 114 Malaysian youth from both audiology and non-audiology backgrounds. Participants completed the YANS-M questionnaire, which assesses perceptions and behaviours related to everyday noise exposure. Data were analysed using effect size statistics to examine the influence of educational background, gender, and socioeconomic status on attitudes toward noise.

Results:
Youth with an audiology background demonstrated significantly more protective attitudes toward noise exposure (partial $\eta^2 = 0.131$), indicating the positive impact of hearing health education. Moderate effects were also found for gender ($\eta^2 = 0.058$) and socioeconomic status ($\eta^2 = 0.075$), with females and individuals from higher socioeconomic backgrounds showing safer listening behaviours.

Conclusion:
The findings reveal that educational and social factors play key roles in shaping youth attitudes toward noise. Incorporating hearing health education into youth and community programmes could promote safer listening habits among Malaysian youth.

Keywords: Noise exposure, Youth attitude, Hearing health education

Posters

Hearing Disorders
PD 057

Asymmetric Hearing Loss Performance as a function of Demographics and Mapping Techniques. What is Most Impactful to Maximize Outcomes in Adult Population?

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Asymmetric hearing loss can have a significant impact socially and emotionally for those it affects, especially when it occurs rapidly. Current FDA criteria states that patient with unilateral hearing loss with a duration of deafness <10 years may be a candidate for a cochlear implant. Maximizing outcomes as soon as possible for this patient population is important to restore binaural hearing as well as reduce emotional impacts of this unique hearing loss.

Our retrospective study identified eighty-five adult patients implanted from 2018-2024 who were implanted under criteria for asymmetric hearing loss and recipients of a Med El cochlear implant. We identified and analyzed various demographics and mapping techniques to determine what was most impactful in relation to speech outcome scores and overall patient satisfaction rating, assessed through the cochlear implant quality of life-35 profile. We looked at age, duration of deafness, etiology, residual hearing, datalogging, angular insertion depth, and anatomy based fitting through the use of Otoplan on Demand in relation to speech outcome scores at 3, 6 and 12 months post implantation.

Our study revealed no patient variables affected speech outcomes. This tell us that age, duration, etiology, nor residual hearing should be limiting factors for cochlear implantation for patients with asymmetric hearing loss. Rather, factors such as angular insertion depth, datalogging and contralateral pure tone average had significant relationships with speech outcome scores as well as patient satisfaction ratings.

Keywords: Asymmetric, Outcomes, Questionnaire

Posters

Hearing Disorders
PD 058

The Impact of Single-sided Deafness on Visual Attention and Working Memory: An Electroencephalogram Study

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Single-sided deafness (SSD) is an extreme condition of partial sensory deprivation. Growing evidence indicates that SSD not only affects auditory processing but may also impact other sensory and cognitive functions. The human brain exhibits functional asymmetry between the two hemispheres, and SSD may alter this asymmetry due to unilateral auditory deprivation, leading to a reallocation of cognitive resources. However, research on the cognitive functions of SSD patients remains limited, and the specific effects of auditory deprivation on higher-order cognitive processing in the visual pathway are still unclear. To address this issue, we employed a classical visuospatial working memory task with EEG to investigate attention allocation and working memory maintenance processes in SSD patients under different task loads, thereby elucidating the impact of SSD on specific cognitive processes in the visual pathway. We enrolled 21 patients with congenital left SSD (LSSD), 20 patients with congenital right SSD (RSSD), and 38 normal hearing (NH) controls. No significant group difference was observed for behavioral performance. Under low-load conditions, the RSSD group demonstrated significantly enhanced N2 posterior contralateral (N2pc) amplitude compared to both LSSD and NH groups, while the LSSD group exhibited significantly larger contralateral delayed activity (CDA) amplitude than the RSSD and NH groups. No such differences were observed under high-load conditions. These findings suggest that RSSD patients recruited more cognitive resources for visual search, while LSSD patients allocated additional resources for working-memory maintenance under the low-load situation. This may reflect compensatory recruitment in the hemisphere contralateral to the deaf ear. Under high cognitive load, these lateralized effects disappear due to saturated resource allocation. In conclusion, unilateral auditory deprivation in SSD patients exerts a significant impact on higher-order cognitive processes such as attention and working memory within the visual pathway, and the effects differ with the side of deafness.

Keywords: Single-sided deafness, Visual attention, Working memory

Posters

Hearing Disorders
PD 059

Wideband Acoustic Immittance in Adults with Unilateral Sudden Sensorineural Hearing Loss: A Comparison with Contralateral Normal Ears

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Objective: To investigate the impact of sudden sensorineural hearing loss (SSNHL) on Wideband Acoustic Immittance (WAI) parameters in young adults with unilateral idiopathic SSNHL.

Methods: Thirty young adults (18-45 years) with unilateral SSNHL underwent audiometric evaluation, conventional tympanometry, and WAI testing. A within-subject design compared SSNHL-affected ears with contralateral normal-hearing ears, both demonstrating normal middle ear function. Statistical analyses included the Wilcoxon signed-rank test, correlation analysis, and ROC curve analysis.

Results: SSNHL-affected ears showed significantly reduced absorbance at 0.5 kHz and 4-5 kHz compared to normal ears ($p < 0.01$-0.001). Resonance frequency was significantly lower in SSNHL ears (0.675 ± 0.168 kHz vs. 0.806 ± 0.220 kHz, $p = 0.01$). Absorbance at 5 kHz was negatively correlated with pure-tone average ($\rho = -0.57$, $p = 0.0028$). ROC analysis demonstrated good diagnostic performance, with sensitivity of 0.82-0.84 and specificity of 0.75-0.9 at 4-5 kHz.

Conclusions: This study provides the first evidence that cochlear hearing loss directly affects WAI measurements independent of middle ear function. Reduced high-frequency absorbance and lower resonance frequency in SSNHL ears likely reflect cochlear structural alterations, including outer hair cell loss and basilar membrane changes. These findings challenge the assumption that WAI exclusively measures middle ear mechanics and support its potential as a diagnostic tool for inner ear dysfunction.

Keywords: Wideband Acoustic Immittance, sudden sensorineural hearing loss, cochlear hearing loss, resonance frequency, diagnostic audiometry

Posters

Hearing Disorders
PD 060

ECoG & ABR results in 63 patients with acoustic neurinoma & monitoring of VIII nerve function during the surgery for hearing preservation

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ECoG & ABR results in 63 patients with acoustic neurinoma & monitoring of VIII nerve function during the surgery for hearing preservation
We have 63 patients with acoustic neurinoma/Schowanoma nerve that referred for possibility of saving & monitoring the VIII nerve during the surgery with ABR, ECoG test intraoperatively
In this study we evaluated any correlation between size of tumor, location, Hearing level, Speeech discrimination Score , Acoustic Reflex & SINT tests. We will present the percentage & method of monitoring & saving the nerve function during the surgery & pre operative & post operative tests

Keywords: Acoustic neuroma, Intraoperative monitoring, ECoG and ABR

Posters

Auditory Neuroimaging and Neuroplasticity
PD 061

Late Latency Auditory Evoked Potentials and Object-Related Negativity Based on Harmonicity in Hearing-Impaired Children

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purpose: Hearing-impaired children experience difficulties in understanding speech in noise, which could be related to difficulty in parsing concurrent sound object based on harmonicity cues. This study investigated the sensitivity of hearing-impaired children (HIC) in processing harmonic relation using the long latency auditory evoked potentials (LLAEPs), and the object-related negativity (ORN), a neural metric of concurrent sound segregation.
Methods: The participants were 14 normal-hearing children (NHC) with an average age of 7.82±1.31 years and 17 HIC with an average age of 7.98±1.25 years. They were presented with a sequence of 200 Hz harmonic complex tones that had either all harmonic in tune or the third harmonic mistuned by 2%, 4%, 8%, and 16% of its original value.
Results: The analysis of scalp-recorded LLAEPs showed smaller N1 and P2 amplitude elicited by tuned stimuli. The difference in LLAEP between tuned and mistuned stimuli yielded smaller ORN in HIC than controls.
Conclusion: This study showed that deficits in processing harmonic relation in HIC, which may contribute to their difficulty in understanding speech in noise. As a result, top down and bottom up rehabilitations are recommended based on basic acoustic characteristics, including harmonics.

Keywords: Object Related Negativity, Late Latency Response, Hearing impaired children

Posters

Auditory Neuroimaging and Neuroplasticity
PD 062

Top-Down Neural Mechanisms Supporting Speech-in-Noise Perception in Hearing Aid Users After Auditory Training

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The ability to perceive speech in noise (SiN) is essential for social interaction but remains challenging for individuals with hearing loss. Amplification through hearing aids alone cannot fully restore this ability, whereas auditory training targeting auditory–cognitive functions has shown additional benefits. Neuroimaging evidence further suggests that SiN perception engages higher-order networks supporting auditory attention and cognitive control, such as the cingulo-opercular network (CON). This study investigated neurophysiological changes associated with SiN improvement in hearing aid users who underwent auditory training using functional MRI.
An fMRI experiment with a SiN task was conducted, and the Korean Matrix Sentence Test (K-MST) served as a behavioral measure. Fifteen adults with moderate to moderately severe hearing loss and sixteen age- and gender-matched normal-hearing controls participated. The hearing-impaired group was assessed twice—at one and three months after hearing aid fitting—with one subgroup receiving auditory training (HA+AT) and the other using hearing aids only (HAonly). Controls were tested once. Statistical analyses were performed in R, and neuroimaging data were processed with SPM12.
In normal-hearing controls, SiN tasks activated the bilateral auditory cortices and the CON, with the latter showing a linear increase in activity with task difficulty. Among hearing aid users, significant behavioral improvement was observed only in the HA+AT group. Although no group differences were evident initially, follow-up results revealed a significant group difference and a group × time interaction in the paracingulate cortex, a key node of the CON, reflecting increased activation in the HA+AT group.
These findings indicate that the cingulo-opercular attention network plays a crucial role in SiN processing and in auditory training–related improvement, suggesting that effective rehabilitation should incorporate top-down strategies targeting auditory attention and cognitive control.

Keywords: Speech perception in noise, Functional MRI, Auditory training

Posters

Auditory Neuroimaging and Neuroplasticity
PD 063

Ear-Specific Patterns of Functional Connectivity Reorganization Following Single-Sided Deafness

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Neuroplastic changes following hearing loss are influenced by factors such as the duration of auditory deprivation and language experience. In single-sided deafness (SSD), asymmetric auditory input also induces cortical reorganization; however, little is known about how the side of deafness differentially affects auditory network connectivity. This study investigated ear-specific functional connectivity alterations by comparing left-sided (LSSD) and right-sided (RSSD) SSD.
Thirty-five adults with SSD (17 LSSD, 18 RSSD) and twenty-eight normal-hearing (NH) controls participated. All were right-handed and had no neurological or psychiatric history. LSSD and RSSD groups were comparable in age, sex, and SSD duration. Resting-state fMRI data were acquired using a 3T Siemens Skyra scanner. Connectivity analyses were conducted with the CONN toolbox. Six cytoarchitectonic auditory cortex seeds (Te1, Te2, Te3 bilaterally) were used for seed-to-voxel analyses, and 36 auditory network regions (18 per hemisphere) were included for ROI-to-ROI analyses. Statistical thresholds were set at voxel-level $p < 0.001$ (uncorrected) with cluster-level FDR-corrected $p < 0.05$.
Seed-to-voxel analyses showed significant connectivity between auditory seeds and bilateral auditory cortices, perisylvian regions, and cingulo-opercular areas across all groups. RSSD showed reduced connectivity relative to NH controls in the left frontal opercular region when using the left Te2 seed. Duration-related analyses revealed clear ear-specific patterns. LSSD demonstrated widespread increases in connectivity across all seeds and bilateral auditory cortices with longer SSD duration. In contrast, RSSD showed more limited effects, with duration-related increases restricted to focal ipsilateral regions for the right Te1 and left Te2 seeds. ROI-to-ROI analyses similarly showed broad network strengthening in LSSD, whereas RSSD exhibited only localized or homologous interhemispheric increases.
These findings indicate that SSD leads to distinct ear-specific patterns of auditory network reorganization. LSSD shows extensive bilateral reweighting, whereas RSSD demonstrates confined plasticity. Such differences may inform individualized rehabilitation strategies in SSD.

Keywords: Single-sided deafness, Functional connectivity, Auditory netowrk

Posters

Genetics and Implications

PD 064

Mixed Hearing Loss in the Pediatric Population: Etiology, Evolution, and Management

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Purpose: Mixed hearing loss (MHL), defined by the coexistence of conductive and sensorineural hearing loss (HL), is a poorly investigated condition in children. This study aimed to describe the clinical characteristics, etiological spectrum, and audiological evolution of pediatric MHL.

Methods: We retrospectively reviewed medical records of children aged 5–18 years with MHL, evaluated between January 1, 2017, and July 30, 2025, at the Audiology Clinic of the Policlinico of Milan (Italy). A total of 16 800 pure-tone audiometric examinations were analyzed, and demographic, clinical, audiometric (baseline and 1-year follow-up), radiological, and genetic data were collected.

Results: A total of 129 patients (mean age: 83.5 ± 35.3 months) with MHL were identified among 5600 children with HL (prevalence: 2.3%). Overall, 78 patients (60.5%) had passed the UNHS bilaterally. A genetic syndrome was present in 34.1% of cases, including BOR syndrome (6.2%), isolated Pierre Robin sequence (4.7%), Down syndrome (3.9%), and CHARGE syndrome (3.1%). Syndromic patients more frequently exhibited radiologically confirmed otologic malformations (72.7% vs 40.0%; p<0.001) and chronic/recurrent otitis media (OM) (84.1% vs 23.5%; p<0.001).

At 1-year follow-up, significant improvement was observed in PTA-4 (60.3 ± 19.3 to 54.6 ± 25.8 dB HL; p<0·001) and air–bone gap (41.9 ± 14.7 to 34.0 ± 22.0 dB HL; p<0.001). Clinically relevant hearing improvement occurred in 34.1% of patients, while 10.1% showed hearing deterioration; 7.0% evolved from mixed to sensorineural HL. Surgery for chronic/recurrent OM led to hearing improvement in 44.4% (20/45) of cases. Regarding auditory rehabilitation, 74 patients (57.4%) used hearing devices: 55 (42.6%) conventional hearing aids, 15 (11.6%) implantable bone-conduction devices, and 4 (3.1%) cochlear implants.

Conclusions: Pediatric MHL has a heterogeneous, predominantly syndromic and genetic etiology, often associated with otologic malformations or OM. Audiological outcomes vary, underscoring the need for individualized management and long-term follow-up, regardless of UNHS results.

Keywords: Mixed hearing loss, Pediatric hearing loss, Long-term audiological outcomes

Posters

Genetics and Implications

PD 065

Molecular Etiology of Bilateral Inner Ear Malformations

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Background:
Inner ear malformations (IEMs) may occur as isolated defects or as part of genetically determined syndromes. The most common type of IEM is an enlarged vestibular aqueduct (EVA), frequently accompanied by incomplete partition type 2 (IP2) of the cochlea and an enlarged vestibule. The SLC26A4 gene represents the main genetic cause of these anomalies with approximately half of EVA/IP2 cases carrying either two pathogenic SLC26A4 variants or one pathogenic variant together with the CEVA haplotype. In contrast, the genetic etiology of other IEMs is more heterogeneous and remains incompletely elucidated.

Methods:
Genomic DNA was extracted from blood samples of 79 individuals with bilateral inner ear malformations and hearing loss (HL). Targeted sequencing was conducted using a custom-designed panel including 237 or 263 genes associated with HL.

Results:
A molecular diagnosis was established in 57% (45/79) of patients. Among those with EVA/IP2, nine carried biallelic pathogenic variants in SLC26A4, while eleven had a single pathogenic SLC26A4 variant, in several cases in combination with the CEVA haplotype. In patients presenting with other forms of IEM, pathogenic variants were found in POU3F4 and in genes linked to syndromic hearing loss, including CHD7 (CHARGE), EYA1 and SIX1 (BOR), SOX10 (Waardenburg), TFAP2A (BOF), FGF3 (LAMM), and KMT2D (Kabuki). Moreover, a novel pathogenic variant in HOXA2 was detected in a single case.

Conclusion:
Alterations in SLC26A4 and the CEVA haplotype collectively explain 75% of EVA/IP2 cases. In contrast, patients with other IEMs are frequently found to have syndromic forms of HL. Additional studies are warranted to explore noncoding regions of known HL genes and to uncover novel genetic contributors to IEMs.
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Keywords: Inner ear malformations, Next generation sequencing, Hearing loss

Posters

Genetics and Implications

PD 066

Auditory neuropathy associated with pathogenic variant of the TMTC2 gene: Report of the first pediatric case in Honduras

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Introduction:
Auditory neuropathy is characterized by preserved cochlear function with impaired neural synchrony, affecting speech perception. Pathogenic variants in the TMTC2 gene have been linked to autosomal dominant sensorineural hearing loss and auditory neuropathy phenotypes.

Objective:
To describe the clinical, audiological, and genetic findings of a pediatric Honduran patient diagnosed with auditory neuropathy associated with a TMTC2 variant.

Methods:
A six-year-old male, was referred at three years old due to lack of spoken language. Evaluations included auditory brainstem response (ABR), otoacoustic emissions, tympanometry, conditioned play audiometry, neuroimaging, and whole-exome sequencing.

Results:
ABR testing revealed absent neural responses with bilateral cochlear microphonics, confirming auditory neuropathy. Otoacoustic emissions were inconsistent, and tympanometry showed Jerger type-A curves. Pure-tone audiometry indicated thresholds around 40 dB with poor phonemic discrimination. Imaging ruled out structural abnormalities. Whole-exome sequencing detected a heterozygous pathogenic TMTC2 variant (chr12:82895939; 12q21.31), autosomal dominant. Partial improvement was observed with hearing aids during therapy and auditory-verbal therapy, though no functional speech emerged. The patient is currently a candidate for bilateral cochlear implantation.

Conclusions:
This represents the first documented case in Honduras of auditory neuropathy associated with a TMTC2 pathogenic variant. It emphasizes the importance of interdisciplinary management and genetic diagnosis in optimizing treatment strategies for complex pediatric hearing loss.

Keywords: Auditory neuropathy, TMTC2, Pediatric hearing loss

Posters

Genetics and Implications

PD 067

Auditory Function in Ehlers-Danlos Syndrome: Behavioral and Electrophysiological Evaluation of a 26-Year-Old Male Case

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Purpose: To describe the comprehensive audiological evaluation, including behavioral and objective assessments of auditory processing, in a patient diagnosed with Ehlers-Danlos Syndrome (EDS), a connective tissue disorder that may impact auditory function due to collagen integrity effects in the auditory system.

Methods: The case involves a 26-year-old male patient with confirmed EDS; his brother also has the syndrome, suggesting a familial pattern. A complete audiological evaluation was conducted, encompassing pure-tone audiometry, speech audiometry, and tympanometry. Electrophysiological assessments included Auditory Brainstem Response (ABR) to clicks and P300 event-related potentials. Electroacoustic measures comprised transient evoked otoacoustic emissions (TEOAE) and distortion product otoacoustic emissions (DPOAE). Behavioral auditory processing was evaluated over two sessions using 12 specialized auditory tests targeting binaural integration, temporal ordering, temporal resolution, figure-ground for verbal sounds, dichotic digits (binaural integration and directed listening stages), and Synthetic Sentence Identification with Ipsilateral Competitive Message (SSI-ICM).

Results: Pure-tone audiometry revealed a mild sensorineural hearing loss at 2000 Hz in the right ear, with thresholds within normal limits in the left ear (World Health Organization, 2021). Tympanograms were type A bilaterally, with present acoustic reflexes. ABR to clicks and P300 were within normal limits. TEOAE showed absent responses at 5000 Hz bilaterally, while DPOAE elicited partial responses in both ears. Behavioral auditory processing results indicated performance below expectations on the dichotic consonant-vowel test during the left-ear directed listening stage, with no enhancement of the right-ear advantage. This finding was consistent across both sessions, suggesting central auditory vulnerabilities.

Conclusions: This case highlights subtle auditory processing deficits in EDS, particularly in directed listening, despite largely normal peripheral and central electrophysiological measures. Such findings underscore the importance of comprehensive behavioral assessments in connective tissue disorders to identify central auditory processing vulnerabilities. Early intervention may mitigate impacts on communication and quality of life.

Keywords: Auditory Perception, Ehlers-Danlos Syndrome, Diagnostics

Posters

Genetics and Implications
PD 068

Audiologic characteristics in a large cohort of patients with biallelic DFNB1 mutations from a single clinical center

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Background:
Mutations at the DFNB1 locus (GJB2 and GJB6 genes) represent the most common genetic cause of autosomal recessive non-syndromic sensorineural hearing loss. Although the causative link between DFNB1 variants and hearing loss is well established, large single-center cohorts enabling clinically consistent phenotyping remain limited. The aim of the study was to describe the audiologic phenotype, severity, symmetry, and progression of hearing loss due to biallelic pathogenic variants at the DFNB1 locus in a large cohort.
Methods:
We retrospectively reviewed more than 1,600 patients genetically diagnosed at a tertiary referral center for hearing disorders or for eligibility assessment for hearing rehabilitation. All individuals carried two pathogenic or likely pathogenic variants in the DFNB1 locus, with GJB2 homozygous truncating variants predominating. Pure-tone audiometry or auditory brainstem responses were analyzed. Longitudinal data were available for a subset of patients.
Results:
A total of 65 different genotypes were identified. Biallelic GJB2 truncating variants, most commonly c.35delG/c.35delG, accounted for approximately 74% (1198/1614) of the cohort; compound heterozygous truncating/non-truncating genotypes represented 21% (336/1614), and non-truncating/non-truncating genotypes 5% (80/1614). Hearing loss was assessed in a group of 1335 patients. In all patients hearing loss was bilateral and in the vast majority symmetric and sensorineural. The initial severity distribution was: profound (45%), severe (14%), moderate (45%), and mild (17%).
Conclusion:
This large single-center cohort highlights substantial phenotypic variability in GJB2-related hearing loss, with clear differences in its severity between groups with specific genotypic background. These findings underscore the importance of genotype-informed audiologic monitoring and support personalized rehabilitation planning.

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Keywords: DFNB1, Hearing loss, Genetics

Posters

Genetics and Implications
PD 069

Transfection efficiency of vestibular organs according to various AAV serotypes

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Introduction
Inner ear gene therapy, which involves the delivery of therapeutic DNA constructs to restore hearing and balance function, is an emerging field. Several synthetic adeno-associated virus (AAV) capsids have been developed and shown to provide higher hair cell transduction efficiencies in the cochlea. However, results have been variable, and there is a need for more efficient vectors with thorough characterization. This study aims to provide a comparative analysis of different injection methods and AAV vector serotypes for gene delivery to the vestibular organs in neonatal and adult mice.

Methods
In the first part of the study, we evaluated the efficiency of three distinct injection routes—posterior semicircular canal (PSCC), round window membrane, and scala media —in delivering AAV vectors to the utricle. CD1 wild-type neonatal mice were injected with AAV9/PHP.B-CMV-eGFP. One week post-injection, the inner ears were harvested, and the percentage of transfected hair cells in the utricle was quantified using Cellpose 2.0 software. In the second part, using the injection route with the highest transfection efficiency from the first phase, CD1 wild-type neonatal mice were injected with various AAV serotypes, including AAV9/PHP.B, AAV2.7m8, AAV2/Anc80L65, and AAV2/8, each carrying a CMV-eGFP reporter construct. The same approach was applied to C57Bl/6 wild-type adult mice.

Results
Our findings revealed that the PSCC route of injection yielded the most consistent delivery and highest transfection efficiency in the utricle, compared to the other injection methods. In subsequent experiments, PSCC injection route was used in neonatal and adult mice. When various AAV serotypes were injected in neonatal mice, AAV9/PHP.B and AAV2/Anc80L65 demonstrated high transfection efficiency in the hair cells of the utricle, saccule, and the ampulla of the semicircular canals.

Conclusion
These results highlight the potential of PSCC delivery using AAV9/PHP.B and AAV2/Anc80L65 for future gene therapy applications targeting genetic vestibular disorders.

Keywords: Gene Therapy, Vestibule, AAV

Posters

Psychoacoustics and Transitional Research
PD 070

Effect of propofol- or isoflurane-based anesthesia on apical and basal cochlear function in domestic pigs: Preliminary results

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Introduction: Domestic pigs have been excellent animal models in auditory sciences. However, the commonly used propofol- or isoflurane-based anesthesia can affect cochlear function, distorting scientific data. Therefore, we investigated the effect of those anesthetics on apical and basal cochlear function in pigs. Methods: All procedures were approved by the Animal Use Ethics Committee (2232/2025). Twelve large white pigs were randomly assigned to either the Propofol-Group or the Isoflurane-Group. All animals received intramuscular ketamine and xylazine as pre-anesthetics. Propofol-based anesthesia was maintained with a constant intravenous infusion of 5-10 mg/kg propofol. Isoflurane-based anesthesia was maintained with a constant inhalation of 1.5-2% isoflurane. All animals also received fentanyl, oxygen, and saline constantly. Cochlear function was measured with two sets of Distortion Product Otoacoustic Emissions (DPOAEs): lower frequencies (913-1000 Hz) and higher frequencies (4000-5058 Hz). Both sets were logarithmically established and presented randomly twice on the right ear. Measurement 1 started 40 minutes after the onset of anesthesia, enough time for the pre-anesthetics to leave the bloodstream. Measurement 2 started 85 minutes later. All ears showed normal Transient Evoked Otoacoustic Emissions at the beginning of the Measurement 1. Results: For propofol, DPOAEs reduced minimally from measurement 1 to measurement 2 at the lower frequencies. The paired t-test showed no statistical difference regardless of the frequency tested ($p>0.05$). At higher frequencies, DPOAEs reduced consistently from the first to the second measurement, showing statistical difference at all frequencies ($p<0.05$), except in 4450 and 4644 Hz ($p>0.05$). For isoflurane, all DPOAEs for lower and higher frequencies were reduced from measurement 1 to measurement 2 ($p<0.05$), except in 941, 4745, and 5058 Hz ($p>0.05$). Furthermore, greater variability of the responses to isoflurane was also observed. Conclusion: Both anesthetics affected cochlear function, however isoflurane-based anesthesia affected it to a greater extent, involving both the cochlear base and apex.

Keywords: Cochlea, Domestic Pigs, General Anesthesia

Posters

Psychoacoustics and Transitional Research
PD 071

Large interaural level differences may improve binaural fusion by improving localization precision

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Binaural fusion, or the ability to combine signals received by the two ears, is adversely affected by decreases in interaural coherence (i.e. the statistical similarity of the signal at the two ears after accounting for interaural time differences). We have previously shown that adding a large interaural level difference (ILD) to a signal with decreased interaural coherence can improve binaural fusion. The goal of this experiment was to determine if the increase in binaural fusion with large added ILDs corresponds with improved localization precision.

Twenty typical hearing listeners were tested with sound processed with a set of generic head-related transfer functions, with simulated room reverberation used to vary the interaural coherence of a sound source. Perceived lateralization was manipulated either by artificially superimposing an ILD on the reverberant binaural signals or by moving the source away from the frontal location in the virtual room. Participants used a dial to indicate both the perceived sound source width and the location of the perceived sound source. Binaural fusion improved when the sounds were lateralized more to the side, as indicated by participants rating the perceived source width to be narrower. Additionally, binaural fusion ratings improved when the localization precision increased, as indicated by lower variability in the perceived location for a given stimulus.

These results suggest that the increase in binaural fusion with large added ILDs may be influenced by improved localization precision.

Keywords: Binaural fusion, Interaural Level Diferences, Localization precision

Posters

Psychoacoustics and Transitional Research
PD 072

Impressions of Environmental Sounds in individuals with and without Hearing Loss: Using Semantic Differential Factor Analysis

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OBJECTIVE
Advances in hearing aids (HA) and cochlear implants (CI) have improved speech perception. in individuals with hearing loss; however, perceiving environmental sounds remains difficult (Shafiro et al, 2022). Although identification scores have been defined for environmental sounds, subjective impressions remain unclear. In this study, we assessed subjective impressions that cannot be captured by identification.
METHODS
The participants included individuals using HA (n=11; 75.3±5.5y) or CI (n=10; 68.2±13.4 y) or those with normal hearing (NH) (n=15; 72.9±3.3 y). Thirty environmental sounds were played at 60 dB HL in a sound-treated room 1 m away from a loudspeaker. Participants identified each sound, and their subjective impressions were evaluated using 14 adjective pairs (7-point Semantic Differential). The results of the three groups were compared using factor analysis. Factors were extracted from the analysis based on findings from a previous study (Tanaka et al, 2010).
RESULTS
Individuals with NH had significantly higher scores compared with those of individuals with hearing loss ($\chi^2(2)=26.05$, $p<0.01$), but those of individuals with HA and CI showed no significant difference. The first factor extracted was "powerful/loud/annoying" by patients with NH (32.3%) and HA (32.1%), and "beautiful and sharp" by individuals using CI (32.9%). The second factor identified was "beautiful-metallic" by individuals with NH (25.2%), "beautiful–pleasant" by those using HA (18.6%), and "powerful/strong" by those using CI (28.6%). Only individuals using HA had a clear third factor.
CONCLUSION
The results showed that individuals with hearing loss had more difficulty identifying environmental sounds than those with NH. Furthermore, their subjective impressions presented as similar factors; however, the factors consisted of different adjective pairs in each participant group. The perception of environmental sounds by individuals with hearing loss differed qualitatively depending on the device used, suggesting the need for support to be tailored to each individual's sensory experience.

Keywords: Hearing loss, Environmental sound, Psychological impressions

Posters

Psychoacoustics and Transitional Research
PD 073

Correlation between the Pure Tone Audiometry Results and the Subjective Hearing Benefit of Tympanoplasty

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BACKGROUND AND OBJECTIVES:
Measuring the therapeutic effect of tympanoplasty is usually dependent on the surgeon's view-point and the results of pre- and post-operative pure tone audiometry (PTA). But there is considerable discrepancy between the subjective hearing benefit and the PTA, so the aim of this study is to evaluate the correlation between them among the patients who had tympanoplasty for chronic suppurative otitis media.

SUBJECTS AND METHOD:
One hundred patients who had tympanoplasty between 2017 and 2024 were studied. Patients were divided into two groups, improved and not-improved group, according to their answers to the questionnaire asking his or her subjective hearing benefit. The pre and postoperative air conduction threshold (AC), bone conduction threshold (BC), air-bone gap (ABG) and the amount of increment or decrement of these parameters were compared between the two groups.

RESULTS:
Analysis of the data showed significant differences between the two groups with respect to preoperative ABG, postoperative AC, postoperative ABG, AC decrement and ABG decrement. Especially, when the amount of AC decrement was more than 10 dB or the ABG decrement was more than 20 dB, the rate of improved subjective hearing group was increased very strongly.

CONCLUSION:
Among the pre- and post-tympanoplasty PTA results, the most useful indicators of patient's subjective hearing benefit are the amount of AC decrement (more than 10 dB) and ABG decrement (more than 20 dB).

Keywords: Tympanoplasty, Pure tone audiometry, Hearing gain

Posters

Psychoacoustics and Transitional Research
PD 074

Posters

Auditory Processing
PD 075

The effect of central auditory processing training in autistic children

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Purpose:Concerning the prevalence of autism spectrum disorder, many studies have examined the various aspects of this disorder. One of the major problems in autism is the sensory processing deficit, and in particular the abnormalities of auditory processing. In this study evaluated auditory processing disorder in children who they were in autism spectrum and they were training and they were evaluated again.

Methods: Fifteen children sevan girl and eight boy in the range of seven to twelve were evaluated central auditory processing in Buffalo test After evaluation they participated in central auditory processing training.Each month their parents and teachers reported about their education and communication.

Result: twelve children had deficit in their central auditory processing and participated in auditory processing training.Thei teachers and parents reported they were beter in education specially in dictation and they were better in their manner with other people and were better in auditory comprehension.After six months they were evaluated and all of them had better results.

Conclusion: Central Auditory processing deficit is important issue that must be considered in autistic children.Central Auditory processing training is important program that really can help to these children.

Keywords: Central Auditory processing tests, Central Auditory processing training, Autistic children

Posters

Auditory Processing
PD 076

Electrophysiological markers of binaural processing at the brainstem level

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Purpose: This study aimed to identify electrophysiological markers of binaural processing at the brainstem level and to examine whether they serve as neural correlates of behavioral binaural performance in young adults with normal hearing sensitivity.

Method: Twenty-nine young adults (aged 21–29 years) with symmetrical normal hearing sensitivity and word recognition were tested. Electrophysiological measures of binaural processing were obtained using the binaural interaction component (BIC) of the auditory brainstem response (ABR) with 250- and 500-Hz tone bursts (TB). Behavioral binaural performance was assessed with three measures: auditory figure-ground (AFG), 500-Hz masking level difference (MLD), and spondee binaural fusion (SBF).

Results: ABR-BIC latencies were significantly longer for 250 Hz than 500 Hz across peaks, with VId consistently later than Vd, suggesting a more distal generator for VId. ABR-BIC wave Vd amplitude was significantly larger than VId at 500 Hz, with no difference at 250 Hz, suggesting the later peak is more responsive to lower frequencies. ABR-BIC latencies were not correlated with behavioral measures of binaural performance. Conversely, wave VId amplitudes were significantly correlated with SBF scores ($r = 0.38$, $p < 0.01$), with higher SBF scores associated with greater amplitudes. This relationship was even stronger when wave VId was elicited by the 250 Hz TB ($r = 0.47$, $p = 0.01$) compared to the 500 Hz TB.

Discussion: ABR-BIC waves Vd and VId may reflect distinct neural substrates of binaural processing, with each component serving as a separate electrophysiological marker at the brainstem level. The later VId peak may represent higher stages of binaural interaction. Wave VId amplitude may serve as a neural correlate of behavioral binaural performance, particularly at lower stimulus frequencies. These findings highlight the potential clinical value of ABR-BIC as an objective supplement to behavioral measures of binaural hearing.

Keywords: Binaural interaction component, Auditory brainstem response, Binaural hearing

Posters

Auditory Processing
PD 077

Diagnostic accuracy of the Click Ordering Lateralization Test in children with APD

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Objective:
The aim of this study was to determine the diagnostic accuracy of a new lateralization test, the Click Ordering Lateralization Test (COLT), in children aged 8 to 14 years.

Method:
This study was approved by the Research Ethics Committee. Written informed consent was obtained from all participants and guardians.
The COLT consists of two tracks comprising 54 trials each. Binaural noise bursts were presented at 50 dB SL with varying interaural time differences (ITDs) in randomized order. The ITDs varied between 60 and 230 ms, in addition to a non-challenging condition. Participants should indicate the perceived initial location of the stimulus (right, left, or center). Two outcome measures were derived: (1) hit rate, and (2) lateralization threshold, defined as the smallest ITD at which the participant achieved hit rate >83.3%, with stable or improved performance at subsequent ITDs.
The test was administered to 26 children aged 8 to 14 years, all had normal peripheral hearing and no history of neurological, psychiatric, or cognitive disorders. Participants with communication or learning complaints were classified into the APD group based on results from a comprehensive auditory processing battery. Children without such difficulties completed the Dichotic Digits Test as a screening measure; those who passed were assigned to the Control group. For data analysis, mixed-effects linear models were used with age, sex, and track as covariates. Receiver Operating Characteristic (ROC) curves were computed to estimate sensitivity, specificity, and overall diagnostic accuracy.

Results and conclusion:
Children in the APD group exhibited significantly poorer performance on the COLT, with higher lateralization thresholds and lower accuracy rates ($p = 0.008$, $r = 0.217$). Sensitivity and specificity exceeded 70%, with overall accuracy >75%, indicating strong diagnostic accuracy. These findings support the use of the COLT as a valid tool for clinical assessment of sound lateralization in children.

Keywords: Sound Localization and Lateralization, Test Validity, Auditory Processing Disorder

Posters

Auditory Processing
PD 078

Navigating auditory assessment in autistic individuals: A narrative review

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Abnormal sensory responses have been a diagnostic criterion for autism since 2013, with auditory hypersensitivities representing one of the most frequently reported symptoms. It is not unusual for children with autism, some of whom are as yet undiagnosed, to present clinically to specialists with a history of auditory symptoms in the context of normal hearing. This review broadens the traditional scope of audiology by integrating neurodevelopmental and neuroscientific perspectives to explain autism-associated auditory characteristics. We propose a theoretical model of auditory system involvement and outline the clinical importance of a multidisciplinary assessment, combining detailed case history, psychoacoustic testing and neurophysiological measures.

By linking auditory neuroscience with clinical management, this review shows how audiology can contribute meaningfully to early identification and intervention in neurodivergent populations. We also discuss evidence-based strategies to manage auditory difficulties and emphasise the importance that auditory-related symptoms can be the presenting problem in autistic children. This work therefore aims to contribute to the evolution of audiology to address emerging challenges at the intersection of hearing science and neurodevelopment.

Keywords: Auditory processing, Autism, Pediatric

Posters

Auditory Processing
PD 079

Long COVID and Auditory Brain Function: Investigating Central Auditory Processing Alterations

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Over four years into the COVID-19 pandemic, the prevalence of long COVID is approximately 36% among individuals with confirmed COVID-19 (Hou et al, 2025). Fatigue and cognitive impairment are the most commonly reported symptoms in Long COVID syndrome. A systematic review has demonstrated that, on average, 20.4% of these patients experienced mental health symptoms or brain fog over a period ranging from 3 to 24 months. A study identified structural alterations in the thalamus and basal ganglia among individuals with persistent fatigue symptoms three months post-infection (Heine et al, 2023). A case–control study reported reduced activity in the left superior temporal gyrus 27 months after infection, correlating with elevated mental fatigue and cognitive deficits (Zhao et al, 2024). Jalaei et al. (2019) proposed assessing central auditory processing functions as a clinical method to help identify cognitive impairments in adults.

Each included participant in our study had a verified history of COVID-19 infection occurring no less than three months prior to their enrollment. The assessment began with a detailed patient history and evaluation of brain fog severity using the Brain Fog Scale (Debowska et al, 2024). Auditory health was examined comprehensively: the external and middle ear were assessed. Hearing thresholds were measured. Neural auditory pathways were analyzed via Auditory Brain Stem Response, and central auditory processing was assessed using the Multiple Auditory Processing Assessment.

The analysis included 47 participants, with a mean age of 50. Results indicated that individuals with a history of COVID-19–related smell loss and those with comorbid conditions associated with the infection tended to have higher Brain Fog Scale scores. Moreover, a history of smell loss due to COVID-19 was associated with lower scores in the binaural domain score. Additionally, participants who experienced multiple COVID-19 infections (more than three infections) showed reduced performance in the monaural domain.

Keywords: COVID, Auditory processing, Brain Fog

Posters

Auditory Processing
PD 080

The impact of classroom soundfield systems on reading fluency in normal-hearing students

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Objectives

This study aimed to investigate the impact of soundfield amplification (SFA) on reading fluency in normal-hearing students aged 8–10 years and explore potential cognitive predictors of SFA benefit.

Methods

The study involved 84 normal-hearing students from 23 grade 3 and 4 classes across three academic terms. Classes alternated between SFA-On and SFA-Off conditions, with order randomized. Reading fluency was assessed using the Wheldall Assessment of Reading Passages at each term conclusion. Baseline cognitive and listening abilities, including non-verbal intelligence, auditory working memory, speech discrimination in noise, and attention, were also evaluated.

Results

The study found no significant overall difference in reading fluency development between SFA-On and SFA-Off conditions. However, intelligence was mildly predictive of the reading fluency advantage obtained during SFA-On periods, with lower-intelligence students benefiting more from amplification.

Conclusion

While SFA may not provide universal academic benefits for all students, it may offer advantages to students with lower cognitive abilities. This suggests that SFA is a valuable support for diverse learner requirements in the many classrooms that do not meet recommended acoustic standards.

Keywords: Soundfield amplification, Reading fluency, Classroom listening

Posters

Auditory Processing
PD 081

Central Auditory Processing Screening and Diagnostic Program in School-Aged Children

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Objective: To present a school-based program for screening and diagnosing Central Auditory Processing Disorder (CAPD), integrating cognitive, behavioral, and electrophysiological measures. Methods: Cross-sectional study was approved by the Research Ethics Committee and conducted with 165 Portuguese-speaking children aged 6 to 8 years. A total of 129 children (78%) met inclusion criteria of normal peripheral auditory thresholds and adequate cognitive screening performance (Raven's Colored Progressive Matrices). All participants completed the School Performance Test (TDE-II, reading and writing subtests) and CAP screening through an online platform (AudBility), forming two groups: 93 with good academic performance (GI) and 36 with learning difficulties (GII). At the diagnostic stage, 74 children underwent clinical CAP tests, including the Dichotic Digits Test (DDT), Pediatric Speech Intelligibility (PSI), Gaps-in-Noise (GIN), and Frequency Pattern Test (FPT). Of these, 48 children also completed electrophysiological measures: Auditory Brainstem Response (ABR), Long-Latency Auditory Evoked Potentials (LLAEP), and Frequency Following Response (FFR). Data were analyzed using linear mixed models with post hoc tests. Results: GI performed significantly better on AudBility tasks of Binaural Integration ($p < 0.001$) and Frequency Temporal Ordering ($p = 0.005$). Age effects (better performance at 8 years) and ear effects (right-ear advantage) were also observed. At the diagnostic stage, 19 children (25%) were classified with CAPD. Children with CAPD performed worse on the Integration task, with a mean difference of 7.53% correct responses ($p = 0.003$), independent of age and ear. Electrophysiological measures revealed delayed P1 latencies and reduced N2-P3 amplitudes in children with academic difficulties, suggesting cortical slowing and weaker neural encoding of auditory information. Conclusion: Combining cognitive, academic, and auditory screening with clinical CAP tests and electrophysiological measures provides a reliable strategy for early CAPD identification. This approach demonstrates feasibility for large-scale school implementation and highlights potential to guide timely interventions, educational planning, and improved literacy outcomes.

Keywords: Central auditory Processing, Children, Hearing tests

Posters

Auditory Processing
PD 082

How musical training and perceptual history modulate alpha-band dynamics underlying audiovisual speech integration

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The process of perceiving speech relies on combining auditory and visual cues, influenced by both sensory and cognitive factors. Research indicates that musical expertise improves the fusion of multiple senses, and past perceptual experiences can adjust future sensory interpretations. This research investigated the combined impact of these elements on cortical alpha rhythms during the perception of audiovisual speech.
Musicians and age-matched nonmusicians participated in a McGurk illusion experiment with EEG monitoring. The analysis covered five conditions defined by stimulus type and perceptual outcomes. While the groups showed no differences in behavioral vulnerability to the McGurk effect, examinations at the source level uncovered unique alpha-band changes. Musicians displayed less frontal alpha suppression in incongruent-auditory conditions relative to congruent or incongruent-illusory ones, implying enhanced top-down regulation. Conversely, nonmusicians demonstrated increased parietal alpha suppression. Moreover, illusory perceptions were observed even in trials with audio alone. Subsequent examinations showed no notable clusters of alpha modulation in musicians, whereas nonmusicians displayed alpha changes in temporal regions that varied based on the consistency of prior audiovisual stimuli.
The results imply that musical expertise could affect the cortical processes for combining auditory and visual cues in speech recognition. In particular, musicians seem to utilize stronger executive oversight from frontal brain areas, while nonmusicians depend more on bottom-up sensory mechanisms supported by parietal and temporal areas. Additionally, adjustments based on prior perceptions might be more evident in nonmusicians, in contrast to musicians who prioritize immediate sensory data, thereby lessening their dependence on past experiences.

Keywords: Musical training, Perceptual history, Audiovisual information

Posters

Auditory Processing
PD 083

FREQUENCY FOLLOWING RESPONSE (FFR) IN CHILDREN WITH SCHOOL DIFFICULTIES AND STROKE: ANALYSIS USING DESCRIPTIVE STATISTICS AND ARTIFICIAL INTELLIGENCE

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Objective: To analyze Frequency Following Response (FFR) data in different groups of children, using both descriptive statistical methods and artificial intelligence (AI) techniques.

Methods: This study was approved by the Research Ethics Committee (approval no. 2.116.400). A total of 101 children with normal hearing thresholds and normal performance in cognitive screening were included. Participants were divided into three groups: GI (learning difficulties – 33 children aged 7–12 years), GII (stroke – 10 children aged 7–15 years), and GIII (58 typically developing children aged 7–13 years with normal peripheral and central auditory function). FFR recordings were obtained from the right ear, using two blocks of 3000 stimuli each, with the syllable /da/ (40 ms duration), presented at 80 dB nHL, alternating polarity, and a 100–3000 Hz band-pass filter. Descriptive statistical analysis was performed using the Bootstrap technique, with a 95% confidence interval (CI) and significance level of $p < 0.05$. For AI analysis, preprocessing ensured label reliability, followed by exploratory analysis. Data partitioning was conducted per participant, ensuring that the same individual was not shared across training, validation, and test sets.

Results: Statistically significant differences were observed among groups for the amplitude of peaks D ($p = 0.01$) and E ($p = 0.02$), and a near-significant difference for peak F ($p = 0.053$). When analyzing the grand average waveforms across groups, morphological differences in the FFR were evident. In the AI analysis, the model was able to identify individual participants rather than their respective groups, as it primarily learned the unique neural signature of each child.

Conclusion: The FFR differentiated the groups when analyzed using descriptive statistics. However, in the AI-based analysis, the model identified individual subjects but was unable to categorize groups, likely due to the limited sample size.

Keywords: Auditory perception, Auditory physiology, Auditory brainstem evoked responses

Posters

Auditory Processing
PD 084

Speech audibility in learning spaces: Real-time measurement of teacher signal-to-noise ratio in classrooms

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Consideration of hearing technology solutions for children with hearing deficits including auditory processing disorder, and in particular the necessity or not for remote microphones, requires assessment of speech audibility in classrooms. Because privacy issues preclude recording of classroom lessons for analysis, we devised and implemented a real-time method of measuring the signal-to-noise ratio (SNR) of teachers' voices in learning spaces.

A microphone on a mini stand that can be positioned anywhere among students transmits signal and noise for analysis to a processor located at the back of the room. A teacher-worn microphone notifies the processor when the teacher is speaking. Noise levels are measured in the spaces between utterances for comparison with teacher voice levels.

In a large shared learning space with multiple groups and teachers, SNRs were often in the 0-5dB range or lower. When groups of children were moved into an enclosed space SNRs of 25dB or more were recorded.

Keywords: Classroom noise, Signal-to-noise ratio, Teacher voice

Posters

Auditory Processing
PD 085

Effects of noise on listening effort in older adults with normal hearing

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Objective: Older adults, even without hearing loss, often experience difficulty interpreting speech in noisy environments possibly due to cognitive factors (Füllgrabe et al, 2015). However, the underlying mechanisms remain unclear. Pichora-Fuller et al. (2016) define listening effort (LE) as the deliberate allocation of cognitive resources to overcome obstacles during listening tasks. Here, we examined the speech perception difficulties observed in older adults subjectively and objectively, focusing on LE.

Methods: The participants were older adults with hearing thresholds better than 25 dB HL. A number-recognition task was conducted under two noise conditions (S/N −5 dB and +5 dB). Three-digit numbers were presented with multitalker noise during the encoding interval. The participants judged whether the number given in the encoding interval also appeared in the retrieval interval. After all trials, the participants rated their subjective LE for each condition on a visual analog scale (VAS). The median accuracy, reaction time, and VAS ratings were calculated and compared with those previously reported for young adults with normal hearing (Nishida et al, 2024).

Results: Accuracy slightly decreased under the S/N −5 dB condition. Reaction times were consistently longer in older adults than in young adults under both noise conditions. Within the groups, the older adults exhibited marked differences. The VAS scores increased with more demanding noise load, reflecting greater listening effort. This effect was more pronounced in older adults.

Conclusions: In older adults, considerable differences were observed in reaction times and subjective VAS ratings, whereas in young adults, such differences were evident only in VAS ratings. These findings indicate that older adults are influenced by noise, both subjectively and objectively. This pattern is consistent with our previous results in young adults with hearing loss (Nishida et al, 2024), suggesting that noise reduction strategies may help reduce LE even in older adults with normal hearing.

Keywords: Listening effort, Aging, Background noise

Posters

Auditory Processing
PD 086

Changes in Cortical Auditory Evoked Potentials by Ipsilateral, Contralateral, and Binaural Speech Stimulation in Normal-Hearing Adults

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Cortical auditory evoked potentials (CAEPs) reflect neural activity of the auditory cortex in response to sound stimulation and provide an objective measure of auditory processing. While CAEPs have been used to assess cortical maturation or hearing rehabilitation outcomes, little is known about how cortical responses vary depending on the side of auditory input. This study aimed to investigate the effects of ipsilateral, contralateral, and binaural stimulation on CAEP waveforms using different speech sounds in normal-hearing adults.

Sixteen right-handed adults (aged 23–33 years) with normal hearing were tested using the HEARLab system. CAEPs were recorded at Cz following ipsilateral, contralateral, and binaural stimulation with three speech tokens (/m/, /g/, /t/) presented at 65 dB SPL. Amplitudes and latencies of P1, N1, and P2 components were analyzed and compared using repeated measures ANOVA with Bonferroni correction ($p < .05$). All participants exhibited identifiable P1–N1–P2 waveforms. Contralateral stimulation elicited significantly larger P2–N1 amplitudes than ipsilateral stimulation ($p < .01$), mainly due to greater P2 amplitudes, but comparable responses to binaural stimulation. Bilateral stimulation produced shorter N1 and P2 latencies than unilateral stimulation. Among speech sounds, /m/ elicited the largest P2–N1 amplitude during ipsilateral stimulation, while /t/ produced the largest P2–N1 amplitude during bilateral stimulation. P1 amplitudes were generally smaller for ipsilateral input. Cortical encoding of sound varies according to input side and spectral characteristics of speech stimuli. Contralateral stimulation evokes stronger cortical responses, suggesting it may be optimal for CAEP recording. These findings highlight the importance of standardized speech stimuli and stimulation conditions when assessing cortical auditory function or rehabilitation outcomes.

Keywords: Cortical auditory evoked potential, Auditory cortex, Speech stimulation

Posters

Auditory Processing
PD 087

Developmental Effects and Dichotic Advantage in the Digits-in-Noise Test for Children Aged 5–12 Years

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Purpose: Digits-in-noise (DiN) tests are widely used to assess speech-in-noise perception. While adult performance on the DiN test is well documented, developmental effects in children remain less understood. Additionally, dichotic paradigms, where noise and signal are presented to opposite ears, may yield substantial binaural benefit, but their effect in children has not been systematically examined. This study investigated age-related changes in monaural DiN thresholds in children and quantified the dichotic advantage by comparing standard diotic and ear-segregated presentations.

Method: Data were obtained from 122 children aged 5–12 years with normal-hearing (≤ 20 dB HL at 0.5, 1, 2, and 4 kHz). Each completed monaural left (L_din) and right (R_din) conditions. A subset of 14 participants also completed three binaural configurations: diotic (B_din) and two dichotic conditions including noise-left/signal-right (LNRS) and noise-right/signal-left (LSRN). Digit triplets were presented in speech-shaped noise via headphones, with adaptive SNR adjustment to determine speech recognition thresholds (SRTs). Linear regressions assessed the effect of age on monaural SRTs, and paired t-tests compared diotic and dichotic SRTs.

Results: Age significantly predicted monaural SRTs (R_din: $\beta = -0.55$ dB/year, $R^2 = 0.28$, $p < .001$; L_din: $\beta = -0.530$ dB/year, $R^2 = 0.29$, $p < .001$), indicating roughly 0.5 dB/year improvement. Dichotic conditions yielded large advantages over diotic presentation (B_din: –7.76 dB SNR; LNRS: –16.98 dB SNR; LSRN: –17.02 dB SNR). Compared with the diotic condition, LNRS improved SRTs by 9.22 dB SNR and LSRN by 9.26 dB SNR.

Conclusion: Monaural DiN thresholds improve significantly with age, reflecting maturation of speech-in-noise processing in children. Ear-segregated dichotic presentation produces a robust binaural advantage, supporting its potential for assessing pediatric binaural processing. These findings highlight the clinical utility of the DiN test in evaluating speech-in-noise perception in childrens.

Keywords: Digit-in-Noise Test, Speech in Noise, Dichotic Listening

Posters

Auditory Processing
PD 088

Testing auditory processing capacity using summary statistical tasks

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Purpose and background: Estimates of auditory processing capacity in short-term memory typically involve verbal or counting tasks (e.g, digit span, nonword repetition, n-back tasks). However, daily auditory processing often involves non-verbal sounds as well (e.g, footsteps, knocks, animal sounds). Here we investigate auditory processing capacity using summary statistical tasks requiring averaging and recognition of non-verbal simple sounds with different pitches.
Procedure: Absolute pitch (AP) listeners (n=14), musically experienced non-AP listeners (n=16), and non-musicians (n=20) performed discrimination experiments with pure tones. In Experiment 1 ("tone averaging"), a set of six tones with random frequencies was presented, followed by a single comparison tone. Participants were asked to estimate the set's mean pitch and to judge whether this pitch was higher than that of the comparison tone. In Experiment 2 ("tone recognition"), they judged whether the single comparison tone had been part of the set.
Results: In the averaging task, AP listeners showed a significantly higher percentage correct (85.28%) than both non-AP listeners (78.00%) and non-musicians (73.91%), while the latter two groups did not differ significantly. The just noticeable differences (JNDs) also significantly differed between AP listeners and the two other groups, but not between the non-AP listeners and the non-musicians. Furthermore, the Points of Subjective Equality (PSEs) were in between -0.15 and +0.07 semitones, showing high overall accuracy with no significant differences between the groups. The recognition task yielded similar results: AP listeners (percentage correct: 79.16%) significantly outperformed both other groups, but there was no significant difference between non-AP listeners (66.14%) and non-musicians (60.41%).
Conclusion: These findings suggest that performance in pitch averaging and recognition reflects auditory short-term memory processing capacity independent of musical training, with only AP possession conferring a significant advantage. Together, auditory summary statistical tasks could form a suitable addition to the current auditory (short-term) memory testing battery.

Keywords: Auditory memory, Pitch perception, Summary statistics

Posters

Auditory Processing
PD 089

Influence of Yoga Practice on Temporal Processing and Working Memory in Adolescents

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Background:
Yoga has been widely recognized for its positive influence on overall physiological functions, including the auditory system. Specific yoga postures are believed to enhance oxygenated blood circulation to the cochlea, activate hippocampal regions, and strengthen the efferent auditory pathways, thereby facilitating improved auditory processing abilities.
Aim:
The present study aimed to evaluate temporal processing skills and working memory abilities among adolescents with and without yoga training.
Method:
Fifty-two adolescents aged 12–16 years participated in the study and were divided into two groups. Group 1 comprised 26 adolescents with a minimum of one year of yoga training, while Group 2 included 26 adolescents without any yoga experience. Temporal processing abilities were assessed using the Gap Detection Test, Modulation Detection Test, and Duration Discrimination Test. Working memory was evaluated through the Forward and Backward Digit Span Tests.
Results:
Adolescents with yoga training demonstrated significantly smaller gap detection and duration discrimination thresholds and larger modulation detection thresholds compared to those without yoga training, indicating enhanced temporal processing skills. Additionally, superior forward and backward digit span scores were observed among yoga-trained adolescents, reflecting improved working memory performance.
Conclusion:
The findings suggest that regular yoga practice positively impacts auditory temporal processing, attention, memory, and executive functioning. Incorporating yoga into educational and therapeutic frameworks may serve as a beneficial strategy to enhance cognitive and auditory development, thereby promoting overall well-being among adolescents.

Keywords: Yoga practice, Auditory processing, Adolescents

Posters

Auditory Processing
PD 090

The effect of increased right ear advantage in dichotic listening on speech perception in noise performance among older adults

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Background: Evidence suggest that a small right ear advantage (REA) in dichotic listening (DL) tasks implies effective processing of binaural information during activities involving the simultaneous presentation of competing stimuli. Older adults exhibit a large REA for dichotic listening. Such deficit may impact older adults' capacity to process competing binaural information thereby affecting speech perception in noise (SPiN) abilities.

Objective: To investigate whether speech perception in noise abilities differ between older adults that exhibit differences in the magnitude of the REA for DL tasks.

Design: Sixty-three older adults with normal hearing for their age participated in this study. A dichotic digit test was used to evaluate DL abilities, specifically the binaural integration process. Participants with a left ear advantage for dichotic listening were excluded from the research. All the participants selected for the study were then divided into three groups according to their REA index: a no REA group (nREA; n = 16), a lower REA (lower than or equal to 10%) group (n = 28), and a Higher REA (greater than 10%) group (n = 19). The Hearing-in-Noise Test (HINT) was used to evaluate SPiN performance. The HINT was conducted in three different listening conditions. Also, the HINT composite score was calculated to provide a single index of overall speech recognition in noise.

Results: Results showed significantly worse SPiN scores for the Higher REA group compared to the Lower REA and nREA groups but only for the HINT left ear and HINT composite. Scores for the HINT noise-front and HINT right ear were not significantly different between groups.

Conclusion: Older adults with a large REA for DL perform worse in SPiN tasks compared to older adults with either a small or a no REA for DL.

Keywords: Dichotic listening, Speech perception in noise, Older adults

Posters

Auditory Processing
PD 091

The Importance of Breastfeeding on The Auditory System, Speech and Language: A Narrative Review

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Purpose: The type of feeding has different effects on various parts of the body, and the effects of breastfeeding on the auditory system, speech and language has also been confirmed. The aim of this study is to provide a comprehensive review of various studies conducted on the effects of different feeding types on the auditory system, speech and language.

Methods: We performed an extensive search across various databases, such as Medline , Google Scholar, Science Direct, and the Cochrane Library, with no time limitations. The search terms included: "breastfeeding," "formula feeding," "bottle feeding," "auditory system," "speech," and "language." Initially, we selected 65 relevant papers. From this collection, we purposefully sampled 43 papers that were most pertinent to the topic of the effects of type of feeding on the auditory system, speech and language, ensuring they met our inclusion criteria.

Result: Breastfeeding has different effects on various aspects of hearing, speech, language, and cognition in children compared to formula feeding. Breastfeeding, as a protective factor against middle ear changes, improves middle ear health and reduces the risk of middle ear infections, as well as improves Eustachian tube function. Breastfeeding also improves results in hearing tests including tympanometry, transient evoked otoacoustic emissions , central auditory processing, and auditory brainstem responses . Breastfeeding is associated with better speech and language development, including verbal intelligence, better receptive and expressive language, improved language skills, sentence formation, and the natural development of oral-motor skills necessary for speech production. It also strengthens the emotional bond between mother and child through closer interactions during breastfeeding, leading to cognitive and communicative development.

Conclusion: breastfeeding not only meets physical and motor needs but also contributes to optimal functioning of the peripheral and central auditory systems. It plays a significant role in enhancing communication skills, speech and language development, and related abilities.

Keywords: Auditory system, Breastfeeding, Speech

Posters

Auditory Processing
PD 092

Assessing the different types of listening difficulty in noise in adults with normal or near-normal hearing

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Background and aim
The aim of this study is to investigate the presence and causes of self-perceived listening difficulty in noise in adults with normal or near-normal hearing thresholds.

Methods
A comprehensive test battery was given to two groups comprising a total of 62 individuals with confirmed clinical normal, or near-normal, hearing: (1) people who self-declare listening difficulty in noise; and (2) people who do not perceive such difficulties. Their low-level auditory functioning was assessed using a range of listening tasks designed to tap into different auditory abilities, including non-speech based tests of auditory processing, and the Language Independent Speech In Noise and Reverberation test (LiSN-R), which measured phoneme identification in noise, ability to use spatial cues to segregate target sounds, and the impact of reverberation on speech sound identification. High-level cognitive and language abilities were assessed using a short-term and working auditory memory test (DigiSpan, forwards and backwards) and an auditory closure test (AudiCloze). Sentence understanding in noise was assessed using the Test of Listening Difficulties - Universal (ToLD-U).
Finally, self-perceived listening ability was assessed using the subjective counterpart of ToLD-U (ToLD-US) in which people estimate the proportion they understand at different signal-to-noise ratios; and questionnaires, such as the Image-Based Questionnaire for Hearing (IBQ-H), the Revised Hearing Handicap Inventory (RHHI) and a sub-set of the Speech, Spatial and Hearing Qualities Questionnaire (SSQ).

Results and conclusion
Self-declared difficulties hearing in noise were consistent with the various questionnaire scores. However, a deficit in speech perception in noise could be demonstrated for only half of the people reporting such difficulties. For some, the observed deficit could be attributed to high level cognitive or language deficits; while for a smaller subset, low-level auditory deficits were involved.

Keywords: Listening in noise difficulty, Self-perceived listening ability, Auditory processing

Posters

Auditory Processing
PD 093

Association between socioeconomic status and auditory processing skills among university students

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Background: Auditory processing skills (APS) are essential for effective communication and learning. Although socioeconomic status (SES) has been linked to poorer APS in children, evidence in adults is scarce. SES influences access to education, language exposure, and cognitive stimulation, factors that may shape auditory performance across the lifespan. This study examined the association between SES, operationalized through institutional selectivity, and APS in Chilean university students.

Methods: Forty-five students with normal hearing (median age = 22 years) were recruited from a highly selective university (HSU, n = 15), a low selective university (LSU, n = 15), and a professional institute (PI, n = 15). APS were assessed with the Dichotic Digits (DD), Pitch Pattern (PPS), Duration Pattern (DPS), and Filtered Speech (FS) tests. Group comparisons used Kruskal–Wallis and fractional regression models adjusted for maternal education and cognitive variables.

Results: Significant between-group differences emerged for DD (left ear: $\chi^2 = 12.57$; $p = 0.002$), PPS (right: $\chi^2 = 9.21$; $p = 0.010$; left: $\chi^2 = 8.21$; $p = 0.017$), DPS (right: $\chi^2 = 6.81$; $p = 0.033$), and FS (right: $\chi^2 = 7.42$; $p = 0.024$; left: $\chi^2 = 6.08$; $p = 0.048$) tests. Adjusted models confirmed that PI and LSU students performed significantly worse than HSU peers in DD (left ear: $\beta = -1.71$; $p = 0.003$ and $\beta = -1.97$; $p = 0.003$) and FS (right ear: $\beta = -1.15$; $p = 0.002$; left ear: $\beta = -0.84$; $p = 0.006$).

Conclusions: After controlling for maternal education and cognitive variables, institutional selectivity, used as an SES proxy, remained associated with APS performance. Students from higher-SES contexts demonstrated superior auditory processing, suggesting that SES-related disparities in auditory mechanisms may extend into adulthood.

Keywords: Auditory processing, Socioeconomic status, Higher university education

Posters

Auditory Processing
PD 094

Study of spatial processing in children with a history of otitis media

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Introduction: Recurrent otitis media (OM) can cause temporary hearing deprivation, negatively affecting the development of central auditory pathways, especially Spatial Processing (SP), a crucial skill for understanding speech in noisy environments. Objective: The aim of this study was to analyze Spatial Processing and Central Auditory Processing in children with a history of otitis media, with and without cleft lip and palate. Methodology: A total of 82 children, aged 6 to 10 years, both male and female, participated and were divided into three groups: Control Group (CG), with no history of OM; Experimental Group I (EGI), with cleft lip and palate and OM; and Experimental Group II (EGII), with a history of OM treated with ventilation tubes. Audiological tests, behavioral assessment of Central Auditory Processing (DD, TPF, GIN, PSI/SSI), and the PROSER test—an instrument specifically designed to assess SP in Brazilian Portuguese—were conducted. Results: PROSER data showed that both EGI and EGII performed worse than CG in all test conditions. The largest difference was observed in the Same Voice at 90° (SV90°) condition, in which CG performed better than EGII (p=0.001). Regarding Spatial Advantage, the control group obtained higher values, a condition related to the position of the competing sound source, meaning they had greater ease in using spatial cues to recognize the target message. Still concerning Spatial Advantage, EGII showed worse performance with a statistically significant difference compared to CG (p=0.047). In the assessment of CAP, groups with a history of OM showed poorer performance than CG in all tests, with significant differences in binaural integration (p<0.001), figure-ground (p<0.001) and temporal ordering(p=0.014).Conclusion: Sensory deprivation resulting from OM negatively affected Spacial Processing and other auditory skills, impairing their ability to focus on target messages in noisy environments and to suppress competing stimuli coming from different direction.

Keywords: Otitis media, Children, Spatial processing

Posters

Auditory Processing
PD 095

PLC-IP3 signaling regulates sensory hair cell formation in zebrafish neuromast

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Sensorineural hearing loss results primarily from irreversible damage to sensory hair cells (HCs), and regenerative strategies remain limited by incomplete functional maturation of newly generated cells. Here, using pharmacological perturbation, single-cell transcriptomics sequencing (scRNA-seq), and genetic analysis in zebrafish neuromasts, we identify phosphoinositide-specific phospholipase C (PLC) signaling as an intracellular regulator of HC development and maturation. Activation of PLC signaling increases HC number and enhances mechanoelectrical transduction (MET) function, whereas inhibition reduces HC number and impairs sensory-driven behavior. Single-cell trajectory and RNA velocity analyses reveal that PLC signaling does not alter lineage topology but instead accelerates SC-to-HC state transitions along an existing developmental continuum. Among PLC isoforms, plcd4a is selectively enriched in HCs and is both necessary and sufficient to promote HC differentiation and maturation in vivo. Mechanistically, PLC-IP_3 signaling functions downstream of Notch/Wnt pathways to coordinate fate progression with terminal mechanosensory specialization. These findings show PLC signaling as an intracellular coupling node that links lineage commitment to functional maturation and suggest a strategy for overcoming maturation bottlenecks in HC regeneration.

Keywords: PLC signaling, Plcd4a, Hair cell maturation

Posters

Global Audiology and Public Health
PD 096

Geospatial mapping of otitis media and social determinants in remote Australian communities

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Background
Otitis media (OM) is a critical public health concern in remote Northern Territory (NT) communities, particularly among Aboriginal children, where it contributes to hearing loss, developmental delays, and broader social challenges. While biological and environmental risk factors are well documented, there is limited insight into how social determinants—such as housing, education, and access to healthcare—affect OM prevalence.

Methods
A ten-year dataset (2014–2024) from NT Hearing Services was analysed using Power BI with ArcGIS to visualise OM clusters.
• Phase 1: Community-level mapping with geocoordinates and linkage of OM subtypes and associated hearing loss.
• Phase 2: Development of a 100-point index incorporating census-based social indicators, weighted for relevance to OM.
• Phase 3: Application of AI tools and regression modelling to examine temporal patterns and quantify associations between social determinants and OM prevalence.

Results
Phase 1 has been completed, including geospatial mapping and data linkage of OM and hearing loss across communities. Phases 2 and 3 are ongoing, focusing on creating the social determinant index and selecting appropriate AI tools for modelling.

Conclusion
This study highlights the value of geospatial AI in identifying hidden patterns and supporting targeted, community-specific interventions. The interactive mapping interface will empower policymakers and community stakeholders to visualise data at the local level and prioritise responses based on key social risk factors. Final results aim to inform equitable, data-driven strategies to improve ear health outcomes for Aboriginal children in the NT.

Keywords: Otitis media, Aboriginal health, Geospatial mapping

Posters

Global Audiology and Public Health
PD 097

Audiology Technician Training in Cameroon

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Background: In Cameroon, hearing services are significantly limited in local healthcare clinics and regional hospitals due to a lack of and unequal distribution of specialists and supplies. This often means that the majority of hearing assessment and treatment is conducted by less experienced private sector providers further limiting accessibility due to cost. To address these concerns, a global coalition has launched a project to develop and enhance hearing healthcare across the country. Part of this targeted initiative is to train hearing technicians

Aims/purpose: The aim of this hearing technician specific project is to create a sustainable training program in which technicians will be able to provide specialty services and facilitate the training others. The purpose is to create extended access to population-based audiology services.

Methods:
1) Collaborate with partners and local experts to develop and translate comprehensive training and trainer manuals including exercises, case studies, interactive resources, and videos.

2) Train Audiology Technicians for primary clinical practice and as trainers of audiology assistants in: anatomy, physiology, ear disease, hearing screening and recognition of hearing impairment across the life course, performance of audiometric test battery, identification of hearing impairment, management options, hearing aid maintenance and repairs, and referral to secondary assessment.

Results: Training was implemented in August 2025. Mid term and final exams were utilized to assess participants' knowledge gain and evaluate the effectiveness of the training. Evaluation forms collected feedback from participants on content and methodology.

Conclusion:
The project will provide training and create deliverables that ensure post-training, the technicians are able to conduct hearing screenings for all age groups and offer specialized audiological tests for adults and children increasing access to hearing healthcare services and subsequent improvement in communication and quality of life for the hearing impaired population in Cameroon.

Keywords: Global, Education, Training

Posters

Global Audiology and Public Health
PD 098

What insights can health professionals provide into the resourcing of ear health evaluation programs for Aboriginal and Torres Strait Islander children?

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Background: Aboriginal and Torres Strait Islander children experience some of the highest rates of otitis media in the world. In Australia, targeted ear health evaluation programs exist to facilitate early, detection diagnosis and management of otitis media amongst Aboriginal and Torres Strait Islander children. There is significant diversity amongst these programs in terms of types of health professionals employed, cultural and geographic contexts and the models of care used. Previous studies have suggested that program resourcing may be a concern for some health professionals. We therefore aimed to examine health professional perceptions of resourcing across ear health evaluation programs for Aboriginal and Torres Strait Islander children.

Methods: Health professionals working in ear health evaluation programs for Aboriginal and Torres Strait Islander children across the central corridor of Australia were sought to complete an online survey examining their resource awareness, use and confidence in use. Survey outcomes were descriptively analysed to examine the differences in reported resourcing by profession, program type and geographic region.

Results: 102 responses were received from the survey which was open between June 2026 and October 2026. The trends in survey responses in terms of resource access, use and confidence in use, will be discussed in light of existing literature. The influence of profession, program type and geographic region will also be discussed.

Conclusions: This research has engaged with health professionals to provide insights and recommendations for resourcing of ear health evaluation programs for Aboriginal and Torres Strait Islander children in Australia. In comparing responses across professions, programs and geographic regions, we are about to make targeted recommendations to inform advocacy and funding activities within the ear health sector.

Keywords: Aboriginal and Torres Strait Islander Health, Otitis Media, Public Health

Posters

Global Audiology and Public Health
PD 099

Development and Validation of the Korean HEAR-COMMAND Tool: An ICF-Based Approach to Hearing and Communication Assessment

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Hearing loss imposes significant barriers to communication, social connection, economic independence, and psychosocial well-being. As the World Health Organization (WHO) advocates for an "integrated people-centered approach", it is important to conceptualize the relationship between hearing loss and other aspects of one's well-being based on the WHO International Classification of Functioning, Disability and Health (ICF) Core Sets for Hearing Loss (CSHL).

This study presents the translation, cultural adaptation, and validation of the HEAR-COMMAND Tool into Korean, a self-report instrument grounded in the ICF-CSHL. It was developed to support a person-centered, biopsychosocial model of hearing healthcare, enabling a standardized assessment of functioning across body functions, activities, participation, and contextual factors. Its cross-cultural adaptation addresses a critical need for ICF-based tools that are linguistically and culturally appropriate for Korean-speaking populations worldwide.

A systematic six-step translation process was conducted under the guidance of four Korean faculty members. Initial translation was performed by two nursing faculty to ensure conceptual fidelity to the original instrument. This draft was subsequently reviewed by a bilingual linguist specializing in English-Korean translation for linguistic accuracy, and then by a faculty member in speech-language and hearing sciences for cultural and clinical appropriateness. The translated tool was then evaluated by 10 Korean-speaking adults for readability, cultural relevance, and accessibility, leading to revisions based on their feedback. Finally, input from five Korean American professionals in healthcare and academia informed further refinements, culminating in a beta version of the HEAR-COMMAND Tool–Korean.

The translation and cultural adaptation of the HEAR-COMMAND Tool into Korean represents an advancement in addressing the hearing healthcare needs of the Korean population in the USA. Grounded in the ICF, this tool facilitates hearing-related assessments that can be used more broadly among all Korean-speaking individuals worldwide. Future research should validate this tool and examine its impact in clinical settings.

Keywords: Hearing healthcare access, Hearing loss, International Classification of Functioning, Disability and Health

Posters

Global Audiology and Public Health
PD 100

Bridging the Healthcare Gap: Advancing Health Equity for Individuals with Intellectual and Developmental Disabilities

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Background: People with intellectual and developmental disabilities (IDD) face significant health disparities, due to gaps in education and health care access. Special Olympics addresses these disparities through the Healthy Athletes® program, which includes Healthy Hearing—a discipline offering free audiologic screenings, hearing aid support, and referrals for follow-up care to people with IDD. The program aims to detect hearing issues early, promote regular screenings, and connect athletes to community-based care. Despite this, a critical gap persists between screenings and follow-up care.

Purpose: This study examines the discrepancy between referrals given at Special Olympics Healthy Hearing screenings and the subsequent care athletes report accessing within their communities.

Methods: Special Olympics athletes aged eight and above participated in standardized Healthy Hearing screenings conducted by volunteer audiologists and speech-language pathologists. Screening results, including referrals, were entered into a health database. Additional follow-up data was collected via semiannual program reports, with athletes self-reporting care ideally accessed 2–4 weeks after screenings. Data analyzed spans Jan 1, 2020 – Jun 30, 2025.

Results: Over this period, 33,768 global audiologic screenings were conducted, resulting in 8,681 referrals for further care. Of those referred, 69% reported having a place to go for follow-up care, but only 34% of the total referred confirmed receiving the recommended care for which they were referred.

Conclusions: The findings underscore the critical need for accessible hearing health care services among Special Olympics athletes with IDD, even when free screenings and referrals are provided. Barriers include provider availability, transportation, financial constraints, and insufficient information about resources. The gap between screening and receipt of care underscores the need for stronger collaboration among health professionals, Special Olympics staff, and communities to support athletes navigate the pathway to care. Ongoing research is needed to identify barriers, implement targeted interventions, and improve long-term hearing outcomes for this underserved group.

Keywords: Intellectual and Developmental Disabilities, Hearing Loss, Special Olympics International

Posters

Global Audiology and Public Health
PD 101

Railway noise and community conversations: A decolonizing perspective of sound and hearing in Sri Lanka

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Objective: This study explored the lived experience of a community in Ragama, Sri Lanka exposed to railway noise and their relationship with sound and hearing.
Background: This study explored the experiences of residents living near railway tracks and how they engaged with their soundscape. Soundscapes are shaped by person-place-activity interactions and are deeply influenced by social context. While studies often quantify railway noise and its auditory and non-auditory effects, qualitative research highlight how community perceive and experience noise. This study used an integrated framework combining Schafer's soundscape theory, decolonizing methodologies & Community-Based Participatory Research to investigate community experiences of sound and hearing. It centered culturally grounded, lived experiences challenged by Western perspectives and emphasized sound's social, emotional, spiritual and political aspects to inform commuinity-driven hearing health initiatives.
Methods: A modified Community-Based Participatory design was used to collect data, through individual interviews with 15 residents of a community who was exposed to railway noise. Data analysis was guided by Braun & Clarke's framework of thematic analysis.
Results: Findings revealed four themes: 1) Social and cultural negotiation of sound and hearing perceptions; 2) Adaptation and emotional engagement with environmental sounds; 3) Hearing in daily life and well-being, and 4) Challenges and barriers in addressing hearing loss.
Conclusions: This study describes how community members exposed to railway noise in Sri Lanka engage in conversations concerning sound and hearing care through a decolonizing perspective. It highlights the importance of respecting local participation levels and addressing power, colonialism and context when applying Global Northern research models in Global South settings.

Keywords: Hearing, Lived experience, Railway noise

Posters

Global Audiology and Public Health
PD 102

Factors influencing the professional quality of life in South African audiologists

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Background: Audiologists in South Africa operate within a complex, under-resourced healthcare system where high caseloads, limited institutional support, and emotional demands impact their professional quality of life (ProQOL). While international studies have explored the ProQOL among various healthcare professionals, little is known about the contextual and psychosocial factors influencing the ProQol among audiologists, particularly in in low- and middle-income settings.

Purpose: This study explored the factors influencing the professional quality of life of South African audiologists

Methods: A qualitative descriptive design was employed, involving semi-structured interviews with 15 South African audiologists who were purposively recruited. Data were analysed thematically using Braun and Clarke's (2006) approach, guided by Resilience Theory, which conceptualises resilience as a dynamic process of positive adaptation to adversity.

Results: Six overarching themes emerged: (1) Compassion satisfaction and professional fulfillment from improving patients' lives and mentoring others; (2) Burnout and emotional exhaustion: fatigue, frustration, and reduced empathy due to workload and resource constraints; (3) Secondary traumatic stress and compassion fatigue: emotional strain from repeated exposure to patient suffering and moral distress; (4) Resilience and coping mechanisms: adaptability, perseverance, teamwork, and emotional regulation that sustain professional functioning; (5) Support systems and organizational resources: the critical role of managerial guidance, teamwork, and mental health services; and (6) Personal and professional coping strategies: including rest, exercise, faith, therapy, and boundary-setting. These themes demonstrate how emotional labour, systemic challenges, and resilience interact to shape audiologists' professional well-being.

Conclusion: The study highlights the need for contextually responsive interventions that strengthen resilience, enhance peer and supervisory support, and address systemic barriers. Investing in organizational well-being and equitable resource allocation is essential to sustain the South African audiology workforce and improve care outcomes.

Keywords: Audiologists, Professional quality of life, South Africa

Posters

Global Audiology and Public Health
PD 103

Promoting Healthy Hearing Over the Lifespan

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There is mounting evidence that good hearing is related to healthy living. Hearing impairment in adults is associated with a long list of common chronic diseases and unhealthy lifestyle factors. This scientific literature review summarizes peer-reviewed published research documenting risk factors for hearing loss and related disorders (e.g, tinnitus and auditory processing disorders). The risk factors include comorbid conditions, such as cardiovascular disease, hyperlipidemia, diabetes, kidney disease, and dementia. Scientific literature documenting selected lifestyle factors is also reviewed, specifically smoking and inadequate exercise. The review also emphasizes the importance of the administration of a patient-specific diagnostic test battery consistlng of senstive and specific auditory procedures selected on the basis of patient history and chief complaint. The link between the pattern of auditory test findings and patient management, including referral to other health care professionals, is clearly defined. Audiologists are encouraged to collaborate closely with primary care physicians and relevant medical specialists to increase the likelihood of preventing or mitigating the development of hearing loss over the lifespan.

Keywords: Hearing loss, Comorbid conditions, Lifestyle factors

Posters

Global Audiology and Public Health
PD 104

Building Bridges: Interprofessional Collaboration Between Hearing Care Professionals and Spoken Language Interpreters

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Objectives:
Professional interpreters enable equitable access to hearing healthcare for people from diverse ethnic communities with limited English proficiency. We explored factors influencing collaboration between hearing care professionals and spoken language interpreters.
Methods: A concurrent multilevel mixed-methods approach was used to examine collaboration between audiologists/audiometrists and spoken language interpreters. Data collection involved online surveys and qualitative interviews. The study surveyed 241 participants across Australia, including 83 clinicians (mean age = 37.6 years, 87.8% female) and 158 interpreters (mean age = 51.0 years, 69.0% female). Additionally, 33 in-depth semi-structured interviews were conducted with 18 clinicians and 15 interpreters. The Interprofessional Collaborative Practice (IPC) framework guided qualitative analysis, while descriptive statistics and chi-squared (χ^2) tests were used to model relationships between variables.
Results: During hearing appointments, interpreters reported difficulties with specialised audiology terminology (13%) and client comprehension (15%). Face-to-face communication was preferred by clinicians (63%) and interpreters (70%), with interpreters placing greater importance on pre-appointment briefings than clinicians (75% vs 53%). Clinicians working without interpreters struggled with taking patient histories (59%) and understanding clients (57%). Access to free interpreting services (χ^2 = 16.18, $p < .001$) and positive prior experiences (χ^2 = 25.30, $p < .001$) were associated with clinicians engagement with interpreters. Qualitative analysis identified four themes: (a) ethical and cultural complexities in interpreter-mediated care affect trust and professional integrity; (b) role ambiguity and workflow inefficiencies; (c) breakdowns in communication accuracy, adaptability, and modality selection; and (d) gaps in workforce training, interpreter availability, and systemic support.
Conclusions: Effective collaboration necessitates specialised training for hearing care professionals in how to work with interpreters, funding for interpreting, multilingual audiology resources, and feedback on interpreter engagement and patient satisfaction for service development.

Keywords: Healthcare equity, Culturally and linguistically diverse, Interpreting

Posters

Global Audiology and Public Health
PD 105

Association between frequency of adding salt to foods and risk of hearing loss: A population-based cohort study using UK Biobank data

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Objectives: To evaluate the association between the frequency of adding salt to food and the risk of incident hearing loss.
Design: A prospective cohort study.
Setting and participants: 492,168 UK Biobank participants aged 40–69 years who were free of hearing loss at baseline (2006–2010) and followed through 2023.
Measurements: Frequency of salt addition to foods was self-reported and categorized as "Never/Rarely," "Sometimes," "Usually," or "Always." Incident hearing loss was identified using ICD-10 codes H90 and H91. Cox proportional hazards models were applied to estimate hazard ratios (HRs) and 95% confidence intervals (CIs), adjusting for demographic, lifestyle, and medical confounders. Causal mediation analyses were conducted to investigate potential intermediating roles of systemic inflammation and vascular dysfunction.
Results: Over a mean follow-up of 11 years, 19,188 participants developed hearing loss. The incidence rate increased from 3.37 to 4.33 per 1,000 person-years across ascending salt use categories. Compared with the "Never/Rarely" group, the adjusted HR for the "Always" group was 1.23 (95% CI, 1.16–1.32), with a significant dose-response relationship (p for trend <0.001). Subgroup analyses showed stronger associations among younger participants, men, and individuals without diabetes or hypertension. Mediation analysis indicated that systemic inflammatory markers, particularly glycoprotein acetyls and CRP, significantly mediated part of the association, while blood pressure and arterial stiffness did not demonstrate a significant mediating effect.
Conclusions: Frequent addition of salt to food was associated with an increased risk of incident hearing loss in a dose-dependent manner. These findings suggest that salt intake may be a modifiable risk factor for hearing loss and implicate systemic inflammation as a potential biological pathway.

Keywords: Salt intake, Hearing loss, Dietary sodium Aging

Posters

Global Audiology and Public Health
PD 106

Challenges in the Professional Status of Audiologists in Mainland China: A Thematic Analysis of Career Experiences

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Objective: To investigate the professional status of audiologists in mainland China.
Design: A qualitative study employing semi-structured interviews, analyzed using Thematic Analysis following Braun and Clarke's (2006) framework, to identify recurring patterns in audiologists' professional experiences and perceptions.
Study Sample: Fifteen audiologists (12 female, 3 male; aged 24–44 years) from hospitals and educational institutions, representing clinical audiologists, educators, and former audiologists.
Results: Five themes emerged: (1) Limited Professional Recognition: participants reported being mistaken for nurses or ear, nose, and throat (ENT) doctors, undermining their professional identity. Many described lacking diagnostic authority, which restricted their ability to influence patient care, leading to feelings of being undervalued in healthcare settings. (2) Constrained Career Progression: participants noted the absence of a national audiologist certification, forcing reliance on unrelated qualifications. Limited promotion pathways and low salaries prompted some to pursue alternative careers, such as physician roles or administrative positions, seeking better advancement opportunities. (3) Educational Gaps: participants criticized domestic audiology programs for emphasizing theoretical knowledge over clinical training, leaving graduates unprepared for hospital demands. (4) Gender Dynamics: many participants viewed audiology as stable and suitable for women due to regular hours and no night shifts. However, professional success was attributed more to communication skills and ability than gender, indicating nuanced perceptions. (5) AI's Impact: participants predicted automation of routine tasks like pure-tone audiometry, potentially reducing demand for certain roles. However, patient counseling and rehabilitation were seen as irreplaceable.
Conclusions: Audiologists in China face significant barriers in recognition, career advancement, and training. Establishing a national certification, enhancing clinical education, and increasing public awareness are critical to strengthen the profession. These measures can leverage opportunities from growing hearing care demands, positioning audiologists as vital contributors to China's healthcare system.

Keywords: Audiologist, China, Hearing care service

Posters

Global Audiology and Public Health
PD 107

Prevalence of Hearing Loss and its Associations in the Australian Eye and Ear Hearing Survey

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Background: Hearing impairment is one of the leading causes of disability in older adults yet accurate estimates of its prevalence and associations are not well characterised in population studies across many parts of the world. The Australian Eye and Ear Health Survey (AEEHS) was designed to determine the prevalence of hearing impairment (HI) among Indigenous and non-Indigenous adults aged 50+ years in a representative sample of the Australian population.

Methods: The AEEHS utilised a stratified, multi-stage cluster sampling of 30 sites across Australia and was conducted from 2022-2025, with purposeful oversampling of Indigenous Australians. Audiometry, tympanometry, otoscopy and a variety of demographic and health measures were conducted in the AEEHS. Generalised linear mixed models were employed to identify associations between HI and predictor variables.

Results: A sample of 4519 participants were recruited, with 617 (13.6%) Indigenous and 3902 (86.4%) non-Indigenous individuals. The age-standardised prevalences of HI of any level, and of moderate or worse level, were 42.8% (36.8-49.5) and 14.3% (11.0-18.4%) in Indigenous; and 39.4% (37.3-41.8) and 13.2% (12.0-14.5%) in non-Indigenous participants, respectively. Among younger Indigenous participants, moderate or worse HI was almost three times as likely than in similarly aged non-Indigenous participants (9.4% vs 3.2%, among those aged 50-59 years), and twice as likely for Indigenous persons aged 60-69 years (14.3% vs 6.9%).

Conclusion: A small but important gap in the prevalence of hearing impairment is seen between Indigenous and non-Indigenous Australians. A range of modifiable risk factors for HI were identified and offer a potential focus of intervention to reduce the inequality and burden of HI in Australia.

Keywords: Hearing impairment, Australia, Prevalence

Posters

Global Audiology and Public Health
PD 108

The Mahino Project: Bringing clarity to ear health in Tonga with 3D printed otoscopes

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Hearing healthcare across the global Pacific region is delivered by a growing collaborative network of ear, hearing, speech, and education professionals. A variety of challenges, including resourcing and geographic isolation, are major barriers to the development and sustainability of Pacific hearing healthcare services. The prevalence of hearing loss and ear disease in the Pacific region is estimated to be high.

Within the Kingdom of Tonga, primary healthcare services in smaller communities are delivered by a resident or itinerant nurse with basic skills in ear care but limited diagnostic resources. Founded in Tongan values and building on local expertise and infrastructure, the Mahino Project will empower local nurses' clinical capability and decision-making in ear health through the provision of 3D printed otoscopes and localised training. On-site 3D printing technologies at Viola Hospital in Nuku'alofa will be utilised to produce otoscopes; reducing the cost, risks, and environmental impact associated with imported resources. 3D printing also facilitates rapid prototyping and evolution of designs to reflect local needs and preferences.

Initial in-country conversations have confirmed the acceptability, feasibility, and potential impact of this project. Long term evaluation of the end-to-end design, implementation, and community usage of the otoscopes will be carried out using culturally appropriate methodologies including Talanoa.

Through the provision of student nurse training and 3D printed otoscopes as a local resource, the Mahino Project will improve long-term ear health and subsequent hearing health outcomes, while reducing over-referral to limited tertiary healthcare services.

Keywords: Co-design, 3D printing, Pacific healthcare

Posters

Global Audiology and Public Health
PD 109

Recognizing factors impacting audiological evaluation help-seeking behaviors in adult Vietnamese populations in Oklahoma using the Health Belief Model

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Purpose: This study aims to understand the hearing help-seeking behaviors in the Vietnamese population in Oklahoma using the Health Belief Model (HBM), barriers and lack of awareness or knowledge of audiology services. It also aims to measure the relationship between hearing help-seeking behaviors and age, hearing status, hearing aid use, medical history, noise exposure, communication needs, and income. Long-term objective of this research study is to provide knowledge and resources to underrepresented populations in Oklahoma regarding audiology services.

Methods: A cross-sectional online survey will be conducted using a HBM survey with questions measuring six constructs. Twenty participants between the age range of 40-80 years were recruited from the Vietnamese community in Oklahoma City, Oklahoma utilizing the snowball sampling method. These participants all speak Vietnamese as their first language or are simultaneous bilinguals speaking Vietnamese and English.

Results: This study explored attitudes toward hearing health among Vietnamese adults aged 40–80. Participants broadly recognized hearing as essential for effective communication. Over 75% reported they would seek a hearing assessment when experiencing difficulty understanding others, and more than 90% would do so if they suspected hearing loss. Nevertheless, over 65% associated hearing testing with stress, and more than half believed that untreated hearing loss may lead to dementia. Perceptions of hearing aids presented notable barriers. Half of the participants questioned their efficacy and over 60% would not pursue treatment without insurance coverage. Encouragingly, willingness to adopt hearing aids increased when individuals observed positive outcomes in others and when devices were discreet and accompanied by personalized clinical care.

Conclusion: Findings highlight both awareness of hearing health and substantial barriers to help-seeking among Vietnamese adults. Addressing misconceptions, reducing stigma, and improving access to culturally informed audiology services may enhance early intervention and promote more equitable hearing healthcare engagement.

Keywords: Vietnamese, Audiology, Hearing

Posters

Global Audiology and Public Health
PD 110

Developing a Sustainable Online Training Framework to Enhance Audiologist Expertise in Hearing Implant Technology

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Introduction:
The widespread adoption of Tele-Audiology and online learning in recent years has transformed how hearing healthcare practitioners access education and professional development. What began as a response to limited in-person training opportunities has evolved into a sustainable model that enhances accessibility, affordability, and inclusivity in Audiology education. E-learning and blended learning approaches are now integral to both pre-service and continuing professional development, particularly for clinicians in rural and remote areas. However, challenges remain in translating traditional, hands-on training methods into engaging, effective online formats that support skill development and clinical competence.

Methods:
A qualitative research design was employed to describe the development of an online training program on hearing implants for Audiologists in Malaysia and Sub-Saharan Africa. A phenomenological case study captured the experiences of training developers and subject matter experts in adapting conventional instructional content into e-learning and blended learning modules. Learning science principles and learning experience design (LxD) frameworks were integrated into the development process. Feedback from Audiologists participating in the pilot program was collected through an online questionnaire to assess usability, engagement, and perceived learning outcomes.

Results:
Findings highlight that the design and delivery of online training — including interactivity, feedback mechanisms, and communication channels — significantly influence learner engagement and perceived effectiveness. Adult learning preferences, such as self-paced exploration, contextual relevance, and opportunities for collaboration, emerged as critical factors in successful online training design.

Conclusion:
Developments in online education present a unique opportunity to reimagine Audiology training as both sustainable and scalable. Incorporating evidence-based e-learning strategies can help bridge geographic and resource gaps, ensuring equitable access to high-quality training for hearing healthcare practitioners worldwide. Ongoing research into digital pedagogy and learner experience will be essential to refine and sustain this evolving model of training Audiologists.

Keywords: Educational Programs, Training, Hearing Implants

Posters

Global Audiology and Public Health
PD 111

Voices from the Clinic: Professional Perspectives on Culturally Responsive Hearing Care

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Background: Effective hearing healthcare requires sensitivity to the ethnic diversity of clients, yet many hearing care professionals experience challenges in delivering culturally responsive care to their clients from ethnically diverse backgrounds. Understanding these barriers and facilitators is important for improving care outcomes for clients from different backgrounds.

Objectives: To explore the barriers and facilitators for hearing care professionals in providing culturally responsive hearing healthcare to clients from ethnically diverse backgrounds in Australia.

Methods: A qualitative descriptive methods design using semi-structured in-depth interviews was used. Adult and paediatric hearing care professionals (n = 25) (audiologists, audiometrists, reception staff, and clinic managers) with more than six months experience in providing hearing services in Australia participated in the study. Qualitative data from the interviews were analysed using inductive thematic analysis.

Results: Several barriers and facilitators to provision of culturally responsive care were identified across five key themes: (1) Identifying client's cultural needs, abilities, and building trust; (2) Overcoming language barriers through professional interpreters, informal interpreters, and technology; (3) Providing information that is understandable and acceptable; (4) Including family members in appointments; and (5) Scheduling flexibility, clinic support, resources, and priorities.

Conclusion: The findings revealed multiple barriers that hinder the delivery of culturally responsive care, including language barriers, inadequate resources (such as availability of speech assessments in multiple languages and sufficiently sized consultation rooms to accommodate family members), time limitations, and insufficient cultural responsiveness training. These barriers were addressed through support of the clinical team, appropriate cultural training, and access to interpreters and translations.

Keywords: Cultural responsiveness, Audiological rehabilitation, Diversity

Posters

Global Audiology and Public Health
PD 112

Registration of the Audiology Profession in Australia: Implications for Public Health Services

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Background:
In 2025, Australia announced the decision to register audiologists under the Australian Health Practitioner Regulation Agency (AHPRA). This policy aims to standardise professional practice, enhance public safety, and ensure consistent quality of care nationwide. Until now, audiology in Australia has operated without mandatory registration, resulting in variability in service delivery and public accountability.

Methods:
This paper will review the policy context and outline anticipated implications from three Australian jurisdictions, Victoria, Queensland, and Western Australia. The analysis will draw on public health service reports, stakeholder perspectives, including professional bodies, and state health department publications.

Results:
Victoria: Registration is expected to facilitate clearer referral pathways and improve interdisciplinary collaboration within public health services.
Queensland: Registration is expected to support the rollout of the Statewide Audiology Governance Model and enhance the delivery of integrated ENT and Audiology networked services, particularly in regional and remote areas.
Western Australia: Registration is anticipated to enhance clinical governance across public audiology services, particularly by formalising standards for service delivery, strengthening pathways for consumer feedback and complaint resolution, and supporting workforce development through mandated continuing professional development. These changes are expected to improve transparency and consistency in care, especially in rural and remote regions.

Conclusion:
The registration of audiologists under AHPRA is expected to represent a significant advancement for public health services in Australia. Anticipated outcomes include greater professional accountability, improved service quality, and enhanced patient safety. The projected experiences from Victoria, Queensland, and Western Australia will provide valuable insights into the impact of registration on public health outcomes and may serve as a model for other jurisdictions considering similar reforms.

Keywords: Audiology registration, Public health, Australia

Posters

Global Audiology and Public Health
PD 113

Understanding the acceptability of hearing healthcare among people from diverse ethnic communities in Australia

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Purpose: In healthcare, acceptability is defined as the perceived appropriateness of care based on individuals' emotional and cognitive responses. While existing literature has identified barriers and facilitators to accessing hearing healthcare among people from diverse ethnic communities, little is known about how these communities perceive the acceptability of such services or which factors shape these perceptions. This study therefore aimed to explore the factors influencing the acceptability of hearing healthcare services for people from diverse ethnic backgrounds in Australia.

Methods: Using a qualitative descriptive design, semi-structured interviews were conducted with 46 participants, including adults with hearing loss (n=23) and family members of adults (n=12) and children (n=11) with hearing loss, recruited via community organisations and social media. The topic guide was developed with reference to literature on access to hearing services and the domains of the Theoretical Framework of Acceptability (TFA; Sekhon et al, 2017). Interviews were completed in English or participants' preferred language, with interpreters provided as required. Data were thematically analysed and mapped to the seven domains of the TFA.

Results: Participant experiences reflected all seven domains of the TFA. 1) Affective Attitude and 2) Ethicality were influenced by stigma, cultural beliefs, and clinician behaviour. 3) Burden and 4) Opportunity Costs arose from language barriers and availability or interpreters, travel, cost, and work conflicts. 5) Self-efficacy and 6) Intervention Coherence reflected low health literacy and difficulty navigating services, while 7) Perceived Effectiveness related to varying perceptions of the effectiveness of hearing aids and services.

Conclusions: Acceptability of hearing healthcare in diverse ethnic communities reflects the interaction between personal beliefs and systemic structures. Building health literacy, improving interpreter access, and embedding cultural safety within clinical practice are critical to promoting trust, empowerment, and equitable engagement in hearing services.

Keywords: Cultural and linguistic diversity, Hearing healthcare, Acceptability

Posters

Global Audiology and Public Health
PD 114

Comparative analysis of clinical and developmental milestones in children with hearing loss from diverse ethnic communities in Australia

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Purpose: Evidence from outside Australia suggests that children with hearing loss (HL) from minority ethnic groups and non-English speaking backgrounds may obtain lower levels of support from audiological services, resulting in poorer developmental outcomes. Therefore, we explored the differences and factors associated with clinical milestones (age of diagnosis, initial hearing aid fitting, first cochlear implant switch-on), device usage per day, and developmental outcomes (functional listening, speech and language, and psychosocial skills) in children with HL from diverse ethnic communities compared to the ethnic majority children in Australia.
Methods: Data from five-year-old 441 children with bilateral HL and 138 children with normal hearing who participated in a population-based study, the Longitudinal Outcomes of Children with Hearing Impairment, were used. We defined diverse ethnic status as speaking a language other than English or mother born in a non-English speaking country. Developmental outcomes were evaluated using Parents' Evaluation of Aural/Oral Performance of Children, Child Development Inventory, Strengths and Difficulties Questionnaire, and Preschool Language Scale (PLS-4).
Results: Group comparisons indicated no significant differences in clinical and developmental outcomes between children from diverse ethnic backgrounds and those from the ethnic majority, except in language skills. In generalised linear models, belonging to diverse ethnic communities, additional disabilities, and lower maternal education were associated with lower PLS-4 scores. Living in advantaged areas and non-verbal IQ were associated with better scores. There was no significant interaction between ethic and hearing status, suggesting that there was no excess disadvantage in language outcomes for children with HL from ethnic communities.
Conclusion: Clinical milestones for children with HL from diverse ethnic backgrounds in Australia were similar to those of their ethnic majority peers, and there was no evidence for disadvantage in developmental outcomes. Data suggests that Australia's hearing services provide equitable and effective services for children from diverse ethnic backgrounds.

Keywords: Diverse ethnic, Hearing loss in children, Child development

Posters

Global Audiology and Public Health
PD 115

No Clear Pathway: Hearing Healthcare Transitions as a Missed Opportunity for Global Adolescent Health

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Background:
Adolescence and young adulthood are pivotal periods for lifelong health trajectories. The Lancet Commission on Adolescent Health and Wellbeing describes these years as the foundation for future health, yet hearing healthcare systems seldom reflect this perspective. Despite universal access to free hearing services for Australians under 26, many emerging adults who are deaf or hard of hearing experience uncertainty when transitioning to adult care. The aim of this qualitative study was to explore their lived and living experiences to identify systemic gaps in continuity of care and implications for health equity.

Methods:
Using participatory art-based research and yarning process as an Indigenous research method, deaf and hard of hearing participants aged 16–35 years created visual or written works describing their hearing health journeys. Subsequent yarning explored meanings behind their creative pieces. Data were analysed reflexively using Braun and Clarke's thematic framework, guided by participatory and decolonising research principles.

Results:
Transitions were rarely planned or supported. Participants described "falling through the gaps" between paediatric and adult services, with change in funded supports, unclear eligibility, and raises the question of the role of health literacy for young people. Many relied on peer networks for guidance around hearing technology, funding, and identity. Creative expressions revealed resilience but also persistent inequities within an otherwise well-resourced national system.

Conclusion:
Hearing healthcare transitions remain an under-recognised determinant of adolescent and young adult health equity. Addressing these systemic gaps aligns with global calls to strengthen adolescent health systems and ensure that no young person is "lost in transition." Co-designed, youth-informed, and stakeholder-engaged models of care could transform hearing services into equitable systems of lifelong support.

Keywords: Adolescent health, Hearing healthcare, Transition

Posters

Global Audiology and Public Health
PD 116

Hearing Screening for Adults within the Inn.Health Study on Cardiovascular Health

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Background
According to WHO estimates, by the year 2030, approximately 500 million people worldwide will be affected by moderate to severe hearing loss. More than half of the population over the age of 60 experiences hearing impairment that restricts daily functioning, referred to as disabling hearing loss.
Currently, there is no standardized method for the early detection of hearing loss in adults. The WHO recommends implementing adult hearing screening starting at the age of 50 as part of preventive health examinations.
As part of the upcoming Inn.Health Study in Tyrol, western Austria — a population-based study focusing on vascular health in a random sample of 1,000 participants — an additional module, "Hearing Screening for Adults," has been integrated. The aim of this sub-study is to apply a suitable screening protocol for adults and to determine the prevalence of hearing impairment across different age groups.
Materials and Methods
The study will include adults aged 18 years and older, with an equal distribution of 500 women and 500 men across all age ranges. The hearing screening consists of two tests:
1. Digit Triplet Test (DTT): to estimate speech understanding in background noise.
2. Distortion Product Otoacoustic Emissions (DPOAE): to assess hearing thresholds from 1 kHz upward.
In addition, participants will complete hearing-specific questionnaires to evaluate subjective hearing perception.

Results
The study is scheduled to begin in spring 2025. Within six months, a total of 1,000 participants are expected to be examined.

Discussion
Currently, there is no established adult hearing screening program worldwide. This study aims to develop, test, and implement a simple and valid hearing screening method for adults that can be integrated into routine preventive health assessments.

Keywords: Hearing screening, Public Health, Hearing Loss

Posters

Global Audiology and Public Health
PD 117

Using systems thinking to design an approach to delivering ear and hearing care through Indigenous Community controlled health services in Australia

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Introduction

Aboriginal and Torres Strait Islander people are resilient, have been caring for one another holistically for tens of thousands of years and are committed to improving the health and wellbeing of their Communities. Many factors, including institution racism, siloed services, and social determinants, contribute to the health disparities seen between Indigenous and non-indigenous Australians. One such disparity is the high prevalence and severity of otitis media (OM). The Australian government has made commitments to improving ear health outcomes for Indigenous Australians through system level reforms. Changes to health systems require a systems thinking approach to account for complex interconnections between policy, programs, and sectors. This study aimed to design an approach to delivering ear and hearing care (EHC) in Aboriginal Community Controlled Health Services (ACCHS) that considers national and state-level health system principles, constraints and best practice.

Methods

A targeted literature review was conducted to identify national and state policies, guidelines, programs and scopes of practice that influence the delivery and funding of EHC for Indigenous children delivered by health workers through ACCHS in New South Wales (NSW), Australia. These documents then informed the development of a new conceptual approach to EHC for Australian Indigenous children affected by OM that operationalizes best-practice guidelines, considers external constraints and that aligns with the national health reform principles.

Results

The findings from the targeted literature review were collated to design a new EHC approach which was displayed using the Functional Resonance Analysis Method (FRAM) showing the pathway a child with OM follows from accessing primary care, diagnostic hearing assessments, and then treatment and management from tertiary and allied health services.

Conclusion

The FRAM demonstrates the complexities of Australian EHC pathways. It highlights how critical skilled health workers, a national data strategy, and multidisciplinary partnerships are to ensuring effective, timely and culturally-safe care.

Keywords: Indigenous Health, Systems Thinking, Ear and Hearing Care

Posters

Global Audiology and Public Health
PD 118

Barriers, Facilitators, and Strategies for the Labor Inclusion of Deaf People in Latin America: A Scoping Review

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This scoping review aims to map and synthesize the existing evidence on the barriers, facilitators, and strategies influencing the labor inclusion of Deaf people in Latin America. Although there is growing recognition of Deaf communities as linguistic minorities, the region still lacks a comprehensive overview of how social, educational, and policy factors shape employment opportunities for Deaf individuals.

Methods:
The review followed the methodological framework proposed by Arksey and O'Malley and refined by the Joanna Briggs Institute, adhering to PRISMA-ScR guidelines. A comprehensive search was conducted in Scopus, Web of Science, PubMed, SciELO, and LILACS for studies published between 2010 and 2025 in English, Spanish, and Portuguese. Eligible studies addressed barriers, facilitators, or strategies related to the employment inclusion of Deaf people within Latin America. Data were charted by two independent reviewers and synthesized descriptively and thematically.

Results:
Preliminary analysis reveals that communication and linguistic barriers—such as the limited recognition of sign languages and the shortage of interpreters—persist across Latin American contexts. Educational inequalities, medicalized understandings of disability, and policy gaps further restrict employment inclusion. Reported facilitators include bilingual education initiatives, legal recognition of national sign languages, and the empowerment of Deaf organizations. Emerging strategies emphasize the use of Information and Communication Technologies (ICTs), inclusive educational tools, and community advocacy to enhance access to work.

Conclusions:
The labor inclusion of Deaf people in Latin America is shaped by complex social, cultural, and structural factors. Strengthening bilingual education, digital inclusion, and culturally informed labor policies appears essential to promote equitable employment opportunities for Deaf individuals across the region.

Keywords: Deafness, Employment inclusion, Latin America

Posters

Global Audiology and Public Health
PD 119

Comprehensive Assessment of In-Helmet Noise Exposure and Acute Auditory Threshold Shift in Motorcyclists

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Context: Noise-induced hearing loss (NIHL) is an acute and cumulative occupational/recreational risk for motorcyclists. This comprehensive study quantified the acoustic exposure across diverse environments—recreational road use and high-performance competitive (motocross)—to evaluate the corresponding physiological impact on auditory thresholds.
Methods: This multi-part investigation combined objective in-situ acoustic measurements with clinical audiological testing. Acoustic data were gathered from two distinct cohorts: (1) road riders across varying speeds 30 to 130 km/h while manipulating helmet type (full-face vs. jet), visor position, and ventilation; and (2) motocross riders using a competitive-grade 250 cc motorcycle. In-helmet sound pressure levels were recorded near the external auditory canal, and acoustic measurements were employed to separate aerodynamic (wind) noise from other environmental (engine) noise. A separate clinical sub-study performed pre- and post-exposure pure-tone audiometry on a cohort of recreational riders following a single 8-hour road trip. Noise data were compared to the occupational limit of LEX, 8h = 80 dB(A).
Results: Noise exposure consistently exceeded safe limits across all measured conditions. Road noise exposure increased linearly with speed, averaging an increase of 0.19 dB/km/h. Even in the most protective configuration (full-face helmet, visor closed), road speeds of 90 km/h or greater resulted in LEX, 8h equivalents above 80 dB(A). Motocross activity resulted in the highest sustained mean levels, exceeding 99 dB(A), placing riders at immediate risk. The clinical assessment demonstrated a statistically significant mean Temporary Threshold Shift (TTS) in the 500 Hz to 1500 Hz and 6000 Hz frequency ranges following a single day of riding.
Conclusion: Motorcycling constitutes a significant and acute audiological hazard driven primarily by aerodynamic and engine noise. The measurable TTS and noise levels confirm that both recreational and competitive riders require immediate, mandatory, and specialized hearing protection counseling to prevent cumulative NIHL and cochlear synaptopathy.

Keywords: Noise-Induced Hearing Loss (NIHL), Motorcycle Noise, Temporary Threshold Shift (TTS)

Posters

Global Audiology and Public Health
PD 120

Dietary Patterns and Pure-Tone Audiometric Thresholds in Chilean Older Adults: An Exploratory Cross-Sectional Study

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Background: Age-related hearing loss (ARHL) is one of the most common sensory impairments among older adults. While advancing age remains the primary factor, growing evidence suggests that nutrition may modulate auditory health through anti-inflammatory and antioxidant mechanisms. However, Latin American data are scarce despite high prevalence of both ARHL and nutritional deficiencies. This study examined the association between dietary intake and audiometric hearing thresholds in Chilean adults aged 50 years and older.

Methods: A cross-sectional study was conducted in 43 adults (25 women, mean age = 63.9 ± 7.8 years) recruited in Santiago, Chile. Participants completed a validated Quantified Food Trend Survey assessing consumption across 11 food groups. Nutrient composition was derived using the myfood24 dietary assessment tool. Pure-tone thresholds were obtained bilaterally at 125–8000 Hz following WHO classification criteria. Only participants with normal tympanometry and MoCA ≥ 22 were included. Statistical analysis: Quantitative variables were summarized as medians and interquartile ranges. Correlations between food and nutrient intake and hearing thresholds were assessed using Spearman's rank coefficients. Quantile regression models were fitted for median hearing thresholds at each frequency, incorporating significant dietary predictors and adjusting for age.

Results: Higher consumption of proteins, cholesterol, and polyunsaturated fatty acids (n-3 and n-6) correlated with lower thresholds (better hearing) across multiple frequencies ($\rho = -0.31$ to -0.44, $p < 0.05$). Retinol and vitamin B_{12} intakes were associated with improved high-frequency hearing ($\beta = -7.29$; $p = 0.007$ and $\beta = -0.36$; $p = 0.017$, respectively). Effects remained after age adjustment.

Conclusions: Dietary intake of proteins, polyunsaturated fatty acids, retinol, and vitamin B_{12} was associated with better hearing thresholds in older Chilean adults. These findings support diet as a potentially modifiable factor in the prevention of age-related auditory decline.

Keywords: Age-related hearing loss, Dietary patterns, Audiometry

Posters

Global Audiology and Public Health
PD 121

Socio-cultural factors on parental attitude towards newborn hearing screening

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Hearing screening programs are afflicted by loss to follow-up, specifically in Indian scenario, where many socio-economic factors influence the program. Understanding the views of low and middle income parents using government services in Bangalore is essential. The aim of the study is to examine these parents' sociocultural views on newborn hearing screening and childhood hearing loss.
Method: Cross-sectional survey design was adopted. A survey tool developed by Rajan et al. for evaluating the NBHS program at government hospital was used for data collection. Parents were informed about the purpose of the study during their hospital visit and invited to participate. Questionnaire was administered only for those who gave informed consent. Fifty participated. Questionnaire had sections on knowledge of hearing loss, perceptions on causes, medical choices of treatment and social acceptance.
Results:
Demographic details shows the participants are heterogeneous group, with varied linguistic (Kannada, Hindi, Tamil and Telugu) and socio-economic backgrounds. Occupations of father span drivers, teachers, private sector workers. Majority of parents were aware of hearing screening program but knowledge level varied. Knowledge of major medical causes, preventable, and also association between hearing loss and language development was also poor. Majority believed in seeking medical help if hearing loss was identified, sooner than later (75%). Some also (43%) believed in temple visits and prayers. Social beliefs held for health of the baby were temple visit and blessings (43%), astrological consultation (48%), blessings of elders in the family (32%). Opinions on Screening Process also varied, with the majority preferring qualified specialists like audiologists (70%). The importance of NBHS was poor (35% agreement). Positive findings were lower concern for social stigma and belief in medical care.
Conclusion: Urban parents, including blue-collar workers, show medical awareness and low stigma, but greater emphasis is needed on hearing loss and early screening among expectant mothers.

Keywords: Newborn hearing screening, Socio-cultural difference, Parental attitute and knowledge of hearing loss

Posters

Global Audiology and Public Health
PD 122

Use of WHODAS 2.0 to assess the functionality of people with hearing impairment: An integrative review

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Introduction: Hearing loss, characterized by a partial or total reduction in the ability to hear, can significantly compromise the functionality and social participation of individuals with hearing impairment, especially when associated with social determinants. Based on the International Classification of Functioning, Disability and Health (ICF), the World Health Organization (WHO) developed WHODAS 2.0 (World Health Organization Disability Assessment Schedule) in 2010 — a standardized and cross-cultural instrument that assesses functionality in six domains: cognition, mobility, self-care, interpersonal relationships, life activities, and social participation. Objective: To conduct an integrative review of the literature on the use of WHODAS 2.0 in the assessment of adults and elderly people with hearing impairment. Method: The SciELO, PubMed, LILACS, and Google Scholar databases were used considering publications between 2005 and 2025, based on the guiding question: What are the results obtained in studies that used WHODAS 2.0 to assess the functionality of adults and elderly people with hearing impairment? Results: Six studies were identified. Three studies conducted in Taiwan addressed different themes: degree of disability among individuals registered in a national database (2014); a comparison of functionality between people with hearing and visual impairments (2018); and the relationship between employment status and functionality among people with hearing impairment (2020). Another three studies, conducted in the United States of America, presented interventional and clinical designs focused on measuring functional outcomes of auditory rehabilitation in adults with acquired hearing loss (2005a, b; 2025). Conclusion: The findings indicate that WHODAS 2.0 is an effective instrument for documenting functional profiles and supporting health decision. However, its application among individuals with hearing impairment remains limited in the literature. Therefore, there is a need to expand research involving this population to better understand their needs and to promote the development of appropriate public policies.

Keywords: Person with disability, Hearing loss, WHODAS 2.0

Posters

Global Audiology and Public Health
PD 123

A systematic review and quality assessment of clinical practice guidelines for congenital hearing loss

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Introduction: Congenital hearing loss affects a child from birth in various ways is associated with poor receptive and expressive language skills which could lead to limited socialization and poorer quality of life. To support the creation of the Package for ear and hearing care interventions, led by WHO, a systematic review was conducted to identify clinical practice guidelines related to congenital hearing loss, assess their quality, and determine key interventions related to the prevention, diagnosis, and management of congenital hearing loss.

Method: A search was carried out in PubMed, CINAHL, ClinicalKey, Cochrane, and TRIP databases, and websites of otolaryngology and audiology professional associations, to identify guidelines on congenital hearing loss published since 2014. A total of 464 articles were retrieved. The quality of the guidelines was evaluated using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) tool.

Results: A total of 15 guidelines passed the full text screening and underwent quality assessment. Eleven guidelines were excluded after quality assessment, due to their methodological limitations. Therefore, four high-quality guidelines were included in this review. The following are key interventions identified from the guidelines. During the assessment, a detailed case history and medical evaluation, and in some cases, genetic counselling and family-to-family support were recommended. Additionally, early intervention with hearing aids or cochlear implants, alongside appropriate counselling and support, were recommended as rehabilitative options.

Conclusion: In general, many existing guidelines for congenital hearing loss are limited in their methodological rigour and few high-quality guidelines exist. Among the few high-quality guidelines, key interventions emphasize early identification and rehabilitation of congenital hearing loss. Results from this review can serve as a resource for hearing healthcare providers at all levels of care in terms of evidence-based interventions for congenital hearing loss.

Keywords: Congenital hearing loss, Prevention, Guidelines

Posters

Global Audiology and Public Health
PD 124

Developing a Dynamic Early Intervention Program for early cochlear implants: A Data-Driven Approach to Training and Tracking in Australia and Japan

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Backgroud:The long-term success of cochlear implantation and spoken language development in young children depends on the quality and consistency of post-operative early intervention. Shizuoka General Hospital, a major medical centre in Japan, has partnered with The Shepherd Centre, an internationally recognised leader in paediatric hearing loss and early intervention, to address the need for a standardised, evidence-based model of care. This joint initiative aims to design and implement a dynamic, data-driven early intervention (EI) program to enhance therapeutic consistency and improve spoken language outcomes for paediatric cochlear implant recipients.

Method: A comprehensive clinician training framework and a developmental tracking system were developed to objectively monitor auditory skill acquisition and key milestones. The program utilises a shared, real-time data platform that enables continuous feedback and collaborative decision-making between clinical teams across continents.

Results: Implementation findings indicate that the data-centric model improves therapeutic consistency and facilitates the timely identification of individual child and family needs. Access to real-time data has enhanced clinicians' professional confidence, competency, and reflective practice, supporting consistent, evidence-based intervention planning. The system allows for rapid, data-informed adjustments to therapy goals, optimising the habilitation process.

Conclusion: Early results demonstrate the program's potential for scalability and its capacity to strengthen international partnerships and workforce capability. This collaboration demonstrates how a data-driven, outcome-focused approach can elevate clinical quality, promote professional growth, and advance outcomes for children with cochlear implants globally.

Keywords: Models of care, Developmental tracking, Data driven practice

Posters

Global Audiology and Public Health
PD 125

Prevalence of Asymmetric Hearing Loss in Korean Adult Population

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Objective: To investigate the prevalence and features associated with asymmetric hearing loss among Korean adults aged 40 years or older, using data from the Korea National Health and Nutrition Examination Survey (KNHANES).
Methods: Asymmetric hearing loss (AHL) is defined as an interaural difference of ≥15 dB HL in the four-frequency pure-tone average (4FA; 0.5, 1, 2, and 4 kHz), according to the criteria of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). A total of 3,229 adults from KNHANES were analyzed. Statistical analyses included paired t test, chi-square tests, and multivariable logistic regression to examine the prevalence of AHL and its associations with age, sex, frequency, and laterality.
Results: The overall prevalence of AHL was 4.8%, with higher rates observed in males (5.7%) compared to females (4.2%). AHL prevalence increased progressively with age and was notably higher at high frequencies (2–4 kHz). Left-sided AHL was significantly more common than right-sided AHL in males (p = .026; OR, 1.494). Left-ear hearing thresholds were significantly higher across all frequencies, with the largest interaural difference occurring at 4 kHz.
Conclusion: Asymmetric hearing loss was more frequent among older individuals and males. Specifically, a distinct left-ear predominance was particularly evident in older males. These findings highlight the relevance of interaural asymmetry and frequency-specific patterns in the evaluation of hearing loss.

Keywords: Asymmetric hearing loss, Korean National Health and Nutrition Examination Survey, Epidemiology

Posters

Global Audiology and Public Health
PD 126

Preventing Noise Exposure in Farmworkers

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Agriculture is among the loudest industries: tractors, harvesters, compressors, and packing equipment routinely exceed safe noise levels. For many farmworkers, these exposures are part of daily life. Over time, repeated exposure contributes to noise-induced hearing loss (NIHL), one of the most preventable yet least addressed occupational health problems, with downstream effects including stress, communication failures, and increased accidents. Prevention is further constrained by limited access to hearing protection devices (HPDs), variable task noise, and language barriers. This presentation reports findings from a three-year, community-engaged study of Latino farmworkers in the U.S.-Mexico border region. In partnership with community organizations and guided by a community advisory board, we conducted on-site audiometry and surveys (n=113) to estimate hearing loss burden in this hard-to-reach population. Two-thirds of participants had high-frequency hearing loss, and nearly 60% self-rated their hearing as fair/poor. Older age, male sex, and perceived occupational noise were significant predictors of audiometric hearing loss. Employer provision of HPDs was uncommon (13%). We translate these results - and lessons from our community partners - into practice and policy recommendations. First, a brief screening and counseling workflow for mobile settings. Second, field-ready supports: low-cost HPD starter kits; fit guides; and targeted coaching to promote correct and consistent HPD use. Third, community and employer engagement strategies, including on-site screening events and integration with routine occupational health visits. Centering community partnership and targeting concrete barriers, this work demonstrates feasible steps to detect, prevent, and mitigate NIHL in agricultural workers and offers a template adaptable to other underserved labor sectors.

Keywords: Noise-induced hearing loss, Prevention, Farmworkers

Posters

Global Audiology and Public Health
PD 127

Development of preliminary items for the Korean version of the Hearing Beliefs Questionnaire

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Background:
Hearing loss (HL) negatively affects various aspects of life, and numerous studies have reported the effectiveness of hearing aids for aural rehabilitation. However, the rate of consistent hearing aid use remains low.
Since the use of hearing technology involves prescription by an otolaryngologist, inadequate awareness of hearing health can hinder individuals from taking actions (i.e, getting a hearing test). Considering the increasing number of individuals with HL in Korea, examining hearing health beliefs is essential, yet the lack of a validated Korean tool for assessing hearing health beliefs limits systematic investigation of their relationship with health behaviors. The aim of the study was to develop the Korean version of the Hearing Beliefs Questionnaire (K-HBQ) and to assess its content validity.

Methods:
After translating the HBQ into Korean, ten healthcare professionals in the fields of audiology, otolaryngology, and speech-language pathology evaluated how naturally each item was expressed and how well it conveyed hearing health concepts, using a four-point Likert scale (1 = strongly disagree, 4 = strongly agree). The content validity index (CVI) was calculated, with a cut-off value of 0.78.

Results:
The K-HBQ consisted of 26 items across six domains (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and perceived self-efficacy) based on the Health Belief Model. The CVIs of all 26 items were greater than 0.78, indicating the overall suitability of the questionnaire for measuring the six domains.

Conclusion:
This study developed preliminary K-HBQ items and examined its content validity. The findings provide baseline data for analyzing hearing health beliefs and influencing factors, and serve as a basis for developing future versions of the K-HBQ for children, adolescents, and older adults. Further steps, such as cognitive interviewing and reliability assessment, are needed to develop the final version of the K-HBQ.

Keywords: Health belief model, Audiology, Hearing health

Posters

Global Audiology and Public Health
PD 128

Introduction to the Global Audiology Initiative of the International Society of Audiology

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Background and Aim: Audiology services vary significantly worldwide, leading to disparities in education, practice, and access to care. The Global Audiology initiative was launched to bridge these gaps by fostering a comprehensive understanding of audiology education and practice across different regions. This presentation will outline the initiative's vision, mission, objectives, working methodology, and current status.
Method: The project began in 2016 with the development of an online platform, engaging volunteers globally in content creation. In 2019, the initiative was officially endorsed and is now managed by the International Society of Audiology (ISA). To enhance accessibility and collaboration, the initiative transitioned to Wikiversity in 2023 (https://en.wikiversity.org/wiki/Global_Audiology), an open educational platform supporting community-driven learning. Wikiversity hosts a wide range of audiology-related resources, including courses, tutorials, research projects, and learning materials. The transition aims to encourage broader contributions from stakeholders worldwide including audiologists, hearing care professionals, speech language pathologists, and phoneticians.
Results: Global Audiology serves as a knowledge hub that promotes international collaboration and knowledge-sharing in audiology education and clinical practice. It also fosters networking among stakeholders in hearing healthcare and supports professional development, particularly in resource-limited settings.
Conclusions: Standardizing audiological education and care is essential to improving global access to hearing health services. The success of the Global Audiology initiative depends on the contributions of dedicated professionals who develop, curate, and update content. The Global Audiology Working Group oversees content moderation to ensure accuracy and relevance. Currently, the information about education and practice is available for 30 countries.

Keywords: Global audiology, Across the globe, Wiki, Access

Posters

Global Audiology and Public Health
PD 129

Development of a Māori Language Ling Sound Test

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The Ling Sound Test (Ling, 1976; 1989) is widely used internationally to verify access to key speech frequencies through hearing aids or cochlear implants. It uses six English speech sounds (/m/, /u/, /a/, /i/, /ʃ/, /s/) spanning the speech spectrum. In New Zealand and Australia, it is routinely used in educational and clinical settings, often with the back vowel /ɔ/ added or in place of /u/. However, for speakers of te reo Māori - the Indigenous language of Māori people in New Zealand and a language undergoing active revitalisation - these sounds do not align with the Māori phonemic system. The Māori vowels differ from English vowels, and the high-frequency fricatives /ʃ/ and /s/ do not occur in the language, limiting the test's linguistic face validity and cultural relevance for Māori children and their families (whānau).

To address this gap, we developed Te Whakamātautau Hoka, a culturally responsive adaptation of the Ling test for use with Māori-speaking children. Phonological analysis and acoustic measurements guided the selection of six representative Māori sounds: the low-frequency nasal /m/, the three corner vowels (found in the Māori words PIKI, WAKA, and MOKO), and the voiceless consonants /t/ and /f/, all of which are produced in triplets.

The test was co-designed with Indigenous communities, audiologists, teachers, and parents through iterative consultation to ensure both cultural appropriateness and clinical practicality. Evaluation of Te Whakamātautau Hoka is currently underway in educational and audiological settings, examining usability, reliability, and cultural responsiveness with Māori-speaking children. Early feedback from professionals indicates strong engagement and enthusiasm for a linguistically authentic tool.

By supporting accurate hearing assessment in a revitalising Indigenous language, this work contributes to linguistic sustainability and equitable access to audiological care. It demonstrates how culturally grounded design can enhance engagement and equity in paediatric audiology and education worldwide.

Keywords: Paediatric audiology, Cultural responsivity, Indigenous language

Posters

Global Audiology and Public Health
PD 130

A framework for advanced audiology practice and training in New Zealand

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Advanced practice (AP) in healthcare is characterised by additional postgraduate experience, training and qualification, demonstration of complex decision-making and diagnostic reasoning skills, leadership in clinical settings, and Integration of research, education, and management into practice.
In New Zealand, AP is increasingly recognised as a mechanism to improve health equity, enhance access to care, and support culturally responsive service delivery but a framework to define expected capabilities is still to be developed. Approaches to date have largely emerged based on local initiatives and service agreements with no consensus for practitioner capabilities, nor explicit training pathways. This gap will lead to inconsistencies in education, practice and role clarity.
We aim to develop a comprehensive framework of AP capabilities tailored to the NZ context using a modified Delphi approach. Alongside the generic training pathways envisaged, we will also focus attention on an AP pathway towards genetic testing following identification of impaired hearing in infants through the NHSP. Following the outcomes of the Delphi study, we will trial and evaluate such an AP led genetic testing protocol in a clinical site in Christchurch (NZ). Outcomes of the trial will include audit data to establish effectiveness, safety and timeliness of the protocol, alongside survey and structured interview data on acceptability and parental satisfaction.
By combining outcomes from our Delphi Study with insights from the genetic testing protocol template, the findings of this proposal will help inform the establishment of frameworks for training in AP and rollout of AP into new areas in the future. Overall, the outcomes should help realise the potential of AP, including improved continuity of care, faster access to specialised services, better patient outcomes, and a more resilient health workforce.

Keywords: Advanced audiology practice, Delphi study, Health equity

Posters

Global Audiology and Public Health
PD 131

How to Write a Knowledge, Attitude, and Practice (KAP) Study in Audiology: A Practical Guideline

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Designing and conducting a Knowledge, Attitude, and Practice (KAP) study in the field of audiology requires both scientific precision and contextual sensitivity. As a cornerstone of behavioral and public health assessment, the KAP model explores how professionals acquire information, form beliefs, and translate them into clinical actions. This practical guideline provides a comprehensive roadmap for developing robust KAP studies tailored to the audio-speech sciences.

The process begins with defining clear research objectives and identifying the target population—ranging from audiologists and speech-language pathologists to public health practitioners and educators. A well-structured KAP survey not only measures factual understanding but also captures the subtle interplay between cognitive awareness, professional attitudes, and habitual practices. The protocol emphasizes balanced questionnaire design across the three dimensions of KAP, guiding researchers through steps of literature review, expert panel validation, and pilot testing to ensure clarity and cultural relevance.

Strategic question framing is vital: while knowledge items should reflect objective facts, attitude questions must reveal value-based perceptions, and practice items illustrate behavioral application. Scoring and analysis methods are delineated to preserve each section's unique interpretive power. Ethical and methodological rigor—such as informed consent, demographic transparency, and proper sample-size calculation—are highlighted as essential components of valid and generalizable findings.

Ultimately, this document empowers audiology researchers to produce KAP studies that are not only scientifically sound but also actionable. By integrating standardized protocols and psychometric validation into survey design, the guideline transforms KAP from a descriptive instrument into a dynamic tool for improving professional training, public awareness, and clinical outcomes. This practical framework bridges theory and evidence, offering a reliable path toward enhancing the quality and comparability of behavioral research in the audiology domain.

Keywords: Audiology, KAP study, Practical Guideline

Posters

Global Audiology and Public Health
PD 132

Global Audiology Training and Education Survey Manuscript

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Over 1.5 billion people worldwide are at risk of hearing loss. The accessibility of hearing care services mainly depends on the availability of hearing professionals across the globe. There is a pressing need for hearing professionals to serve society and raise awareness about hearing care and hearing loss prevention. This study aims to identify the availability of training programs for hearing professionals across the world.

Method: A cross-sectional study design was executed using a questionnaire that aimed to capture the availability of training and education related to hearing care. The questionnaire focused on several aspects, including the availability of training programs for hearing care, the duration of the audiology training program, the degree granted, and whether any programs are accredited in their respective countries.

Results: A total of 135 fully-completed responses were obtained, representing 64% HICs and 36% LICs. Nationally accredited and doctoral-level programs were typically noticed in HICs compared to LICs. Finance related to the training program was more of a concern related to LICs rather than HICs.

Conclusion: There are differences and similarities in audiology training programmes globally. These findings may have implications for professional organizations to optimize audiology programmes to improve hearing healthcare services globally.

Keywords: Audiology training, education, survey, hearing care

Posters

Global Audiology and Public Health
PD 133

Growing the Audiology Profession in Malawi: Progress and Next Steps for the EARS Incorporated–Led Degree Program and Clinical Network

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Background/Objectives:
Malawi has historically lacked a formal audiology workforce and local training pathways. In 2016, EARS Incorporated partnered with the African Bible College (ABC) to establish Malawi's first Bachelor of Science in Audiology program, with the objective of developing a sustainable audiology profession and expanding access to ear and hearing care. This study reports current progress, challenges, and next steps for national service integration.
Methods:
Data was obtained from academic program records, graduate employment tracking, Ministry of Health human resource reports, and clinical activity within the ABC Hearing Clinic and Training Centre (HCTC) and Malawi's central hospitals. Indicators analysed included graduate numbers, government-created posts, equipment provision, patient appointments, and outreach activity. Descriptive methods were used to summarise outcomes to date.
Results:
Since 2021, twenty-seven Malawian audiologists have graduated from the ABC program. In the absence of government audiology positions, more than half of early graduates sought employment overseas or outside the profession. Ongoing engagement between EARS Inc. and the Ministry of Health resulted in the establishment of six government audiologist positions across four central hospitals. EARS Inc. has supplied basic audiology equipment to these facilities. The ABC HCTC employs approximately one-quarter of graduates and collaborates with NGOs and Schools for the Deaf to deliver remote outreach services across underserved regions. With a further ten graduates expected by June 2027, planning has commenced for extending audiology services to district and faith-based hospitals to increase clinical coverage and reinforce integrated people-centred ear and hearing care.
Conclusions:
Strategic partnerships between training institutions, NGOs, and government authorities are essential to developing and sustaining audiology services in low-income countries. The Malawi experience highlights a scalable model for establishing national hearing care capacity and addressing unmet need through coordinated workforce and service development.

Keywords: Audiology education, Workforce development, Malawi

Posters

Global Audiology and Public Health
PD 134

Health-related quality of life and social participation of older adults with hearing loss and their close ones

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Age-related hearing loss can negatively affect communication and well-being in older adults, and these consequences may also extend to their loved ones by influencing their social engagement and relationship dynamics. Although hearing aids are recommended to alleviate these difficulties, their use remains limited and often delayed due to stigma, financial barriers, or limited awareness of their benefits. This study aims to determine whether the hearing-aid use positively influences quality of life and social participation of older adults and their loved ones. A total of 180 individuals aged 60 and over are recruited and assigned into three older adult groups according to their hearing status: 1) normal hearing; 2) untreated hearing loss; 3) hearing loss using one or two hearing aids. Their respective loved ones form Groups 4, 5, and 6. All participants complete questionnaires measuring their quality of life and social participation (WHOQOL-BREF and MHAVIE). Older adults complete sociodemographic questionnaires, the MoCA, and a questionnaire assessing the impact of hearing loss in older adults (HHIE-S). A hearing assessment is performed for older adults unless a recent audiological report is available. It is hypothesized that older adults with untreated hearing loss will show lower quality of life and social participation than those with normal hearing, with smaller differences among hearing-aid users. Analysis of the loved ones' scores will explore the impact of hearing loss on their own well-being and social participation. This study will determine the positive impact of hearing aids on the quality of life and social participation of older adults and their loved ones. The results will contribute to a better understanding of the consequences of age-related hearing loss, promote the use of hearing aids among older adults, and guide hearing rehabilitation strategies and appropriate interventions that promote well-being and social inclusion.

Keywords: Quality of life, Social participation, Hearing aids

Posters

Global Audiology and Public Health
PD 135

Beyond Audiologic Rehabilitation: Integrating Balance and Fall Risk Assessment into the Management of Hearing Aid Users

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Background: Age-related hearing loss (ARHL) is a recognized risk factor for falls, but the mechanistic pathways linking auditory function to postural control and fear of falling in experienced hearing aid users remain poorly defined. This study investigates the critical disconnect between objective balance performance and psychological fall-related outcomes.

Methods: Twenty-eight hearing aid users with ARHL (mean age 69.2 ± 7.20 years; 75% male) underwent a comprehensive assessment. Measures included bilateral pure-tone averages (PTAboth), the Falls Efficacy Scale-International (FES-I), the Gait-Specific Attentional Profile (G-SAP), the Perceived Control Over Falling scale (UPCOF), and objective balance testing via the Bertec Balance System. Pearson/Spearman correlations and multiple regression analyses were conducted, controlling for age, sex, education, duration of hearing aid use, and cognitive status (MoCA).

Results: We identified a concerning paradox. Correlation analyses revealed that greater hearing loss was significantly associated with lower concerns of falling (FES-I: -0.527, $p = 0.004$) and higher perceived control over falling (UPCOF: 0.567, $p < 0.002$). Regression confirmed that worse hearing uniquely predicted increased perceived control ($B = 0.321$, $p = .003$) and decreased concern about falling ($B = -0.646$, $p = .004$). However, objective balance testing revealed severe deficits: profound inability to stabilize after movement (85.7% abnormal Sit-to-Stand sway), extreme visual dependence (64.3% failed eyes-closed balance), and poor control during weight shifts (42.9% abnormal directional control).

Conclusion: In hearing aid users, greater ARHL was associated with unrealistic overconfidence in balance abilities, despite objective evidence of severe postural instability. This significant disconnect suggests that progressive sensory loss impairs accurate self-assessment of fall risk. Clinical management must therefore integrate objective balance assessments to identify and protect overconfident patients who harbor substantial, yet unperceived, vulnerability to falls. Integrating objective balance assessment into audiological practice is crucial to identify this overconfidence and mitigate the substantial, unperceived fall risk in this population.

Keywords: Age-related hearing loss, Hearing Aid, Balance, Gait, Falling

Posters

Global Audiology and Public Health
PD 136

Impact of Symbol Misinterpretation in Audiometry: A Survey Study Supporting Standardization of Symbols for Insert Earphone

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Introduction: Insert earphones are commonly used in audiological testing due to its significant advantages over super-aural headphones; however, in present scenario there is no individualized symbol is present for the it. The absence of standardized and individualized symbols for insert earphones leads to potential misinterpretations especially among clinicians and the non-professionals. The interchangeable use of same symbol for headphones and inserts makes it difficult to determine which transducer was used during testing, which causes a great deal of confusion while taking decision for masking as the IA for both the transducers vary significantly. The misidentification of transducers can lead the clinician to interpret the results as under or over masking.
Purpose: The objective is to assess the awareness, perceived need, and clinical implications of using a distinct standardized symbol and the evaluation of the proposed symbol for insert earphones in audiograms among audiology students through survey study all over the India.
Method: It is a cross-sectional, survey-based study. A structured questionnaire containing 20 items across three domains (demographics, knowledge, and symbol evaluation) was administered via an online platform to audiology students and professionals across India. A total of 204 valid responses were collected.
Result: Only 23.5% of participants reported familiarity with a specific symbol for insert earphones, while 74.2% were unaware. A significant majority (90.2%) agreed that distinct symbols would improve audiogram interpretation, and 80.4% supported universal standardization. Regarding the proposed symbol, 76% agreed on its appropriateness, and 44.1% rated it as very distinct. Participants believed that standardized symbols would improve diagnostic clarity (47% strongly agreed), reduce inter-clinician variability, and support accurate masking decisions.
Conclusion: As there is significant difference between the two transducers in terms of features and standards, implementing a distinct symbol for inserts would bring big benefits clarity, consistency, and confidence in every audiogram we read.

Keywords: Standardization, Insert earphones, Symbol

Posters

Global Audiology and Public Health
PD 137

WHO Initiative to Make Listening Safe

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This presentation introduces the "Make Listening Safe" initiative of WHO and ITU, the UN agencies. It describes the technical background of the dose-based approach to sound allowance and emphasizes the importance of standardized ways of promoting "safe-listening" habits in public health.
Concern is rising about the increasing exposure to loud sounds in leisure activities and recreational settings, such as listening to loud music over headphones, video gameplay, music venues and events. The World Health Organization (WHO) estimates that globally, over one billion people are at risk of avoidable, permanent hearing damage due to unsafe listening. To address this risk, The WHO launched the Make Listening Safe (MLS) Initiative in 2015 with the vision to create a world where all can enjoy leisure listening without risking their hearing health.
The WHO has adopted a collaborative approach to developing standards and building awareness about safe listening by establishing the World Hearing Forum representing top international experts in the field of hearing health, audiology, engineering and acoustics and representing governments, device manufacturers, academic researchers, audio engineers, and industry organizations in order help raise awareness about safe listening practices. The WHO, along with its stakeholders, have developed several global standards for safe listening on smartphones, video gameplay devices and esports, and music venues. These standards recommend safe listening features that should be included to protect the hearing of users and attendees with clear recommendations that can be adopted by device manufacturers, venue operators, audio engineers, or implemented by governments and industry organizations.

This presentation will provide an overview of the Make Listening Safe Initiative and discuss the various global safe listening standards.

Keywords: Hearing loss, Sound Allowance, Dosimetry

Posters

Global Audiology and Public Health
PD 138

Myths and Misperception regarding hearing loss and use of hearing aids in Nepalese population - A Descriptive Cross sectional study

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Introduction:
More than 464 million people worldwide suffer from disabling hearing loss, with 80% residing in low- and middle-income countries. Hearing-impaired people not only have poor access to audition, they are also stigmatized. In Nepal various misconceptions related with ear care, hearing loss and hearing aids use might be prevalent causing the decline of ear hygiene, hearing loss and its rehabilitation. Therefore, we aimed to study such misconceptions and gap in knowledge among Nepalese population.

Research Objectives: To study knowledge, myths, and misconceptions regarding hearing healthcare in the Nepalese population and compare them across age groups, education levels, and rural/urban areas.

Methodology:
A descriptive cross-sectional study was conducted on the Nepalese population living across Nepal. Questionnaire regarding the current knowledge and the myths and misperceptions regarding hearing healthcare practices which were circulated in the e-survey through google forms distributed through various social platforms by the researchers through convenient sampling yielding 431 responses (57.9% male, 41.9% female).

Results: The mean correct response score was 10.74 out of the total knowledge questions. Teenagers and geriatric participants exhibited the most misconceptions and stigmatizing attitudes toward hearing loss and hearing aids. Higher education levels were significantly associated with better knowledge and reduced stigma. Similar results were found between rural and urban residents. Over 50% of participants with ear problems initially used homemade remedies and sought professional help only after six months. Stigma and discrimination toward hearing-impaired individuals remain prevalent.

Conclusion: Misconceptions and stigma surrounding hearing healthcare are common in Nepal, particularly among teenagers and the elderly. Education plays a key role in improving awareness and reducing prejudice. Integrating ear care and hearing health education into school curricula and nationwide health campaigns targeting both urban and rural populations is recommended to promote early intervention, proper ear hygiene, and greater acceptance of hearing aids.

Keywords: Misconception, Hearing care, Hearing aids

Posters

Auditory Rehabilitation and Speech Perception
PD 139

A Preliminary Study on the Development of an Auditory Training Tool for Enhancing Discourse Competence

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Background: Individuals with hearing impairment often struggle to integrate contextual information and construct discourse meaning due to limited auditory experience. Effective training must therefore go beyond literal comprehension to include connotative meanings found in idiomatic expressions. This study aims to develop and validate a context-based auditory training tool utilizing idioms (collocations, idiomatic phrases, and proverbs) to enhance the discourse and communication competence of the hearing impaired.

Methods: High-frequency idiomatic expressions were extracted from Korean corpora, dictionaries, textbooks, and literature. Content validity was established via expert panel review. Subsequently, familiarity and transparency ratings were collected from 30 normal-hearing adults, and auditory difficulty was considered based on articulation manner and place. Idiomatic expressions suitable for auditory training were then selected. The final materials were constructed at the sentence and narrative levels, and the auditory training tool was developed based on criteria of appropriateness, difficulty, and response accuracy.

Results: From an initial pool, 200 collocations, 100 idiomatic phrases, and 50 proverbs were finalized. Based on these selections, 400 sentences containing collocations and 200 sentences containing idiomatic phrases, each consisting of four or more syntactic units, were developed. Additionally, Additionally, narrative materials incorporating proverbs were developed, ranging from five to nine sentences and accompanied by comprehension questions.

Conclusion: The idiom-based auditory training tool developed in this study demonstrates potential for improving discourse and communication abilities in individuals with hearing impairments. Further application studies involving individuals with hearing impairments are warranted to examine the educational and clinical utility of the tool.

Keywords: Auditory training, Discourse competence, Idiomatic expressions, Hearing impaired

Posters

Auditory Rehabilitation and Speech Perception
PD 140

The benefits of adaptive gain in remote microphones

Min Cheol ROH

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Remote microphone technology is under-utilized by people with hearing loss. Some barriers to this include the complexities of using the technology, but also from the lack of awareness and motivation of hearing care professionals to promote the use of remote microphones alongside hearing aids.

This talk will summarize the evidence to date on remote microphone technology in a diverse population (CI users, HI users (both adults & pediatrics), LUHU, APD), specifically highlighting the advanced signal processing and the listening/non-listening benefits these provide.

Keywords: Remote microphone, Adult rehabilitation, Pediatric rehabilitation

Posters

Auditory Rehabilitation and Speech Perception
PD 141

The Three-Legged Stool of Skills Needed to Live Well with Hearing Loss

Shari EBERTS

Founder, Living With Hearing Loss, United States of America

The successful hearing loss journey, whether for those newly diagnosed or for those who have been living with it for some time, requires communication skills that include, but go beyond, the hearing aid. This session focuses on a three-legged stool of vital strategies that are often underrepresented or even overlooked in standard clinical care. The legs include (1) MindShifts or attitudinal change, (2) Technology solutions of all types, and (3) Behavioral changes to improve communication. Like a three-legged stool that never wobbles, even when on bumpy ground, this trio of strategies establishes a solid foundation that equips the person with hearing loss for the best possible communication.

Attendees will leave the session with a better understanding of the full range of strategies that will meet the client's whole-life needs, as well as a roadmap for implementing this knowledge with clients in their practices.

Introducing this concept into student training programs as well as in clinical care settings will result in a stronger bond with the client who becomes a stronger self-advocate, enjoys healthier relationships, and is better equipped to improve almost any listening situation. Better hearing outcomes are the much-needed result.

Presenter Shari Eberts is a passionate hearing health advocate and internationally recognized author and speaker on hearing loss issues. She is the founder of Living with Hearing Loss, a popular blog and online community for people with hearing loss, and an executive producer of We Hear You, an award-winning documentary about the hearing loss experience. Her co-authored book, Hear & Beyond: Live Skillfully with Hearing Loss is the ultimate survival guide to living well with hearing loss. Shari has an adult-onset genetic hearing loss and hopes that by sharing her story, she will help others to live more peacefully with their own hearing issues.

Keywords: Patient Perspective, Communication Behaviors, Living with Hearing Loss

Posters

Auditory Rehabilitation and Speech Perception
PD 142

Person-Centered Care from the Patient's Perspective

Shari EBERTS

Founder, Living With Hearing Loss, United States of America

People with hearing loss approach each audiologist appointment with both trepidation and high hopes. We wonder: Will the audiologist take the time to focus on the communication challenges most important to me? Will I walk out with tools and skills that enhance my ability to live my life fully? Will I find a partner in my hearing care? After this talk, your patients will be answering yes to each of these questions.

This session will describe what person-centered care means from the patient's point of view. This formula includes five key elements:

1. Partnering With Your Patient
2. Making Your Office Hearing Loss Friendly
3. Embracing Creativity
4. Thinking Beyond The Technology
5. Supporting the Hearing Loss Community

After the session, participants will be able to apply person-centered care to enhance their relationship with each patient leading to better hearing outcomes, increased patient compliance with treatment plans, and higher patient satisfaction.

This presentation will be unique because it is from the patient's perspective. In it, I will share first-hand knowledge of my hearing loss journey including case study examples from my audiologist visits. This will be a positive presentation that provides actionable ways to implement patient-centered care in a clinical setting, improving the audiologist/patient relationships and patient hearing outcomes.

This session will help hearing care professionals (HCPs) apply person-centered care to enhance the patient's desire and ability to hear their best. HCPs will learn tangible ways to enhance their relationships with patients to improve hearing outcomes and discover new ways to apply best practice patient management techniques to improve patient satisfaction and referrals.

Keywords: Person-Centered Care, Patient's Perspective, Living With Hearing Loss

Posters

Auditory Rehabilitation and Speech Perception
PD 143

From Accuracy to Confusion: Phoneme Similarity and Perceptual Distance in Korean Monosyllabic Word Recognition

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Purpose: Traditional measures of speech recognition accuracy, while informative, are insufficient for capturing the full complexity of how individuals with hearing loss perceive spoken language. Mere accuracy scores obscure subtle but clinically meaningful error patterns that reflect perceptual reorganization and compromised phoneme discrimination. To advance a fine-grained understanding of speech perception difficulties, this study examined detailed perceptual error patterns in Korean monosyllabic word recognition across graded levels of hearing loss. By employing confusion matrix analysis, we quantified phoneme similarity and perceptual distance, thereby moving beyond conventional accuracy metrics to reveal the nuanced architecture of phoneme perception. Methods: Seventy-two participants were assigned to four groups: normal hearing, mild, moderate, and severe hearing loss. Each listened to 726 Korean monosyllabic words (363 words x 2 speakers) under controlled acoustic conditions and identified each stimulus. Recognition errors were classified by onset, nucleus, and coda positions, and confusion matrices were generated for each group. A six-level error taxonomy enabled structured categorization of error patterns. Phoneme similarity and perceptual distance were estimated with Shepard's Law, and perceptual mappings were visualized to illustrate group differences. Results: Recognition accuracy declined with increasing hearing loss, most sharply in onset and nucleus positions. Moderate and severe groups exhibited significantly higher error rates and expanded perceptual distances compared with normal hearing and mild groups. With greater impairment, phoneme confusions increased consistently in both consonants and vowels. Severe loss participants showed the largest perceptual distances for critical phoneme contrasts, indicating reduced discrimination ability. Group-specific perceptual maps vividly differentiated error patterns by hearing level. Conclusion: Hearing loss fundamentally alters phoneme-level processing in Korean speech perception, producing systematic increases in error frequency and perceptual distance. These findings underscore the importance of tailoring aural rehabilitation strategies to hearing level and contribute foundational perceptual mapping data essential for optimizing interventions in hearing-impaired populations.

Keywords: Korean word recognition, Hearing loss, Perceptual error analysis

Posters

Auditory Rehabilitation and Speech Perception

PD 144

Decoding Speech Errors in Aging Ears for Tailored Rehabilitation

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Background: Speech perception difficulties are a major complaint in older adults with hearing loss, often limiting communication despite conventional amplification. With the rapid growth of the aging population, hearing loss has become one of the most prevalent chronic conditions, significantly impacting communication and quality of life. Although monosyllabic word recognition is widely tested, limited attention has been given to analyzing specific error patterns that may reveal underlying auditory-perceptual weaknesses. A deeper understanding of these errors is essential for individualized aural rehabilitation in older adults. Purpose: This study examined error rates and error types in Korean monosyllabic word perception across different hearing levels to identify phoneme-specific profiles that may guide personalized rehabilitation strategies. Methods: Seventy-two older adults were assigned to four groups: normal hearing, and mild, moderate, and severe hearing loss. Participants completed a discrimination task with 726 Korean monosyllabic words, presented at their most comfortable listening level. Errors were coded at the onset consonant, vowel, and coda positions, and classified as substitution, addition, omission, or compound, resulting in 10 types. Group differences were analyzed using one-way ANOVA with post-hoc tests. Results: Overall error rates rose with hearing loss severity, from 18.3% in normal listeners to 80.4% in severe loss. Errors in onset consonants, particularly high-frequency phonemes, were most vulnerable. Substitution errors predominated in normal and mild groups but declined with more severe loss, while omission and compound errors increased. In severely impaired listeners, compound errors became frequent, indicating broad breakdowns in speech perception rather than isolated phoneme confusions. Conclusion: Age-related hearing loss produces a shift from single-segment substitutions to multi-segment and compound errors, reflecting global perceptual degradation. Clinically, these findings highlight the value of error-based analysis in speech testing and support the development of tailored phoneme-focused rehabilitation programs to improve communication effectiveness in everyday life for older adults.

Keywords: Speech perception errors, Aging and hearing loss, Individualized rehabilitation

Posters

Auditory Rehabilitation and Speech Perception

PD 145

Environmental factors of the ICF – audio processor feedback using the APSQ

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It is well known the provision of a cochlear implant (CI) is an effective treatment for different types of hearing loss. A CI provides a wide range of benefits including speech understanding in quiet and noise, localisation, music appreciation, better communication, and improved quality of life. It is thus important to see each CI user from a holistic perspective, and one way to do this is by using the International Classification of Functioning and Disability (ICF) developed by the World Hearing Organisation. The ICF considers body functions and structures, activities, participation, personal factors, and environmental factors. One environmental factor is products and technology for communication. An audio processor (AP) is one such technology. The AP is an essential part of everyday life for a user. The Audio Processor Satisfaction Questionnaire (APSQ) is a validated questionnaire completed by users and is available in nine languages. MED-EL collects data from the APSQ to enhance usability of its APs. This is an ongoing survey, and we have about 1336 APSQs from 1064 users as of last analysis. The results show a very high overall satisfaction of the users with their APs, this was reported for both unilateral and bilateral users. Most users wear their APs more than twelve hours a day. The subscale scores 'social life', 'usability', and wearing comfort' showed relatively similar results amongst the different AP types. Results provide MED-EL important feedback about their devices, but more importantly, it provides information for audiologists and surgeons to explain benefits and wearing comfort of MED-EL APs.

Keywords: APSQ, Audio Processor, ICF

Posters

Auditory Rehabilitation and Speech Perception
PD 146

Evaluation of the Home Acoustic Environment of Deaf Children: A Descriptive Study

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Language and hearing development in deaf children are influenced by several factors, including the consistent use of hearing assistive devices (HADs), family involvement, and the conditions of the acoustic environment. The Language Environment Analysis (LENA) system is an innovative tool that records and quantifies the sound environment in natural contexts, providing objective measures of verbal interactions and the sounds to which the child is exposed. This study aimed to characterize the variables of the home acoustic environment of deaf children.
Methodology:
The sample consisted of 10 children using HADs, with a mean age of 53.6 months, followed up at an auditory rehabilitation service. The children were instructed to use the LENA device for one day. Recordings were processed using the LENA Pro software, considering the following variables: conversational turns, overlapping speech, exposure to electronic sounds, noise, and distant speech.
Results:
The mean values found were: conversational turns 21%, overlapping speech 13.8%, electronic sounds 9.8%, noise 1.1%, distant speech 7.9%, and average recording duration of 12.3 hours. The results showed that conversational turns represented the highest percentage of the observed period, highlighting the importance of verbal interaction in the home environment. However, it is crucial to analyze the quality of these conversations, distinguishing between direct and indirect interactions, and assessing the impact on language perception during moments of overlapping speech and electronic sounds, which may compete with relevant speech stimuli. These findings suggest the need for interventions to optimize the acoustic environment, demanding greater auditory attention.
Conclusion:
Understanding the factors of the home acoustic environment through LENA-based analysis is essential for developing strategies that promote language acquisition. This awareness enables more effective and individualized interventions, addressing the specific needs of each deaf child.

Keywords: Environmental Communication, Children, Deafness

Posters

Auditory Rehabilitation and Speech Perception
PD 147

Development of the First Patient-Reported Experience Measure (PREM) for Hearing Loss in Audiology

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Aim: This presentation will share how the the first audiology-specific 'My Hearing PREM' was created to reflect the lived experiences of people with hearing loss.

Methods: The 'My Hearing PREM' was developed in three phases and this presentation will discuss the first two: (1) patient and public involvement and engagement, stakeholder input and research evidence were used to co-develop a prototype and (2) testing of the PREM prototype through cognitive using 'think aloud' interviews, with iterative refinement of the items.

Results: My Hearing PREM development included forums with patient and public involvement and engagement (PPIE) through lip-reading classes, South Asian Women's groups, learning disability groups and students. PPIE members were continuously and consulted to provide feedback on the comprehensibility. Moreover, 16 participants took part in 'think aloud' interviews who were recruited from both clinical and non-clinical settings. The My Hearing PREM consists of 16 items across three categories: Emotional Burden, Communication, and Support, with a 5 item-response scale. Items were reviewed for clarity, relevance, comprehensiveness, and acceptability. This presentation will share the iterative process of developing the My Hearing PREM.

Conclusion: This presentation will discuss the development of the first hearing loss focused PREM (My Hearing PREM). My Hearing PREM has the potential to benefit both patients and clinicians in audiology by highlighting the aspects of care that matter most to individuals with hearing loss, promoting effective communication, and helping ensure that services align with what patients' value most.

Keywords: Hearing Loss, PREM, Stakeholder recruitment

Posters

Auditory Rehabilitation and Speech Perception
PD 148

Family-Centred Hearing Care: Exploring the Experiences of Caregivers and Communication Partners

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Background: Hearing loss significantly affects not only those who experience it but also the family members and friends who support them. Despite growing recognition that family and communication partners play a vital role in managing the challenges of hearing loss, their own experiences and burdens are often overlooked in both research and practice.
Objective: This presentation will explore how caregiving responsibilities for a family member with hearing loss are experienced, with a focus on the implications for audiology services and the inclusion of family-centred care.
Methods: In-depth qualitative interviews were conducted with a varied group of caregivers, covering a range of relationships and life stages. Template analysis guided by Burden of Treatment Theory was used to explore the everyday impacts on caregivers in handling the practical and emotional aspects of supporting hearing care and device use.
Results: Caregivers described multiple pressures, from navigating strained conversations and acting as mediators to coordinating medical appointments and device maintenance. However, shared problem-solving, clear information, and feeling part of a care team were reported to help alleviate some of the strain experienced.
Conclusion: This study highlights the importance of recognising caregiver and communication partner perspectives, and the varied roles they play in supporting people with hearing loss. Embracing family-centred approaches in audiology has the potential to improve experiences for both individuals with hearing loss and those who support them. The presentation will reflect on the potential value of family-centred approaches in audiology and consider ways in which caregiver and communication partner experience might be better acknowledged and integrated into hearing care.

Keywords: Hearing loss, Family-centred care, Caregiver experience

Posters

Auditory Rehabilitation and Speech Perception
PD 149

Impact of Formal Auditory Training on Frequency Following Response and Cognitive Potential P300 Responses in a Patient Under Investigation for Mild Cognitive Impairment

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Purpose: To analyze the impact and electrophysiological modifications of a Formal Auditory Training (FAT) program on the responses of the Frequency Following Response (FFR) and the Cognitive Potential P300 (P300) in an adult patient with suspected mild cognitive impairment.
Method: Female, 57 years old, with complaints of mixing up the words she wanted to use both in speech and writing and difficulty with attention, underwent eight individual FAT sessions lasting one hour each, involving intensive auditory training of temporal processing, figure-ground, and auditory closure skills for verbal and non-verbal sounds. The pre- and post- FAT evaluations included basic audiological assessment, behavioral assessment of central auditory processing, and electrophysiological assessment focusing on the capture of FFR and P300.
Result: The audiological evaluation showed responses within normal limits, and the integrity of the auditory pathway up to the brainstem region was confirmed with click ABR. Language assessment revealed a verbal memory deficit, a mild written comprehension disorder, difficulty with mental multiplication and division calculations, and anomies in oral expression. In the pre-CAPD assessment, behavioral auditory processing tests revealed central auditory processing disorder. After the eight-session program, there was an improvement in auditory skills such as sound localization, figure-ground for verbal sounds, and temporal processing, as well as an improvement in morphology and latency values under ideal and impaired listening conditions in the FFR. P300 wave showed a reduction in latency values and an increase in amplitude in the left ear.
Conclusion: Formal Auditory Training was effective in promoting neuroplasticity in the central auditory pathway, resulting in functional improvement. The improvement in FFR and P300 responses serves as objective evidence, validating FAT as a useful tool for managing comprehension complaints in complex cases.

Keywords: Auditory perception, Auditory evoked potentials, Neuroplasticity

Posters

Auditory Rehabilitation and Speech Perception
PD 150

Integrating PCC six elements and tools into Counseling for Listening-related Fatigue: A Clinical Implementation Model

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Objective: To implement and evaluate a counseling model for managing listening-related fatigue (LRF) in young adults with hearing loss, grounded in the six elements of person-centered care (PCC) and the theoretical framework of LRF.

Method: The model integrated PCC principles with the LRF framework, which conceptualizes fatigue as an interaction among situational determinants, effort regulation, and coping responses across cognitive, emotional, social, and physiological domains. The six PCC elements were integrated into the counseling process, establishing a structured framework for clinician-patient interactions. Multiple assessment and counseling tools were incorporated, including the VFS-A-40 questionnaire, family questionnaire, Client-Oriented Scale of Improvement (COSI), the Line Tool, and focus-group interviews. Implementation proceeded through four structured stages: baseline assessment and medical history; identification of fatigue-related contexts; individualized goal setting and motivational evaluation; and collaborative formulation of rehabilitation plans. Six young adults with self-reported LRF completed all stages.

Results : VFS-A-40 scores ranged from 26 to 101, revealing variation across domains. Family questionnaires indicated mild to moderate third-party disability, highlighting the relational impact of listening fatigue. Focus groups consistently identified noisy and work/study environments as the most fatiguing situations. Through COSI, participants formulated individualized goals primarily focused on enhancing speech understanding in noise and sustaining attention during communication. Line Tool ratings showed strong motivation for change (≥7) but variable self-efficacy (5–7). Post-counseling reflections revealed increased awareness of fatigue triggers, adoption of adaptive communication strategies (e.g, planned listening breaks, self-advocacy), and reduced emotional frustration.

Conclusions: This study successfully implemented a novel PCC model for managing LRF in young adults with hearing loss. By systematically integrating the six elements of PCC with the multidimensional LRF theoretical framework, the intervention proved to be both feasible and acceptable to all participants. Future research should aim to validate these results in larger, controlled trials and explore the long-term sustainability of the benefits achieved.

Keywords: Person-centered care, hearing rehabilitation, listening-related fatigue

Posters

Auditory Rehabilitation and Speech Perception
PD 151

Longitudinal Patterns of Hearing Device Use in Children with Congenital Unilateral Hearing Loss

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Purpose: The management of congenital unilateral hearing loss (CUHL) remains challenging, with limited longitudinal evidence on hearing device uptake and usage. This study examined trajectories of device use from early childhood to 5 years of age to identify patterns across key developmental windows.

Method: A prospective cohort of 150 children diagnosed with CUHL through newborn hearing screening was followed at 1 year, 3 years, and 5 years. Device fitting and usage data were extracted from clinical records and parental reports. The cohort included children using various device types (e.g. cochlear implant, traditional hearing aid, and bone conductor). Longitudinal patterns between intervals were classified as positive change (increasing use), negative change (declining use), fluctuating, or no change.

Results: A clear shift toward increased device use was observed over time. At 1 year, 35.9% of children were "often users". This proportion rose to 50.0% at 3 years and 70.3% at 5 years. Correspondingly, the "less use" and "never use" categories declined across intervals. Among the 64 children with complete device use data across all 3 intervals, 48.4% showed stable use between 1–3 years, increasing to 67.2% between 3–5 years. Over these consecutive intervals, positive changes remained relatively stable (29.7% at 1-3 years vs. 26.6% at 3-5 years), while negative changes decreased notably from 21.9% to 6.3%. Over the full 1–5 year intervals, most children demonstrated positive changes in device use (45.3%), followed by no change (28.1%), negative change (17.2%), and fluctuating patterns (9.4%).

Conclusion: Hearing device use in CUHL is dynamic but shows an overall trend toward greater stability, consistency, and frequency over time, with the most marked increases occurring between 3 and 5 years. These findings highlight the importance of ongoing monitoring and targeted support during early childhood to support consistent device use and optimal developmental outcomes.

Keywords: Children, Unilateral hearing loss, Device use

Posters

Auditory Rehabilitation and Speech Perception
PD 152

Using Eye-Tracking to Examine Plural Morphology in Three-Year-Olds Children With and Without Hearing Loss

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Purpose: Children with hearing loss (HL) often face perception and production difficulties with plural morphemes (e.g, /s/, /z/) due to reduced audibility of high-frequency sounds. This study investigated whether age-matched three-year-old children with and without HL can recognize plural forms in novel words and whether performance differs across allomorphic conditions.

Method: Sixty-four children (Mean Age = 39 months, range = 36–42 months) participated, including 21 with mild to severe HL (10 girls) and 43 with normal hearing (NH; 21 girls). An eye-tracking task using the Tobii Pro TX300 system measured the proportion of looks toward plural referents across three conditions: orientation (lexical contrast; e.g, cat–dog), segmental plurals (/s/, /z/), and syllabic plurals (/əz/). Difference scores were calculated as post-stimulus minus pre-stimulus looking proportions. Group-level t-tests compared performance against chance, and a linear mixed-effects model examined effects of Condition, Group, and their interaction.

Results: Both groups performed significantly above chance on orientation trials ($p < .001$), confirming their ability to discriminate lexical items. For plural trials, NH children performed above chance for both segmental and syllabic conditions ($p < .001$), whereas HL children performed at chance ($p > .10$). The mixed-effects model showed significant main effects of condition ($p < .001$) and group ($p = .002$), but no significant condition × group interaction ($p = .43$), indicating similar response patterns but higher overall accuracy for NH children.

Conclusion: By age three, children with HL can recognize familiar words, indicating successful task engagement comparable to their NH peers. However, they show delayed or incomplete understanding of plural morphology. These findings highlight that reduced audibility may affect grammatical growth in children with HL. The results also demonstrate the utility of eye-tracking for detecting subtle group differences in early plural learning.

Keywords: Children, Hearing loss, Eye-tracking

Posters

Auditory Rehabilitation and Speech Perception
PD 153

Development of a Mobile Phone-Based Auditory Training Tool for Mandarin-Speaking Adults with Hearing Loss

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Auditory training (AT) represents a critical intervention for adults with hearing loss (HL), especially for those newly fitted with cochlear implants (CIs) or hearing aids (HAs). This study presents the development and evaluation of a comprehensive mobile application-based AT program for Mandarin-speaking adults with HL.

The training program encompasses hierarchical auditory perception tasks, such as environmental sound perception, speech segment recognition (vowels, consonants, tones), digit recognition, word recognition (in isolation and in sentential context), sentence and paragraph comprehension, multi-talker conversation comprehension (2-4 talkers), and emotional recognition (happiness, sadness, anger, and surprise). All speech materials were related to everyday activities including campus life, work, hospitals, grocery shopping, etc. Speech materials were recorded by four speakers (two professional, two casual) at normal and fast rates, with superimposed white noise and babble noise to simulate real-world listening environments.

A total of 160 adults with HL participated in the program (M = 33.82 years, SD = 15.47), predominantly with profound (107 users) or severe HL (31 users). Participants included 84 CI users (40 bilateral, 44 unilateral), 55 bimodal users (CI + HA), and 21 HA-only users. Fifty-eight were prelingually deaf and 102 were postlingually deaf.

Participants completed home-based training, averaging 18.85 hours (SD = 24.05) within one month. A pretest-training-posttest paradigm evaluated training efficacy through four comparable assessments: baseline (pretest) and at one-third, two-thirds, and full completion (posttests 1-3), evaluating the full range of auditory abilities addressed in the program.

Results demonstrated progressive improvement across tests, with mean scores of 56% (SD = 22%), 74% (SD = 16%), 77% (SD = 14%), and 85% (SD = 8%). Notably, such improvement was observed for both CI and HA users and for both prelingual and postlingual deaf populations. These demonstrate the potential of mobile-based AT programs to deliver accessible and effective rehabilitation for adults with HL.

Keywords: Auditiory training, Mobile-phone based, Mandarin Chinese

Posters

Auditory Rehabilitation and Speech Perception
PD 154

Early Intervention Decisions in Children with Congenital and Late-Onset Hearing Loss

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Purpose: Late-onset hearing loss (LOHL) contributes substantially to rising hearing loss prevalence, reaching 13 per 1,000 children by preschool age. This study examined differences in intervention decisions between families of children with congenital hearing loss (CHL) and LOHL, including proportions and timing of hearing device fitting and auditory-verbal intervention enrollment.

Methods: We analyzed data from 3,685 children with hearing loss born between March 2012 and August 2022 who completed newborn hearing screening. The intervention decisions between CHL and LOHL families were compared. The Scheirer-Ray-Hare Test was performed to evaluate differences in time intervals to reach intervention milestones.

Results: Of 3,685 children, 81% had CHL while the other 19% had LOHL detected after passing newborn screening. Hearing loss severity distributions were comparable between the two groups. Hearing device fitting rates reached 62.2% overall, with higher uptake in CHL (64.4%) compared to LOHL (53.0%). Auditory-verbal therapy enrollment was 36.2% overall, significantly higher in CHL (46.5%) than LOHL (30.6%). Device fitting and intervention enrollment rates increased with hearing loss severity in both groups. The CHL group demonstrated significantly longer intervals from consultation to device fitting ($H(1)=20.56$, $p=.00$) and therapy enrollment ($H(1)=31.47$, $p=.00$). Regardless of group, children with more severe hearing loss required significantly less time for device fitting ($H(5)=39.07$, $p=.00$).

Conclusions: LOHL children had substantially lower intervention rates than CHL children, yet families pursuing intervention decided faster. This expedited decision-making likely reflects the families' direct recognition of the developmental consequences of hearing loss. This disparity reveals that while some LOHL families recognize intervention needs, many remain unserved. Results underscore the necessity of continued audiological follow-up beyond newborn screening and intensified education for LOHL families, especially those with milder hearing loss.

Keywords: Late-onset hearing loss, Hearing device fitting, Intervention

Posters

Auditory Rehabilitation and Speech Perception
PD 155

Results of Cognitive and Motor Function Rehabilitation in Children with Hearing Impairments

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It has been established that children with hearing impairments often present with concomitant deficits in postural control, balance, coordination, and motor skill development, which leads to a diminished quality of life. However, even when balance, motor skills, and quality of life are assessed, the development of these skills is typically not included in the individual rehabilitation plan. Several studies confirm regular, targeted physical exercise can improve motor skills, particularly balance, in children with hearing impairments.
Objective: To develop a methodology for enhancing cognitive and motor skills, thereby increasing the rehabilitation efficacy for children with hearing impairments.
Materials and Methods. The proposed methodology integrates systematic adaptive physical education sessions with tennis elements into the comprehensive auditory-verbal rehabilitation process. Twenty-one school-aged children (8-12 years old) participated in year-long classes comprising three blocks. Block 1 included 24 sessions with 7 tennis ball exercises. Block 2 included 32 sessions with 9 exercises using an agility ladder, a tennis racket, and a ball. Block 3 included 40 sessions with 8 exercises using an agility ladder, cones, a racket, and a ball. Cognitive and motor indicators were assessed before rehabilitation, and after 6 and 12 months.
Results. Cognitive tests demonstrated improved logical skills by 12 months. Auditory attention, intelligence, and oral speech scores showed significant progress by 6 months, followed by a plateau. Early motor improvements (by 6 months) were observed in the overall percentage of motor impairments and visual-motor integration. By 12 months, visual-motor integration and accuracy continued to progress, while balance and gross motor skills stabilized. Dynamic praxis improved only by 12 months. Speed and accuracy demonstrated the most consistent progress. Problem areas with low rehabilitation efficacy were oculomotor functions and oral-facial praxis.
Conclusions. The proposed methodology is effective in developing cognitive and motor functions, with maximum efficacy observed after 6 months of training.

Keywords: Hearing loss, Motor development, Balance

Posters

Auditory Rehabilitation and Speech Perception
PD 156

The benefits of utilizing ipsilateral and contralateral acoustic hearing in pediatric cochlear implant users

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Cochlear implants(CIs) brought a significant breakthrough in children's development; however, the long-term outcomes have revealed that children using cochlear implants persistently showed many limitations compared to those with normal hearing. The purpose of this study is to investigate how the combined use of acoustic stimulation in electric-acoustic stimulation(EAS) leads to better outcomes compared to using a cochlear implant (CI) alone. Additionally, it aims to examine the differences in the development of auditory, language, and musical functions between children who use CIs without any prior acoustic hearing experience and those who have been using EAS.
This study included a total of 52 pediatric cochlear implant recipients who had no inner ear malformations, cognitive impairments, or developmental disorders, and who had used bilateral CIs for at least four years, consistently demonstrating good auditory performance (word recognition score(WRS) >80%). We compared speech performance (WRS in quiet and sentence recognition in noise) in EAS users under ipsi-EAS, contra-EAS, and CI-only modes. We also investigated whether there were differences in auditory performance, language development, and music perception and production among these modes.
In the results, there was no significant difference in performance between the EAS group and the CI-only group in quiet conditions; the EAS group demonstrated significantly better listening ability than the CI group in noisy environments. Moreover, linguistic development was significantly advanced in children over the age of four in the EAS group. Additionally, the EAS group showed significantly better outcomes in both musical production ability and music perception development.
This study demonstrates that for pediatric cochlear implant users, hearing acoustic signals through HA in combination with electrical stimulation, even with a small amount of hearing, has a profound impact on the development of auditory, language, and musical abilities.

Keywords: Acoustic hearing, Long term outcome, Hearing, language, and music performance

Posters

Auditory Rehabilitation and Speech Perception
PD 157

Trust, Hearing Aid Adoption, and Predictors of Trustworthiness

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Trust in healthcare settings is associated with better patient outcomes such as greater adherence to treatment and satisfaction with healthcare interactions. In hearing care, trust has received minimal attention. The limited literature, primarily from qualitative data, suggests that trust between clients and hearing care professionals (HCPs) is crucial for fostering relationship quality throughout the hearing health journey. Specifically, a trusting relationship improves outcomes for hearing help-seeking including uptake of hearing aids (HA).
This study aims to provide a large-dataset quantitative approach to explore if traits such as trust and empathy affect HA adoption rates. In Study I, clients (n = 524) completed an online questionnaire before and after their first audiology appointment from hearing clinics in Canada. The core questions assessed 1) trust in HCPs using a modified Trust in Physician (TIP) scale; 2) the level of care and empathy received from their HCP during their appointment; 3) Overall hearing ability and motivation to improve their hearing; 4) Expected Consequences of Hearing Aid Ownership (ECHO); and 5) Hearing Handicap Inventory (HHIE). In Study II, HCPs (n = 73) completed a brief questionnaire assessing 1) endorsement of practitioner vs. client-centred attitudes, 2) humility, 3) personality, and 4) social inhibition.
In Study I, it was observed that both TIP scores and self-reported hearing handicap predicted greater HA adoption by clients. Furthermore, TIP scores were shown to have the greatest effects for persons who exhibit moderate levels of hearing handicap. In Study II, it was observed that greater trustworthiness by clients toward the HCP was predicted by social inhibition, specifically the extent to which HCPs exhibited greater worry about potential disapproval from others. These findings suggest that trust influences the decision to opt for a HA and this is mediated by hearing loss severity, as well as possible approaches to foster greater trust.

Keywords: Hearing rehabilitation, Trust, Hearing aid adoption

Posters

Auditory Rehabilitation and Speech Perception
PD 158

Enhancing Listening Skills in Preschool Children with Hearing Loss: Development of a Korean Auditory Training Program

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Background:
Children with hearing loss face challenges in auditory perception and communication despite amplification through hearing aids or cochlear implants. While these devices restore audibility, effective communication depends on higher-level processes such as focused listening and auditory comprehension. In noisy environments, increased listening effort reduces cognitive resources for language processing. Although auditory training can improve listening skills and reduce cognitive load, no standardized Korean-language program currently exists for preschool or early school-age children using HAs or CIs.

Objective:
This study aimed to develop a structured auditory training program to enhance listening and communication skills in Korean-speaking preschool children with HAs or CIs, targeting abilities essential for participation in mainstream classrooms.

Methods:
The program was designed based on a hierarchical auditory skill framework encompassing detection, discrimination, identification, and comprehension. A total of 202 sentences and 25 short stories were developed to match the linguistic level of preschool and early school-age children. These materials were reviewed and validated by four professors specializing in audiology and speech-language pathology to ensure linguistic appropriateness and auditory training validity. Speech stimuli were recorded by male and female voice actors and paired with child-appropriate illustrations generated using DALL·E. All audio files were RMS-equalized and mixed with speech noise at 0, +3, and +6 dB SNR. The program has been developed into an interactive auditory training tool incorporating these materials for clinical use. A pilot study with preschool children using HAs or CIs is planned, and outcome measures will include auditory performance, engagement, and usability. Preliminary results will be presented to evaluate feasibility and potential efficacy.

Expected Outcomes:
The program is expected to reduce listening effort, improve speech perception in noise, and enhance communicative competence. Its implementation will provide a foundation for evidence-based auditory rehabilitation and inform the development of training protocols for educational and clinical use.

Keywords: Auditory traning, Preschool children, Assistive hearing device

Posters

Auditory Rehabilitation and Speech Perception
PD 159

Korean Auditory, language, and cognitive Rehabilitation for Infants (KARI) program

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The limited access to specialized services makes it difficult for infants with hearing impairments to receive appropriate intervention during their critical developmental period. This study aims to develop the Korean Auditory, language, and cognitive Rehabilitation for Infants (KARI) program and make the platform to provide systematic and accessible early auditory rehabilitation services. KARI has been researched for 16 years and was completed as the platform(http://www.kari-rehabilitation.com) and patent registration(Registration number 10-2630356) recemtly. The KARI program composed with the evaluation materials, parent education and counseling materials, professional guidelines. KARI was developed based on 5 materials, Korean Infant Vocal and Articulate Development (KIVAD) list for setting baseline and target, Dan dong sib hoon for adapting Korean traditional infants' disciplining method, Short Fun Input for Modeling (SFIM) for systematic modeling technique for infants, Auditory Verbal Therapy (AVT) for emphasizing speech and listening, attachment parenting for fostering a child's socio-emotional bond. KARI also provides special parent education materials. The effectiveness and significance of aural rehabilitation using the KARI has been reported by the 5 articles published. This study highlights that KARI offers developmentally and contextually relevant content, reflecting Korea's unique linguistic and cultural characteristics. In order to improve easy accessibility and high utilization for public satisfaction, the platform was developed using a four-step process planning, design, implementation, and operation. Thus, the KARI is expected to serve as an effective integrated support system for early intervention in infants and toddlers with hearing impairments and may help improve the quality of life for their families.

Keywords: Early intervention, Hearing impaired infants, Hearing rehabilitation platform

Posters

Auditory Rehabilitation and Speech Perception
PD 160

School readiness of first-grade entrants with hearing impairments and additional learning needs receiving auditory-verbal therapy in Taiwan

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Objectives: In Taiwan, over 10% of 6-year-old students with hearing impairments who received early Auditory-Verbal intervention also have additional learning needs. Their rate of delayed school progression is about seven times higher than that of peers with hearing impairment only. This study investigates the influence of the transition service on school readiness in children with hearing impairments and additional learning needs (N = 35, mean hearing age = 4.42; mean age = 6.05). Methods: Data were collected using a 5-point Likert-type questionnaire, the "Transition Skills Rating Scale for Preschoolers with Hearing Impairments", which encompasses four domains: self-care, learning behavior, academic achievement, and social interaction. The assessment was first conducted by the child's primary caregiver six months prior to graduating from senior kindergarten, and later by the child's first-grade teacher after the child entered first grade for at least one month. The data were analyzed by the Paired Sample t-test and Spearman's correlation. Results: (1) The overall school readiness scores of children were significantly higher in first grade compared to kindergarten ($t = 2.558$, $p = 0.015$) and academic performance ($t = 2.057$, $p = 0.047$), extremely significant in self-care ($t = 4.948$, $p < 0.001$); (2) No significant differences were found based on gender, hearing age, the age at hearing device fitting, the age at early intervention, the scores on standardized language assessments, and the pure tone audiometry. Conclusions: Despite the wide individual differences among students with hearing and additional learning needs—whose school readiness cannot be easily predicted by common background factors, systematic Auditory-Verbal transition services can help improve their school readiness.

Keywords: School readiness, Hearing impairments, Additional learning needs

Posters

Auditory Rehabilitation and Speech Perception
PD 161

Korean Sentence-Based Neurofeedback System

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Although selective attention plays a critical role in effective communication in noisy environments, individuals with hearing loss have difficulty segregating target speech from background noise. Prior studies have reported that various types of auditory rehabilitation training can improve hearing abilities in individuals with hearing impairment. This study investigated the feasibility and effectiveness of a sentence-based neurofeedback system designed to enhance selective attention in noisy environments. Participants were instructed to respond to one of two simultaneously presented sentence stimuli from different loudspeakers. The 64-channel electroencephalography data were recorded to provide real-time feedback indicating the stimulus that the participant focused on, using a backward temporal response function. After each training session, comprehension of the presented sentences by the participants was subjectively assessed by completing the missing parts of sentences generated using the Bidirectional Encoder Representations from Transformers model. This method enabled the evaluation of their concentration based on contextually appropriate word completion. The participants underwent neurofeedback training once a week for four consecutive weeks. A preliminary test with four normal-hearing participants showed that spoken-sentence comprehension in a noisy environment improved after neurofeedback training ($p < 0.05$, paired t-test). In this paper, we present the details of a sentence-based neurofeedback system and its feasibility for training auditory selective attention in noisy environments.
This work was supported by the National Research Foundation of Korea (NRF) grants funded by the Ministry of Science and ICT (MSIT) (RS-2024-00461617, RS-2024-00338148)

Keywords: Neurofeedback, Bidirectional Encoder Representations from Transformers, Auditory Selective Attention

Posters

Auditory Rehabilitation and Speech Perception
PD 162

Competitive neurofeedback system to improve speech-in-noise perception

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This study explored the feasibility of a competition-based two-person neurofeedback system to enhance attentional neural entrainment and improve speech-in-noise (SiN) perception while maintaining intrinsic motivation system-provided real-time shared electroencephalography (EEG) feedback. This allowed participants to observe the neural entrainment performances of their partner and themselves, thereby fostering social interaction and competitive engagement. Thirteen adults with normal hearing participated in six sessions. The first and last sessions were dedicated to SiN testing, whereas the second through fifth sessions, conducted at one-week intervals, involved neurofeedback training. Neurofeedback training was conducted with two participants attending to auditory stimuli simultaneously from two speakers and receiving real-time feedback based on their decoded brain activities by 64-channel EEG. The engagement of participants in neurofeedback training was evaluated using the internal motivation inventory (IMI). The neural entrainment index increased after neurofeedback training ($p = 0.068$), indicating a stronger distinction between the brain responses to attended and unattended stimuli. SiN perception improved at both the sentence (effect size = 0.47) and word (effect size = 0.40) levels, and the degree of neural enhancement was positively correlated with behavioral improvements ($r = 0.64$ and $p < 0.05$). The enjoyment scores on the IMI remained consistently high across sessions, with no significant differences observed between sessions ($p > 0.05$), indicating a stable level of intrinsic motivation throughout the training period. Incorporating these preliminary findings, this poster demonstrates that four weeks of competitive and multi-participant neurofeedback training enhances auditory attention and SiN perception while maintaining the intrinsic motivation of the participants throughout the training period.
This work was supported by the National Research Foundation of Korea (NRF) grants funded by the Ministry of Science and ICT (MSIT) (RS-2024-00461617, RS-2024-00338148).

Keywords: Neurofeedback, Speech-in-noise, Internal motivation inventory

Posters

Auditory Rehabilitation and Speech Perception
PD 163

Adding a Recall Task to Auditory Training Significantly Improves Working Memory in Older Adults with Hearing Loss

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Objectives
Fewer than 11% of individuals with hearing loss use hearing aids, owing to barriers such as high costs, social stigma, and limited access to hearing specialists. Previous studies have shown that auditory training can significantly enhance communication skills in this population. However, generalization—benefits extending to untrained tasks—remains a challenge. We therefore hypothesized that incorporating a simple recall task into auditory training would significantly improve working memory.
Design
In this randomized controlled trial. a total of 90 native Cantonese speakers aged 60–75 years with hearing loss were recruited. Participants were randomized into two groups: (A) Auditory training (AT) alone, consisting of an adaptive sentence perception in noise task (30 minutes per day for 30 sessions); or (B) Auditory training plus recall (ATC), in which participants recalled the first or last word of each sentence immediately after the training task. The Cantonese Hearing-in-Noise Test and Reading Span Test were administered before and after training to assess speech perception and working memory, respectively.
Results
Mixed linear modeling revealed that both AT and ATC significantly improved speech perception in noise (Cohen's d = 0.57 vs. 0.74) and working memory (Cohen's d = 0.34 vs. 0.98) post-training. No significant between-group differences were observed for speech perception in noise ($p = .097$), but the ATC group outperformed the AT group on working memory ($F(1, 87) = 4.62$, $p = .034$).
Conclusions
Incorporating a brief recall task into auditory training—a low-cost addition requiring minimal extra time—significantly enhances working memory, in this population.

Keywords: Auditory training, Working memory, Older adults

Posters

Auditory Rehabilitation and Speech Perception
PD 164

RESONATING SUPPORT: PARENTS AS KEY PARTNERS IN HYBRID AURAL REHABILITATION THERAPY — A CASE STUDY

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Introduction:
Aural rehabilitation supports children with hearing loss by fostering communication skills, participation in everyday contexts, and overall quality of life. Hybrid aural rehabilitation combining in-person sessions with tele-practice has expanded opportunities for continuity of care and family empowerment. Parents play a vital role in shaping children's auditory, speech, language, and socio-emotional development; however, their involvement is often limited by inadequate training, confidence, or accessibility.
Purpose:
This case study aimed to examine how active parental involvement contributes to auditory and communication outcomes in a 4-year-10-month-old male child using bimodal stimulation following cochlear implantation within a hybrid aural rehabilitation model.
Methods:
A family-centered hybrid intervention consisting of weekly clinic-based therapy and tele-practice follow-ups was implemented over a three-month period. Professional counselling, home-based listening tasks, continuous device monitoring, and shared goal planning were integral components. The child's progress was monitored using auditory skill questionnaires, speech-language assessments, and parental feedback.
Results:
Active caregiver participation demonstrated positive outcomes, including improved listening behavior, increased vocalization attempts, better consistency in device use, and enhanced responsiveness in structured and naturalistic communication settings. Parents reported greater confidence in implementing listening strategies and maintaining therapy continuity at home.
Conclusion:
This case study highlights that hybrid aural rehabilitation strengthens collaboration between clinicians and caregivers, promotes accessibility, and enhances sustained engagement. When guided and empowered, parents can significantly influence rehabilitation outcomes, particularly in resource-limited contexts. Integrating structured family support within hybrid service delivery offers a promising approach for optimizing communication development in children with hearing impairment.

Keywords: Hybrid Aural Rehabilitation, Parental Involvement, Family-Centered Intervention

Posters

Auditory Rehabilitation and Speech Perception
PD 165

Preoperative Cognitive Predictors of Speech-in-Noise Outcomes After Cochlear Implantation in Adults with Severe-to-Profound Hearing Loss

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Hearing rehabilitation through cochlear implantation (CI) not only restores auditory perception but may also interact with cognitive processes, influencing postoperative outcomes (Völter et al, 2022; Yeo et al, 2023). While demographic and audiological factors have been shown to affect CI success (Blamey et al, 2013; Goudey et al, 2021; Lazard et al, 2012), the predictive value of preoperative cognition remains underexplored. This study aimed to determine whether cognitive measures before implantation could predict speech perception in noise 18 months post-activation.

We recruited 46 adults (mean age 57 years) with post-lingual severe-to-profound bilateral hearing loss. Participants underwent preoperative assessments including demographic and audiological data, and cognitive testing targeting verbal memory (immediate and delayed recall), visual memory, language, and executive functions. Speech perception in noise was evaluated using the Vocale Rapide dans le Bruit (VRB, Leclercq et al, 2018) test at 18 months post-implantation. Participants were categorized into three performance groups based on their VRB scores: Poorer Performers, Average Performers and Better Performers.

Multivariable ordinal logistic regression identified five significant predictors of speech-in-noise performance: immediate and delayed verbal memory recall, mode and apparition of hearing loss onset, age at implantation, and cochlear implant brand. Higher preoperative verbal memory scores were associated with better VRB outcomes, while older age at implantation predicted poorer performance. The model explained 29% of the variance in speech-in-noise perception at 18 months post-implantation and distinguished poorer, average, and better performers.

These findings indicate that preoperative cognitive assessment, particularly verbal memory, can meaningfully inform predictions of CI outcomes. Incorporating cognitive measures alongside conventional audiological and demographic factors may support personalized rehabilitation planning and improve auditory performance after implantation. This study highlights the potential for targeted cognitive interventions to complement auditory rehabilitation, ultimately improving long-term outcomes in adults receiving cochlear implants.

Keywords: Cochlear implant, Cognition, Speech-in-noise perception

Posters

Auditory Rehabilitation and Speech Perception
PD 166

Auditory Cortical Development in Young Children with Hearing Loss Using Cortical Auditory Evoked Potentials

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Purpose: Objective assessment of auditory cortical development is vital for evaluating intervention efficacy in infants with hearing loss (HL). This study used Cortical Auditory Evoked Potentials (CAEPs) to monitor auditory cortical development by examining P1 latency and detection z-scores in children with and without HL from infancy to three years of age.

Method: A prospective cohort of normal-hearing (NH) children and children fitted with hearing aids was assessed at 3-6 months, 7-12 months and three years of age. The cortical onset responses (P1 component) were recorded using three speech-like stimuli ([uiu], [szs], and high-pass filtered spectral rippled noise (SRN) presented in free field at 20 sones. P1 latency was analysed as an indicator of cortical timing. The p-values derived from Hotelling's T^2 test, which compare the signal to the noise floor (where a $p < .05$ indicates a statistically significant response), were converted to z-scores to quantify response certainty and robustness.

Results: P1 latency decreased with age in both groups, consistent with expected maturational trends. Although children with HL showed significantly longer mean latencies across ages compared to their NH peers, the rate of latency change across intervals was comparable between groups, suggesting similar developmental trends. Correspondingly, detection z-scores also changed significantly with age in both groups, showing robust early cortical responses that became less strongly negative over time. Stimulus type also affected z-scores, with [uiu] eliciting the strongest responses. No significant group differences were found in detection patterns, indicating comparable cortical detection patterns between the HL and NH groups.

Conclusion: These findings highlight the use of CAEP measures as objective markers for monitoring auditory cortical development and evaluating the effectiveness of early hearing intervention in young children with HL.

Keywords: Children, Cortical Auditory Evoked Potentials, Hearing Loss

Posters

Auditory Rehabilitation and Speech Perception
PD 167

Evaluating a Co-Designed Hearing Education Program ('ACE Your Hearing'): A Hybrid Effectiveness-Implementation Trial

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Background: Hearing loss significantly affects communication, social participation, and psychosocial wellbeing. The 'ACE Your Hearing' program was co-designed with stakeholders to provide holistic, adaptable support for adults with hearing loss and their families. The aim of this study was to comprehensively evaluate the impact of ACE and to accelerate research-to-practice translation through a hybrid trial design, assessing both efficacy under controlled conditions and effectiveness in routine clinical settings.

Methods: This Hybrid Type 1 design incorporates two complementary trials. Trial 1 (Efficacy) is a three-arm randomised controlled trial (RCT) in which adults aged ≥50 years with hearing loss and their family members are randomised to a 2-session ACE group, a 4-session ACE group, or a 4-session active control (speech-reading) group. Trial 2 (Implementation) comprises three pragmatic, single-arm studies, including a clinic-delivered 2-session ACE group, a clinic-delivered 3- or 4-session ACE group, and a non-intervention treatment-as-usual cohort. Outcomes were measured across both trials at baseline, post-intervention, and 3-month follow-up using validated measures.

Results: Final analyses from both trials will be presented. For the RCT, it is hypothesised that both ACE formats will demonstrate significantly greater improvements in hearing handicap (Revised Hearing Handicap Inventory, RHHI), social participation (Social Participation Restrictions Questionnaire, SPaRQ), and mental wellbeing (Warwick-Edinburgh Mental Wellbeing Scale, WEMWBS) compared to the active control. For the pragmatic trial, pre-post changes will be examined within the clinician-led ACE arms and compared with the treatment-as-usual cohort to assess real-world effectiveness. Preliminary pilot data indicate high program acceptability and perceived benefits.

Conclusion: This hybrid trial will generate comprehensive evidence on both the efficacy of 'ACE Your Hearing' and its effectiveness in clinical practice. By addressing whether the program works and how it works in real world contexts, the findings will inform scalable implementation of holistic, person-centred hearing care.

Keywords: Hearing rehabilitation, Implementation, Randomised controlled trial

Posters

Auditory Rehabilitation and Speech Perception
PD 168

Understanding Variability in Listening and Communication Outcomes for Children with Hearing Loss and Additional Needs

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Background:
Children with hearing loss and additional needs show diverse developmental profiles influenced by medical, cognitive, and environmental factors. Their communication may involve spoken language, augmentative systems, or multimodal approaches. Although frequently seen in clinical services, this population remains underrepresented in research due to the limitations of standardised assessment tools. Monitoring listening and communication development enables responsive goal-setting and supports collaborative communication planning.

Objectives:
This study examined outcomes for children aged 0–6 years with hearing loss and additional needs using a range of hearing technologies. It aimed to document variation in developmental trajectories and identify factors influencing listening and communication outcomes within early intervention (EI) services.

Methods:
A retrospective review of clinical records was undertaken for 154 children with diagnosed additional needs enrolled in a specialised EI program between 2016 and 2025. Listening and communication development were tracked over five years using multiple measures, including the Functional Listening Index–Paediatric (FLI-P), standardised and non-standardised assessments, and caregiver reports. Final outcomes were analysed in relation to hearing technology, intervention timing, and individual developmental profiles.

Results:
Children with additional needs demonstrated greater variability in outcomes compared with peers with hearing loss alone. Most showed meaningful progress, though the rate and pattern of development differed by profile. Factors associated with stronger outcomes included earlier access to intervention, consistent device use, family engagement, and lower medical or developmental complexity.

Conclusions:
Findings highlight the need for inclusive, multidisciplinary models of care that recognise the diversity of developmental pathways among children with hearing loss and additional needs. Early and sustained access to high-quality intervention, combined with individualised and flexible planning, can optimise listening and communication outcomes across a range of communication modes and technologies.

Keywords: Additional needs, Communication outcomes, Early intervention

Posters

Auditory Rehabilitation and Speech Perception
PD 169

Effects of word familiarity on the intelligibility of mosaic speech as perceived by young and elderly listeners

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Background: Mosaic speech is a kind of noise-vocoded, degraded speech in which the speech signal is divided in time × frequency blocks. In each block, the energy distribution is equalized and temporal fine structure is absent. So far, mosaic speech intelligibility has solely been tested with younger listeners with familiar words presented in isolation or in sentences. When created with 20 frequency bands, intelligibility is near perfect for temporal blocks up to 40 ms, but declines sharply for blocks of 80 ms or longer.
Purpose and Method: To gain further insight into the temporal resolution necessary for speech understanding in different age groups, 20 young listeners (<25 y.o.) and 20 elderly listeners (>65 y.o.) reported their intelligibility of mosaicized Japanese words. To assess the influence of lexical familiarity on word intelligibility between these age groups, high-familiarity and low-familiarity words were used. These were segmented into 20 frequency bands and temporal blocks of 0, 20, 40, 80, 160, and 320 ms.
Results: Intelligibility of high-familiarity words, as measured by the percentage of correctly identified morae (i.e, Japanese linguistic units), exceeded 85% for both listener groups when mosaic block duration was 40 ms or less. For blocks of 80 ms, however, intelligibility for younger listeners was about 70%, while that for elderly listeners dipped below 50%. As for low-familiarity words, even when not segmented in time (block duration 0 ms), intelligibility of elderly listeners did not reach 80%, although individual percentages showed a strong significant correlation with hearing loss (r=-0.92). Furthermore, already for relatively short mosaic blocks of 40 ms, intelligibility of low-familiarity words for elderly listeners moved below 60%.
Conclusion: Together, the present results highlight the need for systematic assessments of top-down contributions (i.e, lexical familiarity) to speech intelligibility in studies on temporal aspects of speech processing in different age groups.

Keywords: Speech intelligibility, Lexical familiarity, Elderly listeners

Posters

Auditory Rehabilitation and Speech Perception
PD 170

A review of model approaches and strategies in aural rehabilitation & its implementation for children across the globe

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Introduction
Aural rehabilitation (AR) is an approach for early intervention for individuals with hearing impairment (HI) who are fitted with amplification devices or have undergone cochlear implantation (Houston et al, 2018). AR to children can be delivered through diverse models including traditional (in clinic approach), hybrid models integrating face to face and remote setting, institutional or school based, community based, home and family-centered models . These models are delivered using a combination of methods such as face-to-face, tele-health, mHealth/eHealth. Despite various models to support implementation of AR, the efficacy of the models in terms of outcome, accessibility, suitability & uptake is not well known in children.

Aim
The review aims to synthesize the recent literature on AR for children in all the models and obtain the implementation effectiveness of these interventions for children across the globe.

Objectives
To Identify the models, approaches and strategies in AR for children
To report on the effectiveness of implementation models available for children with HI especially in the rural context

Method
A search strategy was developed for scoping review following PRISMA-ScR guidelines. Articles were accessed through PubMED, Scopus and Google Scholar. The review included studies that have been published since 2005 and are targeted for children below 18 years .Two reviewers independently screened articles for full-text inclusion.

Results
A variety of traditional, hybrid, remote, and community-based strategies including phased (Thammaiah et al, 2017) and school-based telehealth approaches (Robler et al, 2025) aim to broaden access to AR, particularly for children in rural areas. However, current models are few, where there is a lack of standardized framework for measuring outcomes, limited long-term followups, fidelity variability in real-word settings. Development of a more generalized, adaptable model could enable more effective and scalable AR delivery in rural contexts.

Keywords: Aural rehabilitation, Models, Children

Posters

Auditory Rehabilitation and Speech Perception
PD 171

Development of the University of Canterbury Four-Alternative Forced Choice (UC4AFC) Monosyllabic Word List

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Auditory processing disorder (APD) is characterized by a variety of symptoms that can present as listening difficulties despite normal peripheral hearing. The University of Canterbury Adaptive Speech test - Filtered Words (UCAST-FW; O'Beirne et al, 2012; Rickard et al, 2013) is an adaptive low-pass filtered speech test for use in APD assessment. However, it originally used North American stimuli (the NU-CHIPS) which are less suitable for New Zealand and Australian children. To address this, we have created the University of Canterbury Four-Alternative Forced Choice (UC4AFC) monosyllabic word list using phonemic contrasts more appropriate for New Zealand and Australian varieties of English.

We developed an initial list of 98 target words, each with three phonemic, semantic, or unrelated foils. These were subsequently recorded in both audio and video formats. For picture-pointing testing, four candidate images per item (392 total) were evaluated by adults (n=43), who selected "the image that best represents the target word" for children. We then assessed 4-year-olds' (n=30) spontaneous naming of these 98 most-selected images, measuring level of agreement and naming latency. Next, we tested the receptive picture-pointing version of this task with 4-year-old children (n=45) using the unfiltered supra-threshold audio stimuli, measuring the proportion of correct choices and response latency (ms). Combining this paediatric data with adult psychometric data (n=35) for low-pass-filtered stimuli in both open-set and closed-set modes, we selected a final word list of 66 items across two balanced lists. Here we present data from each of these stages of test development and describe the characteristics of the finalised lists.

The UC4AFC provides robust four-alternative monosyllabic stimuli that are more suitable for New Zealand and Australian children than previous North American stimuli. These should enable more accurate paediatric evaluation of speech discrimination and APD.

Keywords: Auditory processing, Pediatrics, Speech testing

Posters

Auditory Rehabilitation and Speech Perception
PD 172

How do the Individuals with Hearing Impairment Behave Regarding to Metaphor Skills: A Systematic Review

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This systematic review provides a comprehensive understanding of metaphor competence in individuals who are deaf or hard-of-hearing (DHH), addressing a significant gap in research. While metaphor is a crucial aspect of communication, DHH individuals may face unique challenges in acquiring and processing it due to various linguistic and cognitive factors.

Method: A systematic search was conducted across multiple databases, including PubMed, WoS, JSTOR, Scopus, and EMBASE, for studies published up to 2025. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed. From an initial pool of 331 records, a systematic review of 24 studies that met the inclusion criteria was conducted to examine the metaphor skills of individuals who are DHH. The risk of bias was assessed using the NIH quality assessment tools.

The findings reveal a complex and heterogeneous picture. Some studies reported no significant differences in metaphor performance between DHH and hearing individuals. Conversely, other research indicated that the DHH population struggles with metaphor competence, particularly with novel or complex examples. Key factors influencing these skills include age, language proficiency, the timing of cochlear implantation, and the primary communication modality used. The review also critically examined the assessment tools employed across studies, highlighting a pressing need for more robust and reliable tasks specifically designed for individuals who are DHH.

In conclusion, this review synthesizes current knowledge, underscoring the multifaceted nature of metaphor skills in the DHH community. It calls for further research to better elucidate the influencing factors and emphasizes the importance of considering these variables when designing effective educational and clinical interventions to improve metaphor comprehension and expression for this population.

Keywords: Deaf and hard-of-hearing, Metaphor, Systematic review

Posters

Auditory Rehabilitation and Speech Perception
PD 173

Relationship between Affiliate Stigma, Stress, and perceived Quality of Life among Parents of Children with Hearing Loss

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Background: Having a family member with hearing loss can profoundly shape family systems, particularly for parents.

Aims: To determine the relationship between parenting stress, affiliate stigma, and quality of life among parents of children with hearing loss (HL) and to compare these findings with previous results from autism spectrum disorder (ASD) and cerebral palsy (CP) groups.

Method: Seventy-nine parents of children with HL completed the Affiliate Stigma Scale (ASS), Caregiver Burden Inventory (CBI), and Carer Quality of Life (CarerQoL) scales. The CareQoL includes the CarerQoL-7D, which measures subjective burden, and the CarerQoL-VAS, which evaluates well-being related to informal care.

Results: Parents who reported a lower perception of stigma related to having a child with HL also reported a significantly lower level of caregiver burden ($r = .53$, $p < .001$). Furthermore, a lower level of perceived stigma was significantly associated with better quality of life, as measured by both the CarerQoL-7D ($r = -.53$, $p < .001$) and the CarerQoL-VAS ($r = -.49$, $p < .001$). When compared to the ASD and CP groups, parents of children with HL exhibited a relatively higher level of caregiving burden ($M = 40.10$, $SD = 14.29$). Conversely, the HL parent group reported a lower level of perceived stigma ($M = 32.32$, $SD = 9.33$) and a higher quality of life ($M = 17.27$, $SD = 2.34$) (all corrected $p < .05$). The only exception to this pattern was that the HL parents' quality of life, as measured by CareQoL-VAS ($M = 8.05$, $SD = 2.09$), was comparable to that of the ASD parents ($p = .252$).

Conclusion: Healthcare professionals should be equipped to identify parents at risk of high stress or stigma, incorporate psychosocial support into routine care, and tailor interventions that bolster caregivers' well-being alongside the child's auditory and communicative outcomes.

Keywords: Hearing loss, Parental stress, quality of life, Affiliate stigma

Posters

Auditory Rehabilitation and Speech Perception
PD 174

Speech Handicap Index in Young Adults with Hearing Impairment Using Cochlear Implants

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Purpose: This study examined the Speech Handicap Index-15 (SHI-15) in young adult cochlear implant (CI) users with hearing impairment and analyzed which audiological and rehabilitation/environmental factors determine SHI-15 scores.

Methods: Thirty young adult CI users (aged 15–34 years) were assessed using SHI-15 total scores and subscores (P: psychosocial functioning; S: speech functioning). Independent variables included audiological factors (listening age, aided hearing level, device fitting type, age at implantation, age at onset), rehabilitation/environmental factors (age at therapy initiation and termination, rehabilitation duration, weekly home practice sessions, daily home practice time, school type), and speech production abilities (speech intelligibility, speech acceptability, percentage of consonants correct [PCC]). Between-group comparisons were followed by correlation and regression analyses.

Results: Significant differences in total and P scores were found according to listening age and device fitting type ($p < .05$). Aided hearing level showed medium effect sizes for total and S scores ($d \approx 0.60$). School type significantly affected P scores ($p < .05$). Correlation analyses revealed that aided hearing level was significantly associated with all SHI-15 scores, and speech intelligibility, speech acceptability, and PCC were significantly correlated with all scores ($p < .05$); however, rehabilitation/environmental factors showed no significant correlations. Regression analyses confirmed that aided hearing level significantly predicted all SHI-15 scores, weekly home practice sessions significantly predicted P scores, and all speech production variables significantly predicted total and subscores. Speech intelligibility and PCC together explained approximately 30% of score variance.

Conclusion: SHI-15 scores in young adult CI users were better explained by current hearing status and speech production abilities than by past medical or rehabilitation history, suggesting that interventions targeting current functional levels are essential for clinical management.

Keywords: Cochlear implant, Speech handicap index, Speech intelligibility

Posters

Hearing Aids
PD 175

The International Outcome Inventory for Hearing Aids (IOI-HA) and its Correlation With WHOQOL-BREF in Assessing the Quality of Life of Patients With Hearing Loss Using Hearing Aids

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Background:
The auditory impairment can have a significant impact on communication, mental health, and interpersonal interaction. The main intervention to combat these effects is hearing aids, although their real-life efficiency and quality of life implications differ among people. In this study, the efficacy of hearing aids and their correlation with the WHOQOL-BREF in people who had experienced hearing loss were assessed using the International Outcome Inventory-Hearing Aids (IOI-HA).

Methods:
The study was performed as cross-sectional research at the Armed Forces Hospital-Southern Region (AFHSR), Khamis Mushait, Saudi Arabia, between August 2021 and May 2022. A sample of 210 adults of the age group between 18 to 65 years with confirmed hearing loss and prescribed conventional hearing aids was used. The interviews and electronic medical record data were considered in which demographics, hearing aid features, IOI-HA scores, and WHOQOL-BREF answers were considered. Data were analyzed by SPSS version 22.

Results:
The average IOI-HA score was 23.8 ± 6.4, with 41.9% of wearers using hearing aids more than eight hours a day and 30.5% claiming the considerable assistance of their aids. Moderate hearing loss, longer hearing aid use, and increased perception of benefit emerged as the factors relating to higher IOI-HA scores. The IOI-HA and WHOQOL-BREF scores showed a positive association, with the psychological and social areas showing the strongest link.

Conclusion:
Hearing Aids effectively improve the lives of people with poor hearing especially with long-term usages. Combining hearing-specific outcome measures with measure of the broader quality of life gives a better picture of the patient experience and can drive more personalized and effective strategies of hearing rehabilitation.

Keywords: WHQOL-BREF, IOI-HA, Hearing Aids

Posters

Hearing Aids
PD 176

Navigating Speech-in-Noise Deficits: Linking Cognitive Health to Evidence-Based Hearing Technology Selection

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The 2024 Lancet Commission reaffirmed hearing loss as the leading modifiable risk factor for dementia (weighted PAF = 7.0%) and underscored the growing importance of speech-in-noise (SPIN) ability, with SPIN loss linked to nearly twice the odds of developing dementia (OR = 1.91). Building on these findings, we advocate for routine SPIN testing such to quantify signal-to-noise ratio (SNR) loss, categorize results per an evidence-based framework, and select technology that addresses the patient's specific listening challenges. Evidence from recent beamforming trials shows up to an 8.6 dB average SNR improvement compared to other premium technologies. Such gains are linked to reduced cognitive load, improved participation in complex listening environments, and the potential to mitigate dementia risk. By aligning the latest dementia prevention guidance with advanced hearing technology, clinicians can play a pivotal role in supporting both hearing and cognitive health outcomes.

Keywords: Hearing Aids, Cognition, Speech in noise

Posters

Hearing Aids
PD 177

Epidemiological profile and determinants of binaural hearing aid fitting in adults with hearing loss in China

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Objective: With age-related hearing loss highly prevalent and intervention often delayed, this study aimed to characterize the profile of hearing aid users in China, and to determine factors influencing binaural fitting.
Methods: A retrospective cross-sectional study was conducted on 909 adults who received hearing aids between 2017 and 2024 in a tertiary hospital audiology center. Demographic, audiometric, and economic data were analyzed, and logistic regression was used to explore factors associated with binaural fitting.
Results: The mean age at fitting was 69.2 years (SD 16.2), with 48.3% aged ≥75 years. The pure-tone average (PTA) in the better ear was 57.9 dB (SD 12.4) and in the poorer-ear was 69.7 dB (SD 15.3), with moderate-to-severe hearing loss being the most common category (45.1%). The overall binaural fitting rate was 54.3%, showing a gradual increase over the 8-year period. The average unit price was ¥14,327 (≈USD 2,000) and mean per capita expenditure was ¥22,835 (≈USD 3,200), with a slight upward trend across years. Logistic regression showed that binaural fitting was less likely with higher unit price (OR = 0.999, $p = 0.042$) and greater interaural PTA difference (OR = 0.934, $p < 0.001$), but more likely when PTA in the better ear were worse (OR = 1.057, $p < 0.001$). Age, sex, and residence were not significant predictors.
Conclusion: In this cohort, hearing aid fitting occurred mostly at an advanced age and with relatively severe hearing loss, suggesting delayed intervention. Binaural fitting was promoted by higher thresholds in the better ear, but hindered by higher device cost and large interaural asymmetry. These findings highlight the need for earlier hearing assessments and timely intervention to encourage binaural adoption, along with measures to improve affordability.

Keywords: Age-related hearing loss, Hearing aid fitting, Binaural fitting

Posters

Hearing Aids
PD 178

From Trial to Clinical Practice: Real-World Implementation of User-Operated Audiometry in Hearing Aid Fitting

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Background:
User-operated audiometry (UAud) has shown potential to expand access to hearing rehabilitation, particularly in healthcare systems facing capacity constraints. A previous randomized controlled trial (RCT) demonstrated that hearing aid (HA) fittings based on UAud are non-inferior to those based on traditional audiometry. However, as these findings were obtained under controlled conditions, broader clinical adoption requires real-world evidence across diverse clinical settings.
This study presents the ongoing implementation of UAud into routine workflows at Odense University Hospital (OUH) and affiliated ear, nose, and throat (ENT) clinics in Denmark. The aim is to evaluate the feasibility and effectiveness of using UAud as the foundation for HA fitting while addressing system-level challenges such as limited audiometric capacity and redundant assessments across sites.
Methods:
Implementation is structured into two phases. In Phase 1, UAud was integrated into clinical routines at OUH, where patients underwent user-operated audiometry followed by HA fittings based on these results. Outcomes included the Speech, Spatial and Qualities of Hearing Scale (SSQ12), Hearing In Noise Test (HINT), and standardized measures of HA benefit and satisfaction (APHAB, IOI-HA). These outcomes are compared to results from the previous RCT to evaluate consistency in clinical benefit. In Phase 2, UAud is implemented in local ENT clinics, where patients complete UAud during their initial audiological assessment as part of the referral process for HA rehabilitation. These audiograms are then used directly for HA fittings at OUH, eliminating redundant testing. Outcomes will be compared to Phase 1 and RCT data.
Results:
Preliminary results from Phase 1 indicate that UAud maintains clinical effectiveness in routine practice. Data collection for Phase 2 is ongoing.
Conclusion:
Early findings support feasibility and clinical validity of UAud beyond controlled conditions. UAud may be a scalable approach to meet rising demand for hearing assessments and improve efficiency in hearing rehabilitation pathways.

Keywords: User-operated audiometry, Implementation research, Hearing aid fitting

Posters

Hearing Aids
PD 179

Influence of Financial Toxicity on Hearing Aid Feature and Service Delivery Preferences

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Background
Financial hardship related to healthcare, often termed financial toxicity, can significantly influence patient choices. Individuals with hearing loss who experience financial strain may opt for lower-cost hearing devices despite preferring advanced features or professional support. Understanding how financial distress affects preferences for hearing aid (HA) technology and service models can help tailor patient-centered hearing care and guide equitable policy development. This study examined associations between financial toxicity, demographic and audiologic factors, and preferences for HA features and service delivery models among adults with self-reported hearing disability.
Methods
Using a cross-sectional design embedded within a four-arm randomized clinical trial, data were collected from 114 adults with self-reported hearing difficulties. Participants completed a patient profile and the Comprehensive Score for Financial Toxicity (COST) questionnaire. Preferences for HA features and service delivery options were analyzed in relation to demographic and financial variables. Spearman correlations and standardized mean differences assessed associations.
Results
Most participants (76%) reported minimal financial burden (COST Grade 0; score ≥26). Higher financial toxicity was moderately correlated with having Medicaid coverage and with identifying cost as a key factor in selecting a service delivery model. Participants who prioritized affordability when selecting over-the-counter (OTC) HAs were typically younger and employed at least part-time, compared with those who prioritized an initial fitting by a hearing care professional. Those with higher incomes tended to favor OTC devices offering advanced features. Preference for online-only support was more common among Medicaid-insured individuals and those living alone compared with participants preferring in-person or hybrid assistance.
Conclusions
Financial strain influences both the type of HA features and service delivery options adults prefer. Although affordability drives some interest in OTC devices, many individuals continue to value professional input and advanced functionality. Addressing financial barriers is essential to ensure that emerging OTC pathways promote equitable and patient-centered hearing care.

Keywords: OTC devices, Financial Toxicity, Hearing Loss

Posters

Hearing Aids
PD 180

Efficacy and Effectiveness of Hearing Devices for Adults with Mild to Severe Hearing Loss: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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Objective
This systematic review and meta-analysis examined the efficacy and effectiveness of hearing devices among adults with mild-to-severe hearing loss. The objectives were to estimate the magnitude of benefit across outcome domains, identify measurement tools used in randomized controlled trials (RCTs), and summarize adverse effects associated with device use.
Methods
Comprehensive database searches were conducted in PubMed, CINAHL, and Embase following PRISMA guidelines. Eligible studies included adults aged 18 years or older with mild-to-severe hearing loss, comparing air-conduction hearing devices with either passive (e.g, no intervention, waitlist) or active (e.g, placebo, alternative device) control conditions. Effect sizes were calculated using Hedges' g, and pooled estimates were derived using random-effects models.
Results
A total of 39 RCTs comprising 6,302 participants met the inclusion criteria. Hearing aids produced a large, pooled effect on hearing-related self-reported outcomes compared with no intervention or waitlist controls. Effects were small to medium for general quality-of-life measures and negligible for behavioral outcomes. Relative to a placebo, hearing aids demonstrated a small effect. Personal sound amplification products (PSAPs) yielded medium effects compared to no intervention. In direct comparisons, hearing aids outperformed other devices, including smartphone hearing aid applications and extended-wear hearing aids, with a large effect size. Most studies (92%) relied on self-report measures, and only three evaluated cognitive or neurophysiological outcomes. Ten studies reported adverse events, with only one directly attributed to device use. Heterogeneity across studies was high (I^2 > 85%), though no publication bias was detected.
Conclusion
Hearing aids provide substantial self-reported benefit and outperform PSAPs, smartphone-based devices, extended-wear models, and placebo. However, limited evidence exists for cognitive, neurophysiological, and long-term behavioral effects, underscoring the need for rigorous, multidomain RCTs in hearing device research.

Keywords: Hearing Loss, Hearing Aids, Outcome measures

Posters

Hearing Aids
PD 181

Effects of DNN-based Denoising Hearing Aids on Categorical Perception of Mandarin Tones

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Purpose: This study investigated whether deep neural network (DNN)-based noise reduction in hearing aids improves categorical perception of Mandarin Tones 1 and 2 for hearing-impaired (HI) listeners in cafeteria noise at 0 dB and -5 dB signal-to-noise ratios (SNRs), compared to normal-hearing (NH) listeners and traditional hearing aid settings.

Method: Twenty NH and twenty native Mandarin listeners with sensorineural hearing loss participated. HI listeners were fitted with commercial hearing aids in two modes: DNN noise reduction enabled (DNNon) and disabled (DNNoff, retaining directional microphone noise reduction technology). Stimuli consisted of a nine-step flat-to-rising tone continuum synthesized from the vowel /a/, presented in quiet and noise conditions. Listeners identified each stimulus as Tone 1 or 2. Logistic functions fitted identification data to derive slopes, with linear mixed-effects models analyzing effects of listener group, HA setting, and SNR.

Results: In quiet, HI listeners with hearing aids showed categorical perception comparable to NH listeners. In noise, tone identification slopes were steeper at 0 dB than -5 dB SNR across groups. HI listeners using HA without DNN processing (DNNoff) yielded shallower slopes that approached significance compared to NH listeners, while with DNN processing enabled (DNNon), identification slopes maintained similar to NH. Among HI listeners, categorical perception declined progressively across conditions: quiet > DNNon_0dB > DNNon_-5dB > DNNoff_0dB > DNNoff_-5dB. Slopes correlated negatively with age and pure-tone average, but only in DNNon conditions.

Conclusions: DNN-based noise reduction preserves categorical perception of Mandarin tones in noise for HI listeners, offering benefits over traditional methods in challenging environments for tonal language users. These findings underscore the potential of advanced signal processing to enhance communication for listeners of tonal languages, suggesting integration of DNN technology in clinical hearing aid protocols to address specific perceptual needs in real-world noisy settings.

Keywords: DNN-based denoising, Categorical perception, Mandarin lexical tone

Posters

Hearing Aids
PD 182

Nuance Eyeglasses with Amplification – Evaluation of Speech-In-Noise Performance, SII Scores, and Effect on Listening Effort in a Group of Adults with Mild to Moderate Hearing Loss.

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The performance of the Nuance Eyeglass Hearing Device was evaluated in an in-lab clinical trial with 21 adult participants with mild to moderate sensorineural hearing loss. Aided speech-in-noise performance was compared to the unaided condition using both the Matrix test for evaluation in speech-shaped-noise and the Connected Speech Test at 0 and -3 dB signal-to-babble ratio for performance in multi-talker babble. Subjective ratings of listening effort were also collected during the Connected Speech Test. Speech Intelligibility Index (SII) scores were collected using real ear measures on an Audioscan Verifit VF2. Results showed significant improvement in speech perception scores with the device for all conditions. Listening Effort in multi-talker babble was significantly reduced with the device, and SII scores were significantly better in the aided condition.

Keywords: OTC, Speech-In-Noise, Listening Effort

Posters

Hearing Aids
PD 183

Comparative Efficacy of PSAPs and Hearing Aids in Unilateral Hearing Loss: A Randomized Crossover Trial

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This study compared hearing outcomes with use of personal sound amplification products (PSAPs) and hearing aids (HAs) in patients with moderate to moderately severe unilateral hearing loss. Thirty-nine participants were prospectively enrolled, and randomly assigned to use either one HA (basic or premium type) or one PSAP (basic or high-end type) for the first 8 weeks and then the other device for the following 8 weeks. Participants underwent a battery of examinations at three visits, including sound-field audiometry, word recognition score (WRS), speech perception in quiet and in noise, real-ear measurement, and self-report questionnaires. Functional gain was significantly higher with HAs across all frequencies ($P < 0.001$). While both PSAPs and HAs improved WRS from the unaided condition, HAs were superior to PSAPs. The speech recognition threshold in quiet conditions and signal-to-noise ratio in noisy conditions were significantly lower in the HA-aided condition than in the PSAP-aided condition, and in the PSAP-aided condition than in the unaided condition. Subjective satisfaction also favored HAs than PSAPs in questionnaires, Abbreviated Profile of Hearing Aid Benefit, International Outcome Inventory for Hearing Aids, and Host Institutional Questionnaire.While PSAPs provide some benefit for moderate to moderately severe unilateral hearing loss, HAs are more effective. This underscores the potential role of PSAPs as an accessible, affordable first-line intervention in hearing rehabilitation, particularly for individuals facing challenges in accessing conventional HAs.

Keywords: Unilateral Hearing Loss, Hearing Aids, Personal Sound Amplification Products

Posters

Hearing Aids
PD 184

Comparison of Remote and Face-to-face Hearing Aid Fitting in Terms of Satisfaction and Outcomes

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Purpose: Necessity of remote fitting of hearing aid is growing with technological innovation. Regular evaluation of hearing aid is essential to verify functional gain and audiological performance. However, appropriate fitting services is limited by resources such as distance, time, and cost. The current study aims to compare satisfaction, audiological outcomes, and resource efficiency between face-to-face and remote hearing aid fitting. It also investigates whether fitting effectiveness varies depending on general characteristics such as age and degree of hearing loss.
Methods: A total of 20 adults with ≥1 year of hearing-aid experience were enrolled and randomized to remote- or in-person fitting groups (n=10 per group). Both groups were monitored over six months, with audiological evaluations such as pure tone audiometry (PTA), sound field PTA, and speech audiometry (SA), and questionnaire conducted at 1, 3, and 6 months. To check the environment and equipment before remote fitting and face-to-face fitting and to evaluate hearing satisfaction under various conditions, we applied a web-based fitting program developed in-house.
Results: Overall satisfaction was comparable between groups, with the remote-fitting group showing higher hearing comfort at 1 and 4 kHz and greater listening satisfaction under white/babble noise and pure-tone–fatigue conditions. In contrast, feedback-related outcomes favored the in-person group; taken together, remote fitting was comparable to in-person fitting with advantages in challenging listening contexts and higher frequencies.
Conclusions: Collectively, the findings indicate that remote fitting achieves outcomes comparable to in-person fitting while offering advantages in resource efficiency and user-centeredness. Furthermore, the validated effectiveness reinforces the feasibility of tele-audiology, specifically a coordinated pathway integrating audiometric testing with remote fitting within a comprehensive remote-care model.

Keywords: Remote hearing-aid fitting, Teleaudiology, Hearing aids

Posters

Hearing Aids
PD 185

Impact of Hearing Aid Use Duration on Depressive Symptoms, Cognitive Function, and Quality of Life in Older Adults with Hearing Loss: Evidence from a Middle-Income Country

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Background: Age-related hearing loss (ARHL) is a leading cause of disability among older adults and a major modifiable risk factor for dementia and depression. In low- and middle-income countries (LMICs) such as Brazil, structural barriers – limited access to hearing healthcare, socioeconomic inequalities, and low health literacy – delay diagnosis and rehabilitation, exacerbating cognitive and emotional decline. Understanding the real-world benefits of hearing aid use in these contexts is relevant to inform equitable global hearing care strategies.
Objective: To investigate the effects of different durations of acoustic stimulation through hearing aids on depressive symptoms, cognitive performance, and quality of life in older adults with hearing loss in Brazil.
Methods: A total of 57 older adults with bilateral sensorineural hearing loss were evaluated. They were divided into three groups matched by age and sex: non-users (GSEA, n=19), users for up to six months (G06M, n=19), and users for over 18 months (G18M, n=19). Assessments included the Geriatric Depression Scale (GDS-15), 10-Point Cognitive Screening (10-CS), and the Short Form Health Survey (SF-36). Hearing aid verification was performed using the NAL-NL2 prescription and Speech Intelligibility Index (SII). Data were analyzed using generalized linear models with a significance level of 5%.
Results: Longer hearing aid use was associated with significantly fewer depressive symptoms, better cognitive performance, and higher quality-of-life scores compared to non-users ($p<0.05$).
Conclusion: Consistent hearing aid use reduces depressive symptoms and cognitive decline, promoting better well-being among older adults with ARHL. These findings, derived from a LMIC context, reinforce the urgent need for accessible and sustained hearing rehabilitation programs within public health systems, particularly in countries like Brazil, where demographic aging and socioeconomic disparities challenge equitable hearing care delivery.

Keywords: Hearing loss, Hearing aid, Aging

Posters

Hearing Aids
PD 186

Restoring Auditory Discrimination in Noise: Evidence for a Deep Neural Network Denoising System in Hearing Aids

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Purpose: To address the primary challenge of understanding speech in noise for individuals with sensorineural hearing loss (SNHL) , this study investigated the neural-level efficacy of a deep neural network (DNN) noise reduction system. Mismatch negativity (MMN) was used as an objective index to determine if the DNN enhances the pre-attentive neural discrimination of speech in these challenging listening environments.

Methods: Seventeen older adults with SNHL participated in a within-subject study. MMN was measured in response to a phonemic contrast (/ba/ vs. /la/) in Quiet and Noise conditions. Two hearing aid programs were compared: a DNN noise reduction system that was activated (DNN-ON) and deactivated (DNN-OFF). MMN peak latency, mean amplitude, and the correlation between amplitude and hearing loss (4-frequency pure-tone average, 4PTA) were analyzed.

Results: In the Noise condition, system deactivation (Noise_DNN-OFF) resulted in an MMN response that was not clearly discernible. System activation (Noise_DNN-ON), however, yielded a robust MMN and significantly shortened peak latency ($p < .001$). A key finding emerged from the correlational analysis: in the Noise_DNN-OFF condition, a strong negative correlation was observed between 4PTA and MMN amplitude ($r = -0.76$, $p < .001$) , suggesting an unexpected larger neural response in individuals with greater hearing loss. This correlation was not evident when the DNN was active (Noise_DNN-ON) ($r = 0.22$, $p = 0.40$).

Conclusion: The DNN system (1) significantly accelerated neural processing speed, (2) enabled the elicitation of a neural discrimination response from background noise, and (3) appeared to normalize the central auditory response by decoupling it from peripheral hearing loss severity. These findings provide strong neurophysiological evidence that DNN-based denoising restores the fidelity of the neural code for speech.

Keywords: Deep Neural Network, Mismatch Negativity, Sensorineural Hearing Loss

Posters

Hearing Aids
PD 187

Assessing Advanced Hearing Aid Algorithms Using a Chinese Concurrent CRM (CC-CRM) Multi-talker Speech Test

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Background:
Accurate assessment of speech understanding in realistic multi-talker conditions is essential for evaluating modern hearing aid technologies. Traditional speech-in-noise tests often fail to capture the cognitive and spatial demands of real-world listening. To address this, we developed a Chinese Concurrent Coordinate Response Measure (CC-CRM) paradigm that enables controlled measurement of multi-talker speech perception. The test was applied to compare two advanced hearing aid noise reduction strategies: a deep neural network (DNN)–based denoising system integrated with a static beamformer and a conventional binaural beamformer system.
Methods:
The CC-CRM adapts the concurrent-OLSA framework (Heeren et al, 2022) for Mandarin. Three talkers (female at 0°, male 1 at 60°, male 2 at 300°) simultaneously presented CRM sentences in cafeteria noise through 12 loudspeakers arranged in a 360° array (radius 1.4 m). Each block contained 74 trials, including 21 target sentences with the call sign "Wang Li." Participants identified the color–number combination spoken by the last talker to utter the call sign. Sentences overlapped by 0.6 s, ensuring no more than two talkers were active at a time. Percentage speech intelligibility was measured and analyzed using a generalized linear mixed-effects model.
Results:
The CC-CRM revealed clear spatial effects, learning improvement across sessions, and differentiated performance between hearing aid algorithms. Significant advantages for DNN-based denoising system were observed at 60° and 300° compared to conventional binaural beamformer system ($p < .001$).
Conclusions:
The CC-CRM provides a linguistically and acoustically realistic assessment of multi-talker speech perception for Mandarin listeners. Its sensitivity to spatial, learning, and algorithmic factors demonstrates strong potential for evaluating advanced hearing aid processing under ecologically valid conditions.

Keywords: Speech perception, Multi-talker, Hearing aid noise reduction

Posters

Hearing Aids
PD 188

AI-Denoising in the Phonak Audéo I90-Sphere hearing aid: Speech-In-Noise Performance and Listening Effort in a Group of Adults with Mild to Moderately-Severe Hearing Loss

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Speech-in-noise perception and listening effort were evaluated with a group of experienced hearing aid wearers. Twenty older adults (age 63-86) with mild to moderately-severe sensorineural hearing loss were fitted with Phonak Audéo I90-Sphere receiver-in-the-canal style hearing aids. Four manual programs were created that varied in signal processing and microphone directionality so that participants were tested with: a No Processing program, a Speech-In-Loud-Noise program with adaptive noise reduction and binaural beamforming; and two Spheric Speech-in-Loud-Noise programs with DNN-denoising activated, one with an omnidirectional microphone setting, and one with fixed monaural beamforming microphones activated. Aided speech-in-noise performance was evaluated using the Connected Speech Test (CST) at 70 dB SPL in speech-shaped noise and in multi-talker babble at 0 dB signal-to-noise/babble ratio. CST stimuli were presented from the front and from the side. Subjective ratings of listening effort were also collected for each condition. Results show that integrating DNN-denoising into hearing aids, particularly when combined with beamforming, can significantly improve speech recognition and reduce listening effort when measured in-lab. Outcomes were influenced by both noise type and spatial configuration, where multi-talker babble posed more challenges for DNN alone, but combining it with beamforming improved outcomes for hearing non-front speech.

Keywords: Machine Learning, Speech-In-Noise, Listening Effort

Posters

Hearing Aids
PD 189

Hearing loss compensation and noise reduction using deep neural networks: How to combine?

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Recent applications of deep neural networks for hearing loss compensation use 'closed loop' approaches: Deep learning is used to optimize the parameters of a neural network by comparing a normal hearing and a hearing-impaired branch of the auditory model, thereby obtaining a new, unrestricted (and unknown) hearing loss compensation (HLC). The potential of such an approach has already been demonstrated by Leer et al, 2024, https://arxiv.org/pdf/2403.10428, using a physiological auditory nerve model and Drgas & Bramsløw, SPIN2025, https://zenodo.org/records/15433866, using a simpler loudness model.
Neural-based Noise Reduction (NR) can also be added, by adding noise only to the hearing-impaired branch. Different combinations of standard and neural HLC+NR can be combined into one (joint) or two (separate) deep neural networks (DNN). Likewise, different loss functions and DNN architecture can be applied, which are both critical for the result.
The aim of the work was to test the early application of a loudness model (AUDMOD: Bramsløw, SPIN2024, https://zenodo.org/records/10473561) for DNN-based HLC and noise reduction in different configurations: 1) Neural NR + Neural HLC, 2) Neural NR + NALNL2 HLC, 3) Joint HLC + NR, 4) No NR + Neural HLC, 5) NALNL2 HLC (standard reference). A selection of cost functions has been applied during training.
For HLC, the resulting signals were evaluated and compared to National Acoustics Laboratory nonlinear (NAL-NL2) prescription using spectral measurements and relevant objective metrics, such as the hearing-aid speech perception index (HASPI, Kates & Arehart 2021, https://doi.org/10.1016/j.specom.2020.05.001) . Total loudness and loudness pattern comparisons are also presented.

Keywords: Amplification, Deep neural networks, Loudness model

Posters

Hearing Aids
PD 190

Band-Importance Function and Transfer Function Variation by Hearing Loss Severity in Korean Adults: Implications for Speech Intelligibility Index

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Objective: This study investigates the band-importance function and transfer function in Korean-speaking adults stratified by hearing loss severity. The investigation aims to elucidate the relationship between audiometric degree and spectral weighting of speech cues, with particular attention to how these acoustic mechanisms influence intelligibility growth across mild-to-moderate versus moderately severe-to-severe hearing loss populations.

Methods: A total of 156 participants took part, comprising 78 individuals with mild-to-moderate hearing loss and 78 with moderately severe-to-severe hearing loss. Speech stimuli were selected from a standardized speech perception test. Speech intelligibility scores were measured across 42 band-pass filters at five signal-to-noise ratio conditions. Both the band-importance function and transfer function were derived using nonlinear optimization. Comparative analyses were performed among the hearing loss groups and speech production types.

Results: Both groups exhibited peak band-importance function values at 250 Hz (7.69% for mild-to-moderate; 7.71% for moderately severe-to-severe), with cumulative importance below 1,000 Hz exceeding 50% in both groups (52.16% vs. 50.61%). However, distinct differences emerged at higher frequencies: above 5,800 Hz, the mild-to-moderate group showed substantially lower weightings (1.95%–0.27%) compared to the moderately severe-to-severe group (2.91%–1.69%). Transfer function analysis revealed that the mild-to-moderate group demonstrated a steeper gradient, and at equivalent speech intelligibility index (SII) values, the mild-to-moderate group achieved higher intelligibility scores (89.5% vs. 84.1% at SII=1.0; 16.0% vs. 5.2% at SII=0.3).

Conclusion: Our findings indicate systematic variations in both frequency band weighting and transfer function slopes as a function of hearing loss severity. These results strengthen the empirical basis for the Korean SII and suggest that severity-stratified parameters may improve prediction of speech perception outcomes across the clinical spectrum of hearing loss. The incorporation of such parameters into hearing aid fitting algorithms could potentially enhance individualized counseling and outcome expectations for patients.

Keywords: Speech intelligibility index, Band-importance function, Transfer functioin

Posters

Hearing Aids
PD 191

The Future of Hybrid Meetings: Improving Accessibility in Conference Rooms using Auracast Broadcast Audio

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Despite advancements in hearing aid technology, individuals with hearing loss continue to encounter challenges when participating in hybrid meetings in a conference room. Auracast broadcast audio offers a promising avenue for improving outcomes by allowing for direct streaming of audio from a video call to an individual's hearing aids, while allowing others in the room to receive the audio from a sound bar connected to the video monitor. This study found improved sound quality and reduced listening fatigue when streaming calls to hearing aids versus using hearing aids alone during hybrid meetings in a conference room.

Video conferencing platforms such as Microsoft Teams and Zoom have become the standard for most work environments, allowing for improved collaboration in hybrid meetings. While workers situated in an office gather in a conference room, others working remotely can join via video and appear on a monitor in the conference room. For individuals with hearing loss who are joining from the conference room, communication with the remote workers can be challenging due to poor quality video and/or audio, as well as compromised room acoustics and potential background noises. With the advancements of Bluetooth Low Energy Audio and Auracast streaming, the main objectives of this study were to explore whether sound quality and listening fatigue can be improved with direct streaming to hearing aids compared to use of hearing aids alone in the same environment. An additional objective included assessing the ease of use for hearing aid users to connect to a streaming system in the office for video conferencing calls.

Keywords: Auracast, Videoconference, Hybrid Meeting

Posters

Hearing Aids
PD 192

Adult Hearing Aid Users' Perspectives on Outcome Expectations and Perceived Value for Money: A Qualitative Study Using the Health Belief Model

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Hearing aids are the primary intervention for hearing loss, yet disparities in use persist, impacting user experiences. Limited research has examined how expectations and perceived value for money influence these experiences, particularly through theoretical models such as the Health Belief Model (HBM).
This study explored how outcome expectations and perceived value for money shape adult hearing aid users' experiences, framed within the HBM.
A qualitative descriptive design was used with semi-structured interviews and content analysis.
Thirty-five adult hearing aid users (new and experienced; mean age = 67.2 years) were recruited from the Hearing Tracker website.

The Expectations domain included three categories with twelve sub-categories reflecting fulfilled and unfulfilled experiences, while the Perceived value for money domain comprised five categories with ten sub-categories capturing both contributors and limiters. Participants described perceived benefits including improved hearing, greater environmental awareness, and device customization as important contributors to fulfilled expectations and greater perceived value for money. Self-efficacy was evident among users with realistic expectations, who described confidence in their ability to manage hearing aids and reported that expectations were met. In contrast, perceived barriers such as device limitations, background noise, and physical fit challenges were described in accounts of unfulfilled expectations and reduced hearing aid use. Affordability also reflected perceived barriers, with some participants describing hearing aids as a worthwhile investment, while others described financial burden due to high costs and limited insurance coverage.

Framed by the HBM, perceived benefits and self-efficacy align with fulfilled expectations and higher perceived value for money, while performance, fit, and financial barriers undermine them. Focused expectation management, skills training, and affordability strategies can improve outcomes and sustained use.
Integrate counselling-based intervention aligned with HBM constructs during pre-fitting care to set accurate expectations, build self-efficacy for device management, and address performance and affordability barriers.

Keywords: Hearing aids, Health Belief Model, Qualitative experiences

Posters

Hearing Aids
PD 193

Hearing loss: Social stereotypes

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Background:
The loss of function of any organ results in a decline in the quality of life, including auditory function. The concept of health-related quality of life has allowed us to identify parameters that describe the state of health, its maintenance, and the quality of healthcare.
In assessing the quality of life, it is crucial to understand that what is being evaluated is not the severity of the pathological process itself but rather how the patient experiences their illness and assesses the medical care they receive.
Methods: In 2024, as part of the World Hearing Forum's program for preventing ear and hearing disorders, our team participated in research efforts.
A survey was conducted among 50 individuals, involving a personalized video interview with five open-ended questions about hearing impairments and hearing aids.
The participants were adults, the majority of respondents were male. The participants were not medical professionals.
Results: The majority of participants indicated that they would use hearing aids if recommended by a medical professional. However, nearly all of them expressed concerns about potential stigma, including fear of public judgment, the social perception of deafness, and feelings of discomfort. And only one of them turned out to be positive about the problem of hearing impairment.
Conclusion:To maintain a high standard of living under any circumstances, it is essential to transcend preconceived notions and delve into the essence of individuals, recognizing their distinctiveness and inherent characteristics. It is imperative not to let stereotypes dictate one's identity or constrain their potential.

Keywords: Hearing aids, Social stereotypes, Hearing loss

Posters

Hearing Aids
PD 194

Audiologists' knowledge of, experiences with, and attitudes toward counseling pre-teens and their families about the "Hearing Aid Effect"

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Background:
The "Hearing Aid Effect" is negative public reactions toward people wearing hearing aids. Stigma is a common reason that people do not pursue amplification. Children are particularly sensitive to peer pressure especially pre-teens. The purpose of this cross-sectional survey is to assess pediatric audiologists' knowledge of, experiences with, and strategies for counseling preteen children and their parents about hearing aid stigma. Takeaways from this presentation will include strategies and resources for helping preteens and their parents cope with hearing aid stigma.
Methods:
An international cross-sectional Qualtrics survey was distributed to pediatric audiologists through professional email lists, social media groups, and networking platforms. The survey included both closed- and open-response items.
Results:
Data collection is ongoing and preliminary results indicate that hearing aid stigma remains a significant concern for preteens and their parents. Approximately 93% of audiologists reported that parents express concern about the noticeability of their child's hearing aids, while 79% reported similar concerns expressed by preteens themselves. Many audiologists noted that the traditional term "hearing aid effect" appears outdated, with "hearing aid stigma" or "cosmetic concerns" being more contemporary terms to describe this phenomena. Qualitative responses indicated common counseling strategies for preteen patients and their parents including peer support (connecting preteens or parents with peers with similar experiences). Many audiologists use role play to prepare preteen to confidently answer questions about hearing aids rather than trying to conceal them.
Conclusions:
These findings underscore that the "Hearing Aid Effect" (stigma) influences preteens and their parents. Audiologists' responses reflect a need for updated terminology and practical counseling tools to reduce stigma and promote preteens' self-advocacy skills. Educational materials based on these findings are being developed to support clinicians in addressing hearing aid stigma effectively with this population.

Keywords: Hearing Aids, Stigma, Pre-teens

Posters

Hearing Aids
PD 195

Factors associated with hearing aid discontinuation among older adults

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Age-related hearing loss is prevalent among older adults and can negatively affect social participation, communication, and quality of life. Despite the well-documented benefits of hearing aid use, discontinuation rates remain high. This study aimed to identify and analyze the main barriers that led older adults to discontinue the use of these devices. This was an observational and descriptive study approved by the Research Ethics Committee (approval number 7.02.810). Twenty-one individuals aged 60 years or older, users of hearing aids provided by the Brazilian Unified Health System (Sistema Único de Saúde – SUS), who had stopped using their devices, participated in the study. Data were collected using an online form comprising the Hearing Handicap Inventory for the Elderly – Screening (HHIE-S), the Satisfaction with Amplification in Daily Life (SADL), and a questionnaire titled "Reasons for Hearing Aid Non-Use," based on Franks and Timmer (2023) and Iwahashi et al. (2015). The mean age of participants was 73.2 years. On the HHIE-S, 71.5% demonstrated a significant perception of participation restriction. The overall SADL mean score was 4.60, indicating moderate satisfaction. The "Personal Image" subscale yielded the highest mean (5.49), suggesting low influence of stigma, whereas "Negative Features" had the lowest mean (3.71), highlighting physical discomfort, excessive noise, and handling difficulties as major sources of dissatisfaction. In the questionnaire on non-use, 51.7% of responses referred to adaptation difficulties, 31.8% to financial and access issues, 13.5% to social aspects and stigma, and 3% to health-related and family-support factors. Conclusion: Hearing aid discontinuation among older adults is strongly associated with low perceived benefit, particularly regarding physical discomfort, excessive noise, handling difficulties, and adaptation challenges. These findings reinforce the importance of individualized audiological follow-up and well-prepared services to enhance adherence, comfort, and sustained device use.

Keywords: Hearing aid fitting, Hearing aid abandonment, Hearing aid non-use

Posters

Hearing Aids
PD 196

Imprecision in the Impression: Does the Slit-Leak Vent Behave Like a Traditional Vent?

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Introduction
Occluded ear fittings often develop an unintended leakage path—known as a slit-leak vent—due to impression errors, shell or mold inaccuracies, canal flexibility, or jaw movements during impression taking. When the canal portion of the fitting does not fully occupy the ear canal's cross-section, a narrow annulus forms that behaves acoustically like a vent. This slit-leak vent permits low-frequency sound energy to escape, influencing ear-canal sound pressure. The amount of sound leakage depends on the relative impedance of the escape path versus the middle ear and residual canal.
The air inside the slit-leak vent has acoustic inertance and compliance. Vent inertance increases with length and decreases with cross-sectional area, whereas the residual canal's compliance decreases with frequency, making the vent a more effective low-frequency escape path.
Objectives:
To determine whether a slit-leak vent exhibits acoustic properties similar to traditional vents by mathematically estimating its acoustic inertance and resonance effects.
Methods:
Sixty-seven impressions (25 CIC, 42 earmold) were measured. The mean canal length was 14 mm (SD ±1.34 mm). End corrections were applied to obtain effective acoustic length (~32 mm). Acoustic mass of the annular vent and the combined compliance of the residual canal and tympanum were calculated to determine the vent-associated resonance frequency. A minimum annulus diameter of 0.05 mm was used based on prior reports.
Results and Discussion:
Calculated acoustic mass was 8417 henry, and total compliance was 10.93×10^{-12}. The resulting slit-leak vent resonance was 524 Hz, indicating that frequencies below this value are vented out—overlapping the range where occlusion effects (≤500 Hz) are typically strongest. Thus, even unintended slit-leak vents can reduce occlusion.
Conclusion:
Although impression inaccuracies may cause feedback or poor sound transmission, they can also reduce occlusion up to ~500 Hz. However, subjective occlusion testing is recommended to confirm these effects.

Keywords: Slit-leak vent, Acoustic inertance, Canal resonance

Posters

Hearing Aids
PD 197

Perceived Health, Hearing Aid Self-Efficacy, and Communication-Related Quality of Life in Older Adults with Hearing Loss: A Correlational Study

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Purpose: Age-related hearing loss adversely affects communication and psychosocial well-being, often leading to a reduced quality of life. Understanding how self-perceived health and functional status influence hearing aid use and communication outcomes can inform person-centered rehabilitation strategies. This study examined the relationships among perceived health and functional status, hearing aid self-efficacy, and communication-related quality of life (CRQoL) in older adults using hearing aids, and identified demographic factors associated with these variables.

Methods: Participants were 105 adults aged 50 years and older residing in Busan, South Korea, who had used hearing aids for at least three months. Structured questionnaires assessed perceived health and functional status, hearing aid self-efficacy, and CRQoL. Data were analyzed using descriptive statistics, independent t-tests, one-way ANOVAs, and Pearson's correlation analyses.

Results: Participants rated hearing status most positively and emotional well-being and cognitive function least positively. The mean hearing aid self-efficacy score was 3.78, with the highest ratings in basic handling and the lowest in advanced handling skills. The mean CRQoL score was 3.59; "roles and self-identity" received the highest rating, while "interpersonal interaction" received the lowest. Significant age-related differences were observed in both self-efficacy and CRQoL ($p < .05$), whereas gender and education level showed no significant effects. Correlation analyses revealed significant positive associations between perceived health/functional status and both self-efficacy ($r = .280–.487$, $p < .01$) and CRQoL ($r = .226–.344$, $p < .05$).

Conclusion: Older adults with poorer perceived health and functional status exhibited lower hearing aid self-efficacy and CRQoL. Enhancing positive health perception and confidence in hearing aid use may improve communication outcomes. Incorporating biopsychosocial and family-centered approaches is recommended for effective aural rehabilitation in older adults with hearing loss.

Keywords: hearing loss, hearing aid self-efficacy, communication-related quality of life, perceived health and functional status, older adults

Posters

Hearing Aids
PD 198

Posters

Aging and Cognition
PD 199

The Invisible Burden: Linking Hearing Loss, Cognition, and Mental Health Through The Listen To This Global Initiative

Megan QUILTER

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Hearing loss affects over 1.5 billion people worldwide and is projected to reach 2.5 billion by 2050. Beyond reduced auditory function, untreated hearing loss contributes to depression, anxiety, loneliness, and social withdrawal; that significantly diminish quality of life. Despite advances in hearing technology, intervention rates remain low, with persistent barriers such as stigma, limited awareness, and missed opportunities for early care.

LISTEN TO THIS, a global initiative from BrainWorks, unites researchers, clinicians, patient advocates, and policymakers to explore the links between hearing health, cognition, and mental wellbeing. The initiative synthesizes emerging evidence on how hearing loss affects cognitive and mental health and provides actionable strategies for both professionals and the public.

A key focus is the upcoming public launch of LISTEN TO THIS, which will feature a dedicated mental health section with accessible, evidence-based resources. The initiative offers communication strategies, interdisciplinary care pathways, and educational materials to improve outcomes, reduce barriers, and encourage proactive engagement; reinforcing a central message: hearing health is brain health and mental health.

Keywords: Hearing and Cognition, Mental Health, Hearing Aids

Posters

Aging and Cognition
PD 200

SRT2104-induced SIRT1 activation enhances mitophagy to mitigate senescence in auditory cells

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Age-related hearing loss is characterized by the progressive degeneration of cochlear hair cells and neurons, with mitochondrial dysfunction and impaired mitophagy implicated as molecular mechanisms. Sirtuin 1 (SIRT1), a NAD^+-dependent deacetylase, plays a critical role in the regulation of mitochondrial quality control and mitophagy. SRT2104, a synthetic SIRT1 activator with improved bioavailability compared to resveratrol, has shown neuroprotective effects in age-related neurodegeneration. However, the role of SIRT1 in auditory cell senescence remains unclear. In this study, we investigated the effects of SRT2104 on cellular senescence and mitophagy in HEI-OC1 auditory cells and organotypic cochlear explants. Senescence was induced using low-dose H_2O_2, and SRT2104 was used as a pre-treatment. SRT2104 significantly enhanced SIRT1 activity, upregulated mitophagy-related proteins (PINK1, Parkin, BNIP3, and LC3-II), and downregulated senescence markers (p53 and p21) in cellular and explant models. β-galactosidase staining confirmed reduced senescence in SRT2104-treated groups. Pre-treatment with SRT2104 preserved mitochondrial function, as indicated by enhanced mitochondrial membrane potential, improved mitochondrial DNA integrity, and increased ATP production. SIRT1 knockdown abolished these protective effects, confirming that SRT2104 mediated its anti-senescence and pro-mitophagy activities via SIRT1. Our findings demonstrated that SRT2104 alleviates premature senescence and promotes mitophagy in auditory cells via SIRT1 activation. The pharmacological activation of SIRT1 may represent a promising therapeutic strategy to counteract age-related degeneration in the auditory system.

Keywords: Sirtuin, Senescence, Mitophagy

Posters

Aging and Cognition
PD 201

Relationship between working memory and listening ability in older adults

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Purpose
Listening-related difficulties in older adults are reportedly associated with cognitive decline (Humes et al, 2013). Reduced working memory capacity may lead to various listening difficulties in daily life; however, the nature of this relationship remains unclear (Moore et al, 2014). This study investigated the relationship between working memory and listening ability in older adults.

Method
The study included 21 older adult participants aged 60 years and above, all without evidence of dementia (mean age = 73.1 years; SD = 5.2). Each participant underwent pure-tone audiometry and the Hearing-in-Noise Test in Japanese (HINT-J) to evaluate their listening ability. Working memory was assessed using the Paced Auditory Serial Addition Test (PASAT), which required participants to mentally add single-digit numbers presented in rapid succession. Two stimulus presentation intervals were used: (1) 1 s and (2) 2 s. The rate of correct responses was calculated, and the relationships among the tests were statistically examined.

Results
Performance in the PASAT was significantly correlated with average hearing levels under both conditions (1-s interval: $r = -0.51$, $p < 0.05$; 2-s interval: $r = -0.46$, $p < 0.05$). It was also significantly correlated with HINT-J scores (1-s interval: $r = -0.52$, $p < 0.05$; 2-s interval: $r = -0.46$, $p < 0.05$).

Conclusion
These results suggest that hearing level and speech perception in complex noise environments are related to working memory. For older adults, not only is it important to simply support their listening, but it is also important to encourage speakers to adjust their speech, for example, by keeping their sentences short to accommodate older adults' memory.

Keywords: Older adults, Working memory, Listening ability

Posters

Aging and Cognition
PD 202

Hearing Aid Experience and Its Associations with Hearing Loss, Cognition, Balance Confidence & Fall Risks: Correlational Analyses in Malaysian Older Adults

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PURPOSE: This study explores associations between hearing loss, cognitive function, balance confidence, fall concern, and hearing aid (HA) experience among Malaysian older adults to identify multidomain links relevant to fall risk management. METHOD: A cross-sectional study was conducted among 25 participants (60% male, 40% female) aged 62–89 years (M=73.9±6.6), with moderate bilateral sensorineural hearing loss (M=55.7±12.3dBHL). Participants completed the Malay Montreal Cognitive Assessment (MoCA-BM), Malay Activities-Specific Balance Confidence Scale (ABC), Malay Short Falls Efficacy Scale–International (FES-I), and Client-Oriented Scale of Improvement (COSI%). Bayesian Pearson correlations were used for normal variables and Spearman correlations for non-normal variables. RESULTS: Participants showed high balance confidence (M=82.4±11.2), low-to-moderate fall concern (M=13.1±4.1), mild cognitive decline (M=22.9±4.2), and average HA use of 27 months. COSI indicated high perceived benefit among HA users (n = 22), with Final Ability (M=4.4±0.8) and Degree of Change (M=4.3±0.8), reflecting substantial improvement across quiet and noisy conditions. Bayes Factors (BF_{10}) ranged from 0.088 to 6.499, Pearson r from −0.566 to 0.486, and Spearman ρ from −0.600 to 0.591, indicating weak-to-moderate associations. Significant correlations included perceived HA benefit with HA duration (ρ=0.591, p=0.002) and age (ρ=0.421, p=0.036), and HA duration with age (ρ=0.448, p=0.025). Bayesian analysis revealed 13 pairwise correlations providing moderate evidence (BF_{10}>3) with highest Bayes factor with negligible association between hearing thresholds and fall concern (BF_{10}=6.500) and lowest Bayes factor with weak positive correlation between cognitive performance and perceived HA benefit (BF_{10}=3.512). Longer HA use was moderately associated with greater perceived benefit, suggesting that sustained device use and satisfaction may indirectly facilitate the adaptation rate. CONCLUSION: Consistency in HA use supports the integrated auditory–cognitive–balance–fall risk rehabilitation aligned with Sustainable Development Goal 3 and Malaysia's ageing-nation priorities.

Keywords: Auditory-cognitive-balance-fall risk, Older adults, Hearing aids

Posters

Aging and Cognition
PD 203

Muscle Quality Correlates with Hearing Thresholds: A Cross-Sectional Analysis

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INTRODUCTION: Muscle quality and mass are important parameters of sarcopenia, and both are independent risk factors for physical disability and metabolic disorders. Although there have been reports of associations between muscle mass and hearing loss, the relationship between muscle quality and hearing has yet to be documented.
MEHTODS: Retrospective data were collected from 7,774 participants (4,537 men and 3,237 women) aged 40 years and older who underwent abdominopelvic computed tomography (CT) and pure-tone audiometry (PTA) as part of routine checkups at a health promotion center. Abdominal body composition, including total abdominal muscle area (TAMA), normal-attenuation abdominal muscle area (NAMA), low-attenuation abdominal muscle area (LAMA), intermuscular adipose tissue (IMAT), visceral fat area (VFA), and subcutaneous fat area (SFA), was measured using muscle quality maps generated from CT imaging. A series of linear regression model were used to analyze the association between BMI-adjusted abdominal body composition indices and PTA after adjusting for clinical and lifestyle variables.Statistical analyses were performed separately for each sex and stratified by decade.
RESULTS: In adjusted analyses, the LAMA index was significantly associated with PTA in both sexes. In women, the TAMA, NAMA, LAMA, and VFA indices were also associated with PTA in women in their 50s. NAMA and LAMA remained associated PTA to women in their 60s when stratified by decade. None of the abdominal body composition indices of male participants, including the LAMA index, were significantly associated with PTA in any age group when stratified by decade.
CONCLUSIONS: Only muscle quality index was associated with hearing in both men and women. Muscle mass and quality indices were associated with hearing in women, especially those in their 50s and 60s. Interventions aimed at improving skeletal muscle health may potentially mitigate age-related hearing loss and warrant further investigation.

Keywords: Hearing, Abdominal muscles, Sarcopenia

Posters

Aging and Cognition
PD 204

Association Between Music Perception and Cognitive Function: A Pilot Study Using AMP and SCST

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Purpose
This pilot study aimed to explore the relationship between the Assessment of Music Perception (AMP) and the Seoul Cognitive Status Test (SCST) to identify AMP components that may reflect Auditory Working Memory (AWM). Unlike conventional AWM tools confounded by linguistic or numerical factors, AMP assesses complex auditory processing, offering greater validity for hearing research.
Methods
Two healthy young adults (ages 22 and 24) with normal hearing and cognition participated. Hearing thresholds were ≤25 dB HL with Type A tympanograms, and cognitive normality was confirmed via the Christensen Health Screening Questionnaire. The AMP comprised six subtests: Pitch, Melody, Rhythm, Timbre, Emotion, and Harmony perception. The SCST evaluated five cognitive domains: Attention, Language, Visuospatial function, Memory, and Executive function. Both assessments were administered via a laptop interface.
Results
AMP performance varied across subtests: Pitch (29, 30; M = 29.5), Melody (20, 20; M = 20.0), Rhythm (48, 48; M = 48.0), Timbre (27, 18; M = 22.5), Emotion (7, 8; M = 7.5), and Harmony (17, 11; M = 14.0). The largest inter-subject difference was found in Timbre and Harmony, indicating high perceptual variability.
SCST results showed similar trends: Attention (13, 17; M = 15.0), Language (35, 38; M = 36.5), Visuospatial (40, 37; M = 38.5), Memory (60, 65; M = 62.5), and Executive time (29.14 s, 24.63 s; M = 26.89 s). The largest variability appeared in Memory and Attention.
Conclusion
Both assessments showed consistent domain-specific variability. AMP (Timbre, Harmony) and SCST (Memory, Attention) exhibited similar inter-subject patterns, suggesting potential shared mechanisms in auditory and cognitive processing. Although limited by the small sample (n = 2), these findings provide exploratory evidence that AMP may serve as a non-linguistic indicator of auditory working memory. Future behavioral and EEG-based correlation studies are needed to validate these associations.

Keywords: Auditory Working Memory (AWM), Assessment of Music Perception (AMP), Seoul Cognitive Status Test (SCST)

Posters

Aging and Cognition
PD 205

Effects of Auditory Training on Cognitive and Auditory Processing Abilities in Older Adults with Mild Cognitive Impairment: A Randomised Controlled Trial

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This randomised controlled trial examined the effects of auditory training (AT) on cognitive and central auditory processing (CAP) abilities in older adults with mild cognitive impairment (MCI). 86 older adults were screened, with 38 participants (mean age 68 ± 4.67 years) meeting eligibility criteria. They were randomly assigned to either auditory training (n = 19) or control group (n = 19) (educational material was given). The AT group completed 24 sessions, targeting temporal processing abilities through Frequency Modulation Difference Limen (FMDL) and Adaptive Threshold of Temporal Resolution (ATTR). Primary outcomes included Attention Network Test (ANT), Digit Span forward (DSF) and backwards (DSB), and Trail Making Test (TMT number and mixed), while, secondary outcomes assessed CAP through dichotic digit test (DDT), FMDL, ATTR, Modulation detection test (MDT), Temporal fine structure (TFS AF) and Quick Sentence in Noise test (QuickSIN). Assessments were conducted at baseline, post (after 24 sessions), and 1-month follow-up. The linear mixed model showed significant improvements across all cognitive domains in AT group compared to control. Trained auditory abilities (ATTR & FMDL) demonstrated notable gains, with transfer effects observed only in double correct score and left correct score of DDT. Follow-up evaluations indicated sustained improvements in ANT accuracy, DSF, and TMT measures, as well as in ATTR, FMDL, and DCS; however, other measures returned to baseline. Given that MCI is a progressive neurocognitive disorder, cessation of intense AT may allow neurodegenerative processes to continue, affecting the cognitive domains that are most vulnerable to these changes. This could explain the partial maintenance of treatment effects. AT is promising non-pharmacological intervention that help delay cognitive decline in MCI and slow the progression to dementia by enhancing sensory-cognitive integration. Future research should aim to replicate these findings in larger, more diverse samples and with extended follow-up periods to confirm validity and generalizability.

Keywords: Auditory Training, Mild Cognitive Impairment, Temporal Processing

Posters

Aging and Cognition
PD 206

Using the Integrated Digit-in-Noise Test (iDIN) for Hearing and Cognitive Function Screening in the Community

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Objective: This study aimed to further validate the efficacy of Integrated Digit-in-Noise Test (iDIN) in community-based settings.
Design: 3-digit Speech Reception Thresholds (SRTs) are employed for hearing screening, while the difference between backward and forward 3-digit SRTs (SRT3b-3) serves as an indicator for cognitive screening.
Study Sample: A total of 601 participants were recruited from the local community, all with potential but undiagnosed hearing loss. The participants had a mean age of 76.0 ± 8.8 years, an average of 6.4 ± 4.4 years of education, and MoCA scores averaging 21.5 ± 6.4.
Results: In terms of hearing screening, the mean 3-digit SRT was -4.3 ± 7.0 dB SNR. Hearing loss was defined as a pure-tone average (PTA) of 35 dB HL or greater at 0.5, 1, 2, and 4 kHz in the better ear. The cutoff value for hearing screening using 3-digit SRT was -7.7 dB SNR, achieving a sensitivity of 0.85 and a specificity of 0.73.
For cognitive screening, the SRT3b-3 values averaged 5.03 ± 7.32 dB SNR. Using MoCA score thresholds of 21/22 (considering educational level) to indicate mild cognitive impairment (MCI), the optimal SRT3b-3 cutoff was 3.3 dB, with a sensitivity of 0.74 and a specificity of 0.76. For dementia screening, with a MoCA score of 15 as the cutoff, the SRT3b-3 cutoff was 5.5 dB, yielding a sensitivity of 0.83 and a specificity of 0.77.
Additionally, no significant correlation was found between SRT3b-3 and better ear hearing levels, suggesting that iDIN can be effectively used for cognitive screening in older adults with hearing loss.
Conclusions: The iDIN demonstrates strong potential as a rapid, dual-purpose screening tool for both hearing and cognitive assessments in community settings, facilitating early detection within a short testing duration.

Keywords: Integrated digit in noise test, Digit in noise test, Hearing screening

Posters

Aging and Cognition
PD 207

Posters

Aging and Cognition
PD 208

The Impact of Auditory and Cognitive Factors on Speech-in-Noise Performance in Chinese Older Adults

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Objective:
This study aimed to examine the relationship between speech-in-noise performance and various auditory and cognitive predictors in Chinese older adults, focusing on the contributions of hearing ability, suprathreshold auditory processing, and working memory capacity.
Design:
Forty-three Chinese older adults participated in this study. Each completed a test battery including pure-tone audiometry, spectrotemporal modulation (STM), Mandarin Digits-in-Noise (mDIN) test, and reading span. Speech-in-noise performance was assessed using the Mandarin Hearing in Noise Test (mHINT), which measured speech reception thresholds in noise (SNR). Correlation and multiple regression analyses were performed to evaluate the relationships between auditory and cognitive measures and speech-in-noise performance.
Results:
Correlation analysis showed that the mDIN test had the strongest positive correlation with SNR ($r = 0.722$, $p < 0.001$). PTA_better exhibited a moderate positive correlation ($r = 0.550$, $p < 0.05$), while STM also showed a moderate positive correlation ($r = 0.489$, $p < 0.05$). The regression model was statistically significant ($F = 5.887$, $p < 0.05$), explaining 58.1% of the variance in SNR performance (adjusted $R^2 = 0.482$). Among the predictors, mDIN was the strongest predictor ($\beta = 0.467$, $p = 0.019$), followed by STM ($\beta = 0.691$, $p = 0.070$). Reading span did not significantly contribute to the model.
Conclusions:
Speech-in-noise performance in Chinese older adults, as reflected by SNR, is primarily determined by auditory factors beyond peripheral hearing thresholds. These findings highlight the dominant role of central auditory processing mechanisms in degraded listening conditions and underscore the need for auditory rehabilitation strategies that target suprathreshold auditory deficits in addition to peripheral hearing loss.

Keywords: Speech in noise, Auditory cognition, Older adults

Posters

Aging and Cognition
PD 209

Translation and Validation of the "the Practitioner Assessment Network Typology" Questionnaire in the Kannada Language

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Purpose:
The Practitioner Assessment Network Typology (PANT), developed by Wenger in 1991, is a tool for evaluating social support networks in older adults. It classifies individuals into five network types based on kin availability and interaction frequency with friends and neighbors. While the PANT has been validated in Western contexts, it is important to validate it in India as well. This study aims to translate the PANT questionnaire and assess its psychometric properties in Kannada, a regional language of India.

Method:
The PANT questionnaire was translated into Kannada following Hall et al. (2018) guidelines. The translation process involved skilled bilingual experts who carried out independent forward and back-translation, each working separately to ensure accuracy. To ensure clarity, five older individuals participated in cognitive debriefing. The finalized questionnaire was then administered to 81 older adults. Latent Profile Analysis (LPA) was utilized to identify network types and assess model fit, analyzing key indices such as Bayesian Information Criterion (BIC) and entropy to select the best-fitting profiles.

Result:
The analysis of 81 samples showed a strong statistical fit (BIC of 1334.467, entropy of 0.91), indicating excellent classification quality and profile separation. All five theoretical network types proposed by Wenger were represented, and an additional, culturally specific sixth profile emerged, reflecting unique regional patterns of family dependency and community integration. The largest proportion of participants (37%) exhibited balanced community networking, while a notable minority were family-dependent or community-bound. The translated PANT instrument demonstrated strong construct validity and measurement reliability within this context.

Conclusion:
The findings confirm the utility of the PANT for evaluating social support networks among older adults in India, extending its validity cross-culturally. Latent Profile Analysis offers a robust method for verifying network typologies, revealing both universal and regionally specific patterns.

Keywords: Social network typology, Latent profile analysis, Older adults

Posters

Aging and Cognition
PD 210

Integrating hearing screening into Geriatric health services: A pilot study in a selected elder's home in Sri Lanka.

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Age-related hearing loss is one of the most prevalent conditions, affecting approximately 65.3% of adults aged 71 years or older (Reed, et al, 2023). It often leads to social isolation, loneliness, reduced communication, and cognitive decline (Ciorba, et al, 2012). Despite this, hearing screening programs for older adults are rarely incorporated into community or primary healthcare settings in Sri Lanka. This study aimed to assess the hearing status among older adults through a community-based screening program and to identify the requiring further evaluation.

The screening was conducted at an elders' home in the Western province, Sri Lanka, by academic staff and undergraduate students from the faculty of medicine, university of Kelaniya. Twenty-nine residents (Mean age 72.21 years; 21 females), participated. A 21-item checklist was administered prior to hearing screening to assess situational hearing difficulties, otologic history, and medical conditions. Otoscopy and Pure-Tone Audiometry (PTA) screening (500-4000 Hz) were performed using supra-aural headphones. A threshold greater than 40 dBHL at any frequency in either ear was considered for further audiological evaluation. Referrals were made based on findings of the screening program and potential risk factors identified from the checklist.

7 participants (24%) suspected they had hearing difficulties. 20% reported difficulties understanding speech in noise, in group, and telephone conversations. Only 2 participants (6.8%) passed the screening, while 25 (86%) required detailed audiological evaluation; 9 participants (31%) were referred for ENT consultation.

The findings of this pilot screening program highlight significant levels of undiagnosed hearing-related issues among elderly adults in institutional settings. These results emphasize the urgent need to incorporate routine hearing screening into geriatric healthcare services. Increasing awareness among healthcare authorities is essential to address the gap in hearing health services for older adults and promote timely management, ultimately improving communication and cognitive well-being in the population.

Keywords: Geriatric hearing screening, Age-related hearing loss, Community screening

Posters

Aging and Cognition
PD 211

Differences in Phonetic Neural Processing Between Normal and Mild Age-Related Hearing Loss Adults

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Age-related hearing loss (ARHL) significantly impairs speech perception, especially in challenging acoustic environments. Although conventional evoked potentials measure overall hearing ability, they offer limited insight into phonetic-level processing. In this study, we investigated how phonetic processing depends on hearing level using phoneme-related potentials (PRPs).

Fifty older adults participated in this study, including ten with normal hearing and five with mild ARHL. Two 30-min stories at different noise levels were presented through insert earphones. Clean stimuli were Talmud stories, whereas noisy stimuli were Korean fairy tales mixed with speech-shaped noise. Auditory-evoked potentials were obtained using a 64-channel electroencephalography system. Phonetic onsets were identified and used in order to compute the PRPs.

In noisy conditions, vowel-related PRPs in the mild ARHL group showed prolonged latencies than the normal hearing group ($p<0.05$). In clean condition, although vowel-related PRPs showed a tendency toward smaller amplitudes in the mild group, the difference was not statistically significant. Moreover, no significant group differences were observed for the consonant-related PRPs. Within both story groups, normal hearing elicited PRPs with larger amplitudes and shorter latencies than the mild ARHL. Topographical analysis revealed a stronger frontal region activity in the mild ARHL group than that in the normal hearing group.

The mild ARHL group demonstrated altered neural processing of vowels in noise, characterized by smaller amplitudes, prolonged latencies, and enhanced frontal activity compared with the normal hearing group. These results indicate less efficient cortical processing and greater cognitive effort with increased hearing loss. Moreover, the lack of group differences in consonant PRPs suggests that vowel-related neural processing is more sensitive to ARHL.

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Keywords: Phoneme-related potentials, Speech perception, Age-related hearing loss

Posters

Aging and Cognition
PD 212

Age-Related Hearing Loss and Cognitive Decline: A Systematic Review of Clinical Challenges and Emerging Virtual Reality Applications

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Age-related hearing loss (ARHL) is one of the most prevalent chronic conditions in older adults and has been increasingly recognized as a significant, potentially modifiable risk factor for cognitive decline. Despite growing evidence linking auditory and cognitive dysfunction, clinical assessment and management remain challenged by diagnostic complexity, overlapping symptom profiles, and limited ecological validity of traditional evaluation tools.This systematic review synthesizes current evidence on the association between ARHL and cognitive decline, with a particular focus on clinical challenges in assessment, differential diagnosis, and intervention. Additionally, it evaluates the emerging role of virtual reality (VR) technologies in enhancing audiological and cognitive evaluation.

A comprehensive search of PubMed, Scopus, Web of Science, and Embase was conducted for studies published between 2000 and 2025. Eligible studies included observational, experimental, and clinical research examining ARHL, cognitive outcomes, and VR-based assessment or rehabilitation. Data were extracted on study design, participant characteristics, cognitive domains, assessment tools, and VR applications.

Evidence consistently demonstrates that ARHL is associated with accelerated cognitive decline, particularly in domains of executive function, processing speed, and working memory. Proposed mechanisms include increased cognitive load, reduced sensory input leading to neural atrophy, and social isolation. Clinical assessment is complicated by measurement bias in cognitive tests that rely on auditory stimuli, under-diagnosis of mild hearing loss, and variability in hearing-aid use. VR-based tools show promise in creating immersive, ecologically valid environments for assessing speech-in-noise perception, multitasking, and real-world cognitive functioning, though current applications remain in early developmental stages.

ARHL is strongly linked to cognitive decline, yet clinical assessment continues to face significant methodological and diagnostic challenges. VR technologies represent a novel and potentially transformative approach for improving the accuracy and ecological validity of auditory–cognitive evaluations. Further high-quality research is needed to establish standardized VR protocols and to determine their effectiveness in clinical practice.

Keywords: Age-Related Hearing Loss, Cognitive Decline, Virtual Reality

Posters

Aging and Cognition
PD 213

Foresight into Cognitive Screening for the Aging Generation with Hearing Loss: Toward Multisensory and AI Driven Prediction Models

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Background
By 2050, today's middle-aged generation will enter late adulthood — a period expected to witness unprecedented growth in both age-related hearing loss and cognitive decline. Hearing impairment has emerged as a significant modifiable risk factor for dementia. The convergence of these two conditions poses a serious challenge to future healthcare systems. As this demographic shift approaches, current cognitive assessments must evolve beyond verbal auditory formats to accommodate sensory limitations and to integrate predictive intelligence for early intervention.

Objective
This presentation proposes a future framework for cognitive screening that transcends conventional pencil and paper paradigms. The goal is to emphasize the need for multisensory cognitive tests, augmented with artificial intelligence (AI) and big data analytics, to enable personalized prediction and prevention of dementia within aging populations.

Approach / Innovation
Next-generation cognitive assessment models should synthesize large-scale data derived from physiology, electrophysiology, psychology, nutrition, and lifestyle patterns. Using deep learning algorithms, these multimodal datasets can generate individualized predictive profiles, identifying subtle cognitive changes before clinical onset. The integration of AI-assisted multisensory testing will enhance the sensitivity, reliability, and cultural adaptability of existing tools such as MoCA H and MMSE AI, facilitating precise risk mapping and proactive intervention strategies.

Conclusion / Outlook
As the current middle-aged cohort approaches old age by mid-century, cognitive health strategies must turn from reactive diagnosis to proactive prediction. Designing smart, multisensory, AI-powered screening systems today will substantially reduce the future prevalence of dementia and promote a vision of healthy, cognitively vibrant aging societies.

Keywords: Aging, Hearing Loss, Dementia, Cognitive Screening, Artificial Intelligence, Big Data, Deep Learning

Posters

Aging and Cognition
PD 214

Impact of Working Memory and Contextual Cues on Speech Perception in Noise among the Elderly

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Background: Speech perception in noise in the elderly is governed not only by peripheral hearing sensitivity but also by central cognitive processes, including working memory (WM) and attention. This study utilized the Korean-Repeat & Recall Test (K-RRT) to examine how hearing loss and aging interact with cognitive resource allocation during sentence recognition and recall tasks.

Methods: Eighty-eight participants (50 NH, 38 HI) in their 60s and 70s were recruited. Participants performed the K-RRT under six signal-to-noise ratio (SNR) conditions (-5, 0, 5, 10, 15 dB, and Quiet) using both high-context (HC) and low-context (LC) sentences. Additionally, recall performance (at 15 dB SNR and Quiet), subjective listening effort, and WM capacity (digit and reading span tests) were assessed.

Results: The HI group demonstrated significantly lower sentence recognition scores and higher noise sensitivity compared to the NH group. In HC conditions, the NH group maintained stable performance until 0–5 dB SNR, whereas the HI group showed significant declines starting at 15 dB SNR. In LC conditions, both groups exhibited increased vulnerability, with the 70s subgroups showing performance breakdowns across all SNR levels. Furthermore, the HI group reported significantly higher listening effort and lower WM capacity. A strong correlation was found between recall performance and sentence recognition at 5 dB SNR. Notably, the HI group struggled significantly with recall tasks at 15 dB SNR, suggesting a depletion of cognitive resources.

Conclusion: The findings suggest that the hearing-impaired elderly face a double burden: degraded auditory input and reduced cognitive spare capacity. Even with contextual cues, the HI group requires higher acoustic clarity to process information. When cognitive resources are exhausted by the effort of decoding sound, insufficient capacity remains for semantic encoding. Therefore, aural rehabilitation must integrate cognitive-auditory training alongside amplification to optimize the functional communication of the elderly in real-world environments.

Keywords: Korean-Repeat & Recall Test (K-RRT), Hearing-impaired elderly, Speech perception in noise, Working memory, Cognitive Load

Posters

Aging and Cognition
PD 215

Environmental Noise and Air Pollution as Risk Factors for Hearing Loss and Dementia: The Tramontana Cohort Study in Taranto, Italy

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Background: Hearing loss is highly prevalent in aging and a recognized modifiable risk factor for dementia.
Air pollution and noise can induce systemic inflammation and auditory damage. Taranto, Italy – an industrial city with substantial steelwork emissions – provides a unique setting to study the long-term impact of pollution on hearing and dementia risk, within the Horizon EU-funded MISTRAL Project.

Aim: To investigate associations between long-term air pollutant (PM2.5, NO2) and noise (Lden) and 10-year hearing loss incidence, and their effect on incident dementia in adults (≥60), including whether baseline hearing impairment modified the pollution–dementia association.

Methods: The Tramontana cohort study (MISTRAL, doi: 10.3030/101095119) followed 201,719 Taranto residents for 10 years. Hearing loss was defined as pure-tone average >45 dB HL (0.5–2 kHz, better ear; n=1,125 cases). Incident dementia (n=927) was ascertained among participants ≥60. PM2.5 and NO2 were estimated via convolutional neural network at 100×100 m resolution; Lden via retrospective urban campaigns. Quasi-Poisson models estimated IRRs adjusted for age, sex, socioeconomic status, and disability.

Results: Each 5 µg/m^3 increase in PM2.5 was associated with ~10% higher hearing loss incidence (IRR~1.10; 95% CI: 1.02–1.18); NO2 showed a similar association (IRR ~1.06 per 10 µg/m^3). Noise showed a dose-dependent association (IRR ~1.08 per 5 dB Lden). Baseline hearing loss was associated with dementia incidence (IRR ~1.5; 95% CI: 1.3–1.8). PM2.5 was associated with elevated dementia risk (IRR ~1.12 per 5 µg/m^3; 95% CI: 1.05–1.20), with a significant interaction: the PM2.5–dementia association was stronger in participants with hearing loss (IRR ~1.20 vs. ~1.05; pinteraction <0.05). Noise–dementia associations became non-significant after adjusting for air pollution.

Conclusions: Long-term air pollution and noise were significant risk factors for incident hearing loss. Air pollution was also associated with increased dementia incidence, amplified by pre-existing hearing impairment. Mitigating pollution and promoting hearing health may be critical strategies to reduce the dementia burden in aging populations.

Keywords: Epidemiology, Dementia, Air Pollution

Posters

Aging and Cognition
PD 216

A Machine Learning Approach To Sensory-based Cognitive Risk Prediction In The Older Population Of Southern Italy

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Background: Sensory decline is common in aging and associated with higher risk of cognitive impairment.
However, the predictive value of individual or combined sensory domains (vision, hearing, smell, taste) for future cognitive decline remains unclear. We examined whether baseline multi-sensory function predicts 8- year cognitive outcomes in older adults using traditional regression and ensemble machine learning models.

Methods: Participants were 636 cognitively unimpaired adults aged ≥65 from the GreatAge Study, followed for 8 years. Baseline assessments included retinal imaging measures (vessel density and neural layer thickness), audiologic tests (pure-tone average and SSI-ICM), olfactory (Sniffin' Sticks) and gustatory (taste strips) tests. The primary outcome was 8-year follow-up MMSE score. Multivariable linear regression, adjusted for demographics and clinical covariates, tested associations of sensory metrics with follow-up MMSE. Logistic regression identified predictors of significant cognitive decline (≥10% MMSE drop). A random forest-guided weighted ensemble model combined sensory domain scores for MMSE prediction.

Results: Older age and lower education predicted greater 8-year cognitive decline ($p<0.01$ and $p=0.02$), while higher baseline MMSE predicted better follow-up scores ($p<0.01$). Better vision (higher retinal vessel density) and hearing (lower pure-tone thresholds and higher SSI-ICM scores) were independently associated with higher follow-up MMSE ($p<0.05$); olfactory and gustatory scores were not significant. In the ensemble model, vision and hearing remained significant predictors of cognitive performance (β ~1.5–1.8 MMSE points per unit, $p<0.01$). Logistic regression showed each additional year of age (OR >1.1) and poorer central hearing (lower SSI-ICM, OR <1.0) increased odds of ≥10% MMSE decline. Random forest variable importance rankings confirmed hearing and vision as the strongest predictors of cognitive outcomes.

Conclusion: Hearing and vision emerged as the most robust sensory predictors of 8-year cognitive outcomes. Incorporating these assessments into routine evaluations of older adults may facilitate early identification of individuals at risk for cognitive decline and support timely preventive interventions.

Keywords: Dementia, Multisensory impairment, Age-Related Hearing Loss

Posters

Aging and Cognition
PD 217

Cognitive Assessment in NHS Hearing Aid Clinics for Older Adults

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Background: Hearing loss is a modifiable risk factor for dementia, yet NHS audiology clinics currently do not routinely assess cognition. The Cognitive Health in older Adults attending hearing services (CHATTS) study explored the feasibility of incorporating a short memory assessment, the Test Your Memory (TYM), into routine audiology practice.

Methods: Between December 2024 and May 2025, patients attending a weekly new hearing assessment clinic were screened. Outcome measures included recruitment and eligibility, completion of the TYM, administration time, patient acceptability, and audiologist feedback. Practicality was assessed through integration into workflow, staff observations, and potential impact on onward care.

Results
A total of 116 patients were screened. Of these, 30 were ineligible, 12 did not attend, and 19 declined participation. 40 patients were recruited (median age: 72 years, range 50-94), with 20 allocated to the TYM cohort and 20 to the memory checklist cohort. Within the TYM group, 20 patients completed the assessment (equivalent to 39% of the overall screened sample). The mean administration time for TYM was 5-6 minutes, while the memory checklist was shorter, averaging around 1 minute which was manageable within standard clinic appointments. Most patients reported positive or neutral emotions during testing, indicating high acceptability. Audiologists rated the process as very uncomplicated in most cases,TYM was successfully integrated into the clinical pathway,with results informing onward recommendations such as encouraging GP follow-up referring to memory services.

Conclusions: This feasibility study demonstrates that brief cognitive screening in NHS audiology clinics is both measurable and practical. Outcome measures indicate moderate completion rates, short administration time, and high acceptability. Practicality results confirm minimal disruption to workflow and manageable staff training requirements. Wider implementation could strengthen integrated care for older adults with hearing loss, though further evaluation of clinical outcomes is needed.

Keywords: Cognition, Ageing, Hearing aid

Posters

Vertigo and Balance Disorders
PD 218

Diagnostic Utility of Caloric and Video Head Impulse Tests in Vertigo

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1.Background
Unilateral weakness (UW) obtained from the caloric test is widely used to diagnose peripheral vestibular disorders; however, the conventional cutoff of ≥25% may not provide optimal diagnostic accuracy across different conditions. The video Head Impulse Test (vHIT), which assesses vestibulo-ocular reflexes during rapid head rotations, can detect high-frequency canal deficits that caloric testing may miss. This study aimed to determine disease-specific optimal UW cutoffs for vestibular neuritis (VN), Ménière's disease (MD), vestibular migraine (VM), benign paroxysmal positional vertigo (BPPV), and sudden sensorineural hearing loss (SSNHL), and to evaluate whether combining caloric and vHIT results enhances diagnostic performance.

2.Methods
A retrospective review was conducted on 517 patients (162 males, 355 females; aged 20–85) diagnosed with VN, MD, VM, BPPV, or SSNHL at Kaohsiung Veterans General Hospital between 2017 and 2024. Patients with bilateral vestibulopathy were excluded. Sixty control subjects without vertigo also underwent standardized caloric and vHIT testing performed by experienced audiologists. Receiver operating characteristic (ROC) analysis with the Youden index was applied to identify optimal UW thresholds and to compare diagnostic sensitivity and specificity both individually and in combination with vHIT.

3.Results
Optimal UW cutoffs ranged from 10.5% to 22.5%. Compared with the conventional 25% threshold, sensitivity increased by up to 37%, whereas specificity decreased by up to 28%. Combining "UW ≥ cutoff" or "positive vHIT" further improved sensitivity, particularly for VM (+47%), without significant loss of specificity.

4.Conclusion
A UW cutoff of 20% provides a better balance between sensitivity and specificity. Integrating caloric and vHIT findings enhances overall diagnostic yield and may reduce missed cases in routine vestibular assessments.

Keywords: Vestibular diagnosis, Caloric test, Video Head Impulse Test (vHIT)

Posters

Vertigo and Balance Disorders
PD 219

Relationship between visual vertigo and postural control in adults and older adults with vestibular dysfunction

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Background: Visual vertigo is characterized by dizziness or instability triggered by complex visual environments and is frequently associated with vestibular dysfunction. Although its impact on the perception of imbalance is recognized, its relationship with objective measures of postural control remains insufficiently explored in adults and older adults.Objective: To analyze the relationship between visual vertigo and postural control in adults and older adults with vestibular dysfunction, in a cross-sectional observational study, using static posturography (Horus, Contronic). Methods:Thirty-eight participants with vestibular dysfunction were assessed (mean age 61.6 years; 68.4% women; 45.1% low education level). Dizziness severity was measured by the Dizziness Handicap Inventory (DHI), and visual vertigo by the Visual Vertigo Analog Scale (VVAS). Postural control was analyzed using static posturography, including sensory conditions and indices of visual, vestibular, and somatosensory integration. Statistical analyses included correlation and group comparison tests ($p<0.05$).
Results: Unilateral vestibular hypofunction was observed in 73.7% of participants, and 36.8% had no defined etiology. Severe DHI scores were found in 44.7% of the sample, while VVAS indicated moderate (50%) or severe (47.5%) visual vertigo. No significant association was found between overall postural control and VVAS scores. However, participants with severe VVAS showed poorer performance in condition 3 (eyes open on unstable surface; $p=0.002$) and reduced somatosensory efficiency ($p=0.008$). Conclusion:Although visual vertigo was not associated with global postural control, participants with severe visual vertigo exhibited impaired performance under sensory-challenging conditions. As a cross-sectional study, causality cannot be inferred, but the findings highlight the importance of assessing visual vertigo in balance evaluation among individuals with vestibular dysfunction.

Keywords: Visual vertigo, Postural balance, Vestibular disorders

Posters

Vertigo and Balance Disorders
PD 220

Sustained Functional Gains After Vestibular Rehabilitation in Older Adults With Vestibulopathy: A Longitudinal Trajectory Across Short-, Mid-, and Long-Term Follow-Up

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Background: Vestibular rehabilitation (VR) is an effective intervention for older adults with vestibulopathy, improving mobility and balance. However, the long-term durability of these effects remains unclear. Objective: To investigate the temporal trajectory of VR effectiveness in older adults with vestibulopathy, assessing the maintenance of functional gains across different follow-up intervals. Methods: This retrospective-prospective observational study included 52 older adults treated at a tertiary balance disorders clinic. Functional performance was assessed using the Timed Up and Go (TUG) and Dynamic Gait Index (DGI) before and after VR, and during follow-up at ≤6 months, 7–18 months, and ≥19 months after program completion. Intra-individual changes and between-group differences were analyzed, controlling for age, etiology, and baseline values. Results: Significant improvements were observed from pre- to post-VR in TUG (p=0.05) and DGI (p=0.024). No significant differences were found among follow-up intervals (p>0.05). Functional gains remained stable across all time windows, with no evidence of decline. Conclusion: VR in older adults with vestibulopathy yields significant functional improvements sustained over time. Although causality cannot be inferred, findings suggest long-term durability of VR benefits regardless of the interval since completion.

Keywords: Vestibular rehabilitation, Older adults, Functional Balance

Posters

Vertigo and Balance Disorders
PD 221

Assessing dynamic instability in bilateral vestibulopathy patients during daily living tasks using inertial measurement units

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Purpose
Monitoring the functional status of patients with bilateral vestibulopathy (BV) or unilateral vestibulopathy (UV) in an ecological environment remains a challenge, as current tests are performed in specialized laboratories and do not reflect patients' limitations and symptoms. This study aimed to evaluate the overall movement pattern of patients using inertial measurement units (IMU) in a semi-standardized environment that replicated daily-life situations.
Methods
Nineteen BV patients, 20 UV patients, and 20 healthy subjects were recruited to perform 15 ecologically valid tasks . Intensity, smoothness, and stabilization parameters were calculated from IMU data. The analysis included the selection of relevant tasks, based on task time and perceived difficulty, before performing a principal component analysis on all parameters calculated.
Results
The variables that contributed most to the variance of the dataset were then examined to assess their ability to discriminate between groups. Tasks involving limited compensatory sensory inputs (put on pants, walking on uneven ground, on inclined plane, in the dark, on a wood beam, or with head turns) with IMUs placed on the feet proved to be the most discriminating. BV and UV patients exhibited reduced movement intensity compared to healthy subjects, that can reflect different compensatory stabilisation strategies.
Conclusion
This study demonstrated the feasibility of objective functional status assessment using IMUs and provided a basis for the development of rapid clinical protocols to assess outcomes for rehabilitation therapies.

Keywords: Vestibulopathy, Balance, Outcome measures

Posters

Vertigo and Balance Disorders
PD 222

The Geneva Balance Test as a useful tool to monitor pediatric patients with bilateral vestibulopathy after vestibular rehabilitation

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Purpose
Our research group developed the Geneva Balance Test (GBT) to objectively quantify balance abilities of children with bilateral vestibulopathy (BV) over a broad age range. In a first study we demonstrated that the GBT allowed quantifying balance deficits in children with BV. In the present study, we aimed to evaluate the capacity of the GBT to quantify potential improvements in balance abilities after vestibular rehabilitation.
Methods
A group of 5 children with BV (diagnosed following the diagnostic criteria of the Bárány Society) underwent a first evaluation with the GBT (T0), with scores in the pathological range according to their age. A second evaluation was performed after a period of 8-12.5 months (T1), during which patients followed vestibular physiotherapy. The scoring in bright light and dim light at T0 and T1 were compared with a Student's t-test. In addition, to exclude the impact of the normal development of balance capacity with age, we performed an ANOVA between the GBT scores of participants with retrospective data gathered in another group of age-matched BV patients.
Results
We observed significant improvements in GBT scores in bright light after vestibular rehabilitation at T1 (p=0,002) as well as in dim light (p=0,02). No significant difference was found when comparing the GBT scores of participants with retrospective data (In bright light: p = 0,1) (In dim light p= 0,1)
Conclusion
Patients who benefitted from vestibular physiotherapy showed significant improvements after a period of 8 months to 1,5 years. This improvement cannot be explained only by the normal development with age, as comparison of GBT scores of patients with BV of different groups of age shows a non-significant amelioration. Despite the very small sample size in the present study, the GBT allowed quantifying improvements in balance abilities in children with BV after vestibular rehabilitation.

Keywords: Balance, Children, Development

Posters

Vertigo and Balance Disorders
PD 223

Optimizing Vestibular Implant Stimulation and Electrode Arrays in a Non-Human Primate

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Vestibular implants aim to restore gaze and postural stability in patients with bilateral vestibular hypofunction. In this study, we evaluated electrically-evoked eye movement responses in a non-human primate implanted with a multi-electrode array in the horizontal semicircular canal. The array studied contained four electrodes to improve the likelihood of at least one landing near the targeted ampullary nerve. We compared single-electrode and multi-electrode stimulation under both distant and common crus return configurations. combined-electrode stimulation – in which we effectively shorted combinations of adjacent single stimulating electrodes – typically produced responses approximating the average of responses elicited by each component electrode. Compared to the distant return configuration, the common crus return configuration required more current but reduced facial nerve activation and therefore enabled elicitation of greater eye velocities without facial nerve activation. These findings highlight the importance of electrode placement and return electrode configuration in vestibular implant design and demonstrate that combining smaller sites into one large electrode can achieve performance that approximates the mean of the constituent sites, and a common crus return outperforms a distant return.

Keywords: Vestibular implant, Semicircular canal, Nonhuman primate

Posters

Vertigo and Balance Disorders
PD 224

Novel Approach to Vestibular Caloric Testing

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Introduction: The vestibular caloric test is a routine part of vestibular diagnostic assessment. Current commercial vestibular diagnostic systems apply temperature regulated air or water to induce the caloric response. Both have their limitations; air tends to be "loud" and requires greater precision for stimulation. Water is messy. In this session we will introduce a novel method to induce vestibular caloric responses using a pre-clinical model and human prototype.

Methods: In adult rats (Long Evans) vestibular ocular reflex (VOR) responses to sinusoidal head rotation and translation were recorded using infrared eye tracking to establish baseline function. After baseline testing, animals were positioned at a ~30 degree angle to position the horizontal canal in the vertical plane and vestibular calorics were assessed using cold water irrigation and compared to a custom temperature delivery system that applies thermoelectric cooling or warming via an ear bar attached to a Peltier device.

Results: Baseline testing showed normal VOR responses. Vestibular caloric responses were successfully observed with delivery of temperature via our custom system. The cool ear bar showed comparable nystagmus to cold water in direction of nystagmus. The warm ear bar showed the expected opposite effect.

Discussion: We observed generation of a vestibular caloric response applying a novel method of ear canal cooling/warming in a pre-clinical model. Our next step is to move forward with a human prototype for clinical investigation. Details on the human prototype will be shared during the session.

Keywords: Vestibular, Calorics, Thermoelectric

Posters

Vertigo and Balance Disorders
PD 225

Pilot Study on the Relationship Between Balance, Functional Mobility, Self-Reported Dizziness, and Falls in Middle-Aged and Older Adults

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Background: Balance and vestibular function are essential for maintaining mobility and preventing falls, particularly in older adults who experience sensory and motor decline with aging. Falls are common and have serious health impacts, leading to fractures, loss of independence, and decreased quality of life. Middle-aged adults with vestibular dysfunction or chronic dizziness may also be at increased risk, but this group remains underexplored in research. Objective: To investigate the association between performance in balance and functional mobility tests (Dynamic Gait Index – DGI, Timed Up and Go Test – TUG, and static posturography), self-reported dizziness (Dizziness Handicap Inventory – DHI), and fall history in middle-aged and older adults with chronic vestibular dizziness. Methods: This cross-sectional pilot study included 33 participants aged ≥40 years (mean 67.8 ± 8.4 years) with vestibular dizziness for at least six months. Participants were divided into two groups: those with at least one fall in the previous year (G1, n = 17) and those without falls (G2, n = 16). Assessments included TUG, DGI, static posturography, and DHI. Between-group comparisons and correlation analyses were performed. Results: Groups were comparable regarding comorbidities, dizziness duration, physical activity, and medication use. No significant differences were found in TUG or posturography. However, DGI scores were significantly lower in the fall group ($p = 0.030$), indicating poorer gait and balance performance. Fall risk estimated by DGI was higher in G1 ($p = 0.02$). A negative correlation between DGI and TUG suggested that poorer gait performance was associated with slower mobility. Conclusion: Although no isolated fall risk factors were identified, the DGI proved to be a sensitive tool for detecting subtle mobility and balance impairments in individuals with chronic dizziness. These findings support the feasibility of the assessment protocol and provide baseline data for larger longitudinal studies on fall prevention.

Keywords: Dizziness, Falls, Aging

Posters

Vertigo and Balance Disorders
PD 226

Characteristics of uncompensated acute unilateral vestibulopathy patients: Comparison of spontaneous nystagmus and direction changing nystagmus

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Objectives: Vestibular compensation supports recovery after acute unilateral vestibulopathy (UVP). A subset of patients develops direction-changing positional nystagmus (DCPN), which may reflect atypical central adaptation. The objective was to characterize clinical and neuroimaging features of UVP patients with persistent vestibular weakness presenting with DCPN.

Methods: Seventeen patients with persistent unilateral weakness on video head impulse test (vHIT; mean 41 days post-onset) were analyzed retrospectively. Three exhibited DCPN (DCNp group) and were compared with 14 without DCPN (CONTROLp group) using vestibular testing and MRI white matter hyperintensity (WMH) grading.

Results: DCNp patients showed reduced spontaneous and head-shaking nystagmus amplitudes ($p<0.05$) and selectively decreased gains in the contralesional anterior and ipsilesional posterior canals ($p<0.05$). Periventricular WMH burden was significantly higher in the DCNp group (mean 3.0 vs 1.8; $p=0.001$), while deep WMH did not differ.

Conclusion: DCPN in UVP is linked to canal-specific gain asymmetry and increased periventricular WMH, suggesting impaired central compensation influenced by cerebrovascular microstructural changes.

Keywords: Vestibular compensation, Vestibulopathy, Nystagmus

Posters

Vertigo and Balance Disorders
PD 227

Analysis of Clinical Characteristics in Meniere's Disease Patients with Tumarkin Crises

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Objective: To analyze the clinical characteristics of Meniere's disease (MD) patients who experience Tumarkin crises.
Methods: A retrospective analysis was conducted on the clinical data of MD patients who visited the Department of Vertigo Diseases between January 2018 and December 2024. All patients had a confirmed MD diagnosis and complete clinical records. Patients who experienced Tumarkin crises were assigned to the study group, while those without such crises formed the control group. Differences between the two groups regarding age, sex, affected side, disease duration, auditory function, vestibular function, and the presence of endolymphatic hydrops were analyzed.
Results: A total of 3104 confirmed MD patients were included, among whom 170 (5.5%) had experienced Tumarkin crises. No significant differences were found between the two groups in terms of age, sex, or affected side. The average disease duration in the study group was 98.6 months, significantly longer than that in the control group. The mean hearing threshold in the study group was 53.5 dB, significantly higher than in the control group. The positivity rate for endolymphatic hydrops in the study group was 92.6%, significantly higher than in the control group. The study group also showed significantly higher positivity rates for both vestibular and cochlear hydrops compared to the control group. Regarding vestibular function, no significant differences were found between the two groups in the abnormality rates of caloric tests, vHIT, cVEMP, or oVEMP. However, among patients with abnormal cVEMP results, the proportion showing absent waveform responses was significantly higher in the study group than in the control group (95.0% vs. 85.8%).
Conclusion: In Meniere's disease patients, Tumarkin crises are more frequently observed in patients with longer disease duration, positive findings for endolymphatic hydrops, and poorer inner ear function.

Keywords: Meniere's disease, Tumarkin crisis, Hearing

Posters

Vertigo and Balance Disorders
PD 228

Long-term Efficacy Analysis of Endolymphatic Duct Blockage for Intractable Meniere's Disease

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Objective: To evaluate the long-term efficacy and safety of endolymphatic duct blockage (EDB) in the treatment of intractable Meniere's Disease (MD).
Methods: A retrospective analysis was conducted on the clinical data of 71 patients with unilateral Meniere's disease who underwent endolymphatic duct blockage at the Department of Vertigo Diseases between January 2015 and October 2022. All patients had a confirmed diagnosis of unilateral MD, had received standardized medical treatment for at least six months, and continued to experience recurrent vertigo attacks. The surgery was performed under general anesthesia via a mastoid approach. After complete mastoidectomy, the endolymphatic duct was exposed and occluded using a silver clip or electrocautery. The follow-up period exceeded two years. Clinical observations included vertigo control and hearing changes.
Results: The 71 MD patients included 36 males and 35 females, aged between 32 and 68 years (mean age: 51.4 years). Preoperative hearing staging classified 28 patients as Stage II (mean hearing threshold 25-40 dB) and 43 as Stage III (41-70 dB). The overall effective rate for vertigo control was 84.5% (60/71), with 43 cases (60.6%) achieving Class A control and 17 cases (23.9%) achieving Class B control. Hearing improvement was observed in 6 patients (8.5%), hearing remained stable in 55 patients (77.5%), and hearing declined in 10 patients (14.1%). Vestibular function showed no significant changes before and after surgery. No complications, such as facial paralysis or cerebrospinal fluid leakage, occurred in any patient.
Conclusion: Endolymphatic duct blockage is an effective and safe method for treating intractable Meniere's disease, demonstrating significant efficacy in controlling vertigo attacks and a high rate of hearing preservation.

Keywords: Meniere's disease, Endolymphatic duct blockage, Vertigo

Posters

Vertigo and Balance Disorders
PD 229

Clinical Characteristics of 315 Cases with Bilateral Meniere's Disease

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Objective: To investigate and analyze the clinical characteristics of 315 patients with bilateral Meniere's disease (MD).
Methods: Clinical data of 315 patients with bilateral MD were collected. Collected information included age, gender, affected sides, disease duration, hearing and vestibular function test results, results of inner ear MRI with gadolinium contrast, as well as family history and past medical history. A control group of 315 patients with unilateral MD treated during the same period was randomly selected.
Results: Among bilateral MD cases, sequential bilateral onset accounted for 55.2%, showing no significant difference compared to simultaneous bilateral onset. No significant differences were found in age, disease duration, or age at onset between patients with sequential and simultaneous bilateral onset. The average age of the bilateral MD group was 54.7 years, higher than that of the unilateral MD group. The average disease duration of the bilateral MD group was 113.4 months, significantly longer than that of the unilateral MD group.The positive rate for endolymphatic hydrops (EH) in bilateral MD was 78.8%, lower than the control group. Among these, the rate of bilateral EH was 21.2%, higher than that in the unilateral MD group. Regarding pure-tone average (PTA), the PTAs for the first affected ear, second affected ear in bilateral MD, and the affected ear in unilateral MD were not significantly different. The overall and bilateral abnormality rate on most of the vestibular tests were significantly higher than that in the unilateral group. A family history of deafness was higher than in the unilateral MD group. The prevalence of comorbidities showed no significant difference compared to the unilateral MD group.
Conclusion: Bilateral MD is more frequently observed in older patients with longer disease duration. The higher prevalence of bilateral endolymphatic hydrops and bilateral vestibular dysfunction suggests a more advanced stage of the disease.

Keywords: Meniere's disease, Bilateral, Vestibular function

Posters

Vertigo and Balance Disorders
PD 230

Standardization of Vestibular Evoked Myogenic Potentials (VEMP) Protocols and Normative Values in Asian Adult Population: A Systematic Review

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Background: Vestibular Evoked Myogenic Potentials (VEMP) are electrophysiological responses reflecting otolith and vestibular pathway integrity. Despite their diagnostic value, variations in stimulus type, frequency, and methodology limit interlaboratory comparability. Normative data derived from Western populations may not be applicable to Asian populations due to anthropometric and physiological differences. This systematic review aimed to synthesize existing evidence on VEMP protocols and normative reference values in healthy Asian adults and to promote standardization across the region. Methods: Following PRISMA 2020 guidelines, electronic searches were conducted across PubMed, Scopus, EBSCOhost, J-STAGE, KoreaMed, and regional databases for studies published between 2000 and 2025. Inclusion criteria were studies involving healthy Asian adults reporting latency, amplitude, and interaural amplitude ratio (IAR) of cVEMP and/or oVEMP. Data extraction covered study design, stimulus parameters, recording techniques, and outcome measures. Results: Eight studies met the inclusion criteria, encompassing 20–54 subjects aged 17–60 years across China, Taiwan, India, Egypt, and Thailand. Air-conducted sound (ACS) 500 Hz tone-burst stimulation at 95–105 dB nHL was the predominant protocol. Mean cVEMP P13 and N23 latencies ranged from 8.00–19.27 ms and 12.6–27 ms, respectively; oVEMP N1 and P1 latencies ranged from 9.40–20.7 ms and 12.4–17.1 ms. IAR values remained below 35%, consistent with international benchmarks. Conclusion: Asian VEMP studies demonstrate convergence toward standardized tone-burst protocols yielding latency and amplitude patterns comparable to Western data, but wide range of reference value was observed. Implementing harmonized protocols—500 Hz tone-burst ACS, 100 ± 5 dBnHL, and repetition rate 5–8 Hz,—would strengthen inter-laboratory consistency and clinical reliability, then establishing unified regional normative reference values will enhance diagnostic precision in vestibular assessment across Asia.

Keywords: VEMP Protocols, Normative Values, Asian Adult Population

Posters

Vertigo and Balance Disorders
PD 231

Living with chronic vestibular symptoms: A mixed-method study on the religious practice and emotional experiences of Muslims

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Background: Vestibular/balance disorders often experience debilitating symptoms even with the slightest movements. For Muslims with vestibular problems, the prayer movements would exacerbate these symptoms, affecting religious practice. This study aimed to explore the impact of living with vestibular symptoms amongst Muslims using quantitative and qualitative methods. Methods: The Malay version of the Vestibular Rehabilitation Benefit Questionnaire (My-VRBQ) was used to measure the severity of symptoms and quality of life. Scores of more than zero reflect the condition of the person compared to the condition before the dizziness happened. Participants (n=12, aged 25–63) with clinically diagnosed chronic vestibular disorders were recruited. Symptom duration ranged from six months to 21 years. In-depth interviews were conducted to explore challenges in performing religious activities, particularly prayer. Verbatim transcripts were analysed using content analysis. Results: My-VRBQ showed that dizziness was the most severe symptom (mean deficit: 51%, SD: 17%), followed by anxiety (mean: 42%, SD: 20%) and motion-provoked symptom (mean: 34%, SD: 19%). The overall quality of life deficit was 27% (SD: 16%). Content analysis identified key themes: common symptoms, triggers, coping strategies, and emotional impact. Participants reported impaired body functions and emotional disturbances, with hopelessness being the most prominent emotion. Prayer-related movements further intensified symptoms, leading to stress, anger, and disappointment. Conclusion: My-VRBQ results showed significant symptom severity, especially dizziness and anxiety, yet quality of life scores were comparatively lower, suggesting some adaptation. However, the in-depth interview revealed deeper struggles, particularly in performing prayer. Content analysis uncovered emotional distress; hopelessness, stress, and anger that linked to disrupted prayer movements. These insights highlight how vestibular symptoms affect not just physical function but also spiritual and emotional well-being. The qualitative approach enriched understanding beyond numerical scores, emphasising the need for holistic care that addresses both clinical symptoms and the personal, religious challenges faced by patients.

Keywords: Vestibular symptoms, Prayer-related challenges, In-depth interview

Posters

Vertigo and Balance Disorders
PD 232

Otolith-Specific Vestibular Deficits as Differential Biomarkers for Amnestic and Non-Amnestic Mild Cognitive Impairment Subtypes

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Objective
Mild Cognitive Impairment (MCI) is heterogeneous, classified into amnestic (aMCI), often progressing to Alzheimer's disease (AD), and non-amnestic (nMCI), linked to non-AD dementias. While vestibular dysfunction is associated with cognitive decline, the utility of vestibular deficits as distinct biomarkers for these MCI subtypes remains unestablished. This study aimed to identify differential profiles of vestibular function across aMCI, nMCI, and healthy control groups to find specific otolith markers that can independently distinguish between these two heterogeneous cognitive impairment subtypes.
Methods
A cross-sectional study was conducted on 60 participants (n=20 each: aMCI, nMCI, and healthy controls). All underwent a comprehensive vestibular test battery, including cervical vestibular evoked myogenic potential (cVEMP for saccular function), ocular VEMPs (oVEMP for utricular function), and the video Head Impulse Test (vHIT) for semicircular canals. Group differences were analyzed using Chi-squaare tests and multinomial logistic regression to determine independent predictors of group membership.
Results
Chi-square analysis revealed significant differences in oVEMP abnormality ($\chi2(2)=11.25, p=0.004$) and vHIT catch-up saccades ($\chi2(2)=27.95, p<0.001$), with aMCI showing the highest abnormality prevalence. Multinomial logistic regression, referencing the aMCI group, found that normal oVEMP status was the most robust independent predictor, increasing the odds of being classified as nMCI by nearly 58-fold ((Odds Ratio = 58.308, 95% CI: 4.09–831.62, p=0.003). Furthermore, cVEMP abnormality was a significant predictor of nMCI compared to the control group (OR = 0.064, p=0.028). Age, sex, and lateral canal gain were not significant predictors.
Conclusion
Utricular dysfunction, as indexed by abnormal oVEMP responses, serves as a highly specific physiological biomarker for aMCI, aligning with early hippocampal/allocentric pathway vulnerability. Conversely, saccular abnormality (cVEMP) is selectively associated with nMCI, potentially reflecting impairment in the egocentric/neocortical networks. These findings support the use of VEMP testing as a potential non-invasive tool to assist in the differential diagnosis and prognostication of MCI subtypes.

Keywords: Mild Cognitive Impairment (MCI), Otolith Function, Biomarker

Posters

Vertigo and Balance Disorders
PD 233

Data-driven analysis from audiometric profiles of 1200 patients consulting for dizziness and vertigo

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Dizziness and vertigo are highly prevalent in audiology clinics, affecting 20–30% of adults across all ages, yet their mechanisms often remain unclear. This retrospective study included 1,115 patients (55 years median age, 64.5% female), all evaluated for dizziness and vertigo with comprehensive audiometry and vestibular testing. Principal component analysis of pure-tone audiograms identified six distinct audiometric clusters. Nearly half the cohort (46.8%, n=522, median age 43y) had normal or near-normal hearing, while high-frequency, symmetric losses were most prevalent among older males (cluster 3, median age 71y). Clusters with asymmetric or unilateral hearing loss (clusters 5 and 6) comprised 12.6% and 6.3% of the cohort, respectively.

Peripheral vestibular pathologies were diagnosed in 49.3% of cases; the most common were bilateral vestibulopathies (16.7%), benign paroxysmal positional vertigo (9.7%), and Ménière's disease (4%). Central causes, including vestibular migraine (15.5%), were also frequent, especially in younger women with normal hearing.

Quantitative audiovestibular correlations were robust: reduced vestibular response (caloric irrigation) increased from a median 12% to 31% (IQR 6–49%) as low-frequency hearing loss in the worst ear progressed, with strong correlations (r=0.92). Rotatory chair phase shift rose from 2.5° to 10.5° (IQR 1–26°) in parallel with binaural pure tone average (PTA) loss (r=0.96). Post-rotatory nystagmus duration increased from 2.2s to 3.4s as hearing loss worsened (r=0.99). Lateral and posterior semicircular canal function (vHIT gain) was negatively correlated with PTA (r=–0.94), while anterior canal function remained unaffected by age or hearing loss.

Clinically, audiometric phenotype strongly predicted individual vestibular vulnerabilities and diagnostic categories. These findings support the routine integration of audiometry with vestibular assessment to improve diagnosis and individualized management in patients with dizziness or vertigo, especially in older adults and those with hearing asymmetry or symmetric high-frequency losses.

Keywords: Big data, Vestibular tests, Vestibular etiologies

Posters

Vertigo and Balance Disorders
PD 234

Balance Training in Older Adults with Idiopathic Dizziness

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Background: Many older adults experience unexplained or idiopathic dizziness, for which standard physiotherapy outcomes remain unclear. Unlike established vestibular rehabilitation for specific vestibular dysfunctions, objective measures of trunk sway may provide insight into treatment effectiveness.

Objective: To evaluate the effects of an 8-week standard physiotherapy program versus a control condition on objective trunk sway (SwayStar) and subjective dizziness handicap (DHI) in older adults with unexplained dizziness.

Methods: Seventeen older adults with unexplained dizziness were recruited into a pre-post controlled trial (10 physiotherapy, 7 control). The intervention group received an individualised 8-week physiotherapy program tailored to baseline deficits and patient feedback, with a mid-point review. Outcomes included objective trunk sway (SwayStar, including 8 m tandem walk metrics), task completion times, and subjective dizziness handicap (DHI). Changes were analysed using Time × Group interaction tests (ANOVA or non-parametric; α=0.05).

Results: No significant Time × Group interaction effects were observed for most objective sway measures, including 8 m tandem walk roll angle (p=0.248) and Balance Control Index (BCI; p=0.694). Task completion time analysis showed a significant improvement favouring physiotherapy only for the 3 m walk with head pitching (p=0.033). Other tasks—including 3 m walk eyes closed (p=0.174), 3 m walk head rotation (p=0.088), 8 m tandem walk (p=0.364), and barrier navigation (p=0.475)—showed no significant differences. No significant changes were observed in DHI total scores (p=0.160).

Conclusion: Eight weeks of standard physiotherapy did not produce significant improvements in objective trunk stability or self-reported dizziness handicap in older adults with unexplained dizziness compared to controls. Future studies should explore tailored or alternative interventions targeting this population.

Keywords: Idiopathic dizziness, Balance, Rehabilitation

Posters

Vertigo and Balance Disorders
PD 235

IMPACT OF MILD HEARING LOSS ON POSTURAL CONTROL IN ELDERLY PATIENTS WITH CHRONIC DIZZINESS

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OBJECTIVES: This study examined the relationship between mild hearing loss and chronic dizziness in elderly patients by evaluating postural control.
METHODS: A retrospective study included 53 elderly patients (≥60 years) with chronic dizziness for over three months. Patients were classified into normal hearing (N=26) and mild hearing loss (N=27) groups. Vestibular function was evaluated using caloric test, video head impulse test (vHIT), and rotation chair test. Sensory organization test (SOT) was used to evaluate postural control.
RESULTS: No significant differences were found in SOT equilibrium or composite scores between groups. A significant negative correlation was observed between age and composite scores, suggesting age-related decline in postural control. However, mild hearing loss did not impact postural control.
CONCLUSION: These findings suggest that mild hearing loss did not significantly affect postural control in elderly patients with chronic dizziness. Instead, age-related postural decline may be an important factor in chronic dizziness among elderly.

Keywords: Mild hearing loss, Postural control, Chronic dizziness

Posters

Vertigo and Balance Disorders
PD 236

Positional Nystagmus in Sudden Sensorineural Hearing Loss with Vertigo

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This presentation will cover the results of our recent clinical studies on 'vertigo and nystagmus associated with sudden hearing loss'. Firstly, we will present about "patterns of nystagmus conversion in sudden hearing loss with vertigo". In this study, we aimed to investigate the characteristic changes in type of nystagmus and clinical features in patients with sudden hearing loss with vertigo who experienced a change in their nystagmus pattern during follow-up. Initial nystagmus was classified into 5 subgroups: paretic type, irritative type, persistent geotropic direction-changing positional nystagmus (PG-DCPN), persistent apogeotropic direction changing positional nystagmus (PA-DCPN), and posterior semicircular canal benign paroxysmal positional vertigo.
Secondly, we will present about "sudden hearing loss with positional vertigo: initial findings of positional nystagmus and hearing outcomes". In this study, we aimed to investigate the initial findings of positional nystagmus in patients with sudden hearing loss and positional vertigo, and to compare hearing improvement among patients with different types of positional nystagmus.
Finally, we will present about "nystagmus findings and hearing recovery in idiopathic sudden sensorineural hearing loss without dizziness". In this study, we aimed to investigate the incidence of nystagmus in patients with sudden hearing loss without dizziness, and to evaluate the correlation of the presence of nystagmus with hearing recovery in those patients.

Keywords: Sudden hearing loss, Vertigo, Positional nystagmus

Posters

Vertigo and Balance Disorders
PD 237

Single-Cell Transcriptomic Atlas of Zebrafish Otic Vesicle Development Reveals Key Regulators of Otolith Formation

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The molecular mechanisms governing otolith biomineralization remain incompletely resolved due to limitations in spatiotemporal resolution of traditional approaches. To address this, we present an integrated single-cell atlas of zebrafish inner ear development, combining public datasets with newly generated 96753 single-cell transcriptomes from our laboratory. After rigorous quality control and batch effect correction using Seurat v4 and Harmony integration, 58,835 high-confidence cells were retained, capturing the complete trajectory of otic vesicle morphogenesis from placode induction (14hpf) to functional maturation (120hpf).

Our analysis leveraged multi-modal dynamic profiling: Pseudotemporal reconstruction revealed bifurcation points in otic vesicle and otolith lineages at 14–120 hpf; Cellular interaction networks (CellChat) predicted the pathway crosstalk between dorsolateral epithelium and differentiating otolith-forming cells (OFCs). Three pivotal biological events govern otolith formation: Establishment of the polarity center defining the spatial axis for biomineralization; Specification and enrichment of otolith precursors (OFCs lineage) through chemoattractant-guided aggregation; Emergence of tether hair cells anchoring otoliths to the sensory epithelium via kinocilial coupling. Focusing on OFC as a novel subcluster we performed multi-method regulator screening: Cis-regulatory analysis prioritized 23 TFs (e.g., nr4a2b,dacha);Weighted gene co-expression networks (WGCNA) uncovered mineral transport modules (slc26a, ca2+ paralogs).Cross-validation confirmed functional convergence:In situ hybridization localized mb to OFC1 during crystal nucleation (48 hpf);knockdown of slc26a10 disrupted otolith calcification (Alizarin red quantification, *p<0.01); Critically, our computational model (multi-omics neural network) predicted stage-specific expression of otolith regulators , This resource establishes a systems-level framework for otolith regul

Keywords: zebrafish, otic vesicle development, otolith development

Posters

Future E-Health, Innovative Technology and Therapies
PD 238

Transforming Hearing Rehabilitation: Harnessing Self-Directed Auditory Training in the Era of E-Health

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Purpose: Hearing loss adversely affects communication and quality of life across all ages. Traditional clinician-led rehabilitation provides benefits but is constrained by accessibility challenges, financial burden, reliance on professional expertise, and limited long-term adherence. Self-directed auditory rehabilitation—delivered through computer-based programs, mobile applications, and telehealth platforms—offers a promising alternative. This systematic review evaluated its effectiveness across children, adults, and older adults, focusing on speech recognition outcomes and their sustainability. Methods: A systematic search of five databases identified peer-reviewed studies involving participants with at least mild hearing loss who engaged in self-directed auditory rehabilitation. Eligible studies included children, adults, or older adults and reported behavioral, objective, or patient-reported auditory outcomes using pre–post or controlled designs. Data were extracted, risk of bias assessed, and random-effects meta-analyses performed. Publication bias was tested with funnel plots and Egger's regression. Results: Of 1,851 screened records, 22 studies met inclusion criteria, representing varied populations, devices, and training formats. In children, meta-analysis showed significant speech recognition improvement (mean difference = 8.7, SE = 3.7, 95% CI: 1.5–16.0; $p < 0.05$), with gains maintained over 1–3 months. In adults and older adults, a moderate significant benefit was observed (Cohen's $d = 0.52$, SE = 0.043, 95% CI: 0.44–0.61). Sensitivity analyses confirmed the robustness of findings despite some evidence of publication bias. Conclusion: Self-directed auditory rehabilitation produces meaningful and sustained improvements in speech recognition across age groups, supporting its integration as an accessible adjunct to conventional care. Given the increasing demand for scalable digital health solutions, these interventions align well with broader e-health strategies to reduce disparities in hearing care. Future research should refine training content, address intervention variability, and explore pathways for establishing evidence-based digital therapeutics in auditory rehabilitation to amplify clinical and societal benefits.

Keywords: Self-directed auditory rehabilitation, E-health, Speech recognition

Posters

Future E-Health, Innovative Technology and Therapies
PD 239

Deep learning based automated diagnosis of Otitis Media from tympanic membrane imaes

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Otitis media, encompassing acute, effusion, and chronic types, is among the most prevalent otologic disorders worldwide, 750 million individuals annually. Inaccurate or delayed diagnosis frequently leads to complications such as hearing loss, developmental delay, and even life-threatening conditions.

Diagnostic accuracy by general practitioners and pediatric specialists remains limited despite reent advances in digital otoscope.
Articitial inteligence based image analysis offers a promising solution, yet curent models still face challemges in achieving consistent accuracy and clinical applicability.

This study sought to develop and valicate a deep learning based diagnostic model using tympanic membrane endoscopic images, aiming to achive performance surpassing conventional diagnostic standards while ensuring clinical relevance for primary care and resource limited settings

Keywords: Artifitial Intelligence, Diagnosis, Tympanic membrane

Posters

Future E-Health, Innovative Technology and Therapies
PD 240

Clinical Evaluation of a Digital Auditory-Cognitive Rehabilitation Program for Age Related Hearing Loss

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Age-related hearing loss has emerged as a significant public health concern. The market for rehabilitation for ARHL is experiencing substantial growth both domestically and internationally. ARHL is distinct from general sensorineural hearing loss as it involves both peripheral issues, primarily due to hair cell loss, and central issues related to speech processing and cognitive decline. Recent research has identified ARHL as the most significant modifiable risk factor for dementia, emphasizing the critical importance of hearing rehabilitation. Despite the availability of hearing aids as the gold standard for hearing rehabilitation, their adoption rate in South Korea remains low. Only 17.4% of patients with hearing loss acquire hearing aids, and a mere 12.6% utilize them in daily life. Consequently, there is a practical need for "remote auditory rehabilitation services" that can provide systematic, long-term rehabilitation at a lower cost to hearing-impaired patients residing in distant locations. Furthermore, there is a clear need for comprehensive rehabilitation approaches that address both auditory and cognitive aspects of the condition because ARHL also impacts on cognitive function.
Digital therapeutic solutions offer promising potential in this regard, as they can potentially target both hearing loss and cognitive decline simultaneously.
This study aims to evaluate the effectiveness of phonetics-based rehabilitation in patients with ARHL and to confirm the efficacy and safety of digital therapeutics for hearing loss rehabilitation training.
By focusing on both auditory and cognitive aspects of ARHL, this research seeks to contribute to the development of more effective and accessible interventions for the growing population affected by age-related hearing loss.

Keywords: Age-related hearing loss, Digital Auditory-Cognitive Rehabilitation Program, Clinical efficacy

Posters

Future E-Health, Innovative Technology and Therapies
PD 241

Student Perceptions of Simulation-Based Aural Rehabilitation Training in Audiology Education

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Objectives:
Aural rehabilitation (AR) is a critical component of audiological care, yet students often report limited confidence in delivering AR services due to the complexity of counselling within a patient centred care (PCC) framework and the need for individualised intervention planning. This study investigates student-perceived benefits of simulation-based AR training integrated into the curriculum of a Master of Clinical Audiology program.
Methods:
Students participated in a series of simulation clinics designed to build proficiency in developing and delivering AR using a PCC approach. Following the simulation clinics, students were invited to participate in a post-clinic survey to assess their engagement, perceived competence, and confidence in delivering AR. Qualitative data from open-ended responses were analysed using conventional content analysis with inductive coding and thematic categorisation.
Results:
Thirty-nine students completed the AR simulation clinics and post-simulation surveys. Results indicated notable improvement across all domains, with 80% of students reporting that simulation experiences were highly engaging, increased confidence in developing AR management plans and 82% feeling more confident applying PCC principles when implementing AR management plans. Thematic analysis revealed that students particularly valued the realistic nature of the clinical scenarios and the opportunity to practice empathetic communication. Overall, students reported that the AR simulation experience greatly enhanced their confidence and preparedness for clinical placement.
Conclusion:
This study highlights that AR simulation training is a valuable pedagogical tool for improving student confidence, engagement and clinical readiness. Ongoing refinement of AR simulation case studies informed by student feedback will further enhance learning outcomes and support the development of competent, patient centred Audiology graduates.

Keywords: Aural rehabilitation, Simulation-based learning, Patient centred care

Posters

Future E-Health, Innovative Technology and Therapies
PD 242

A Robust Auto-Calibration Algorithm Using Headset and Microphone for Reliable dB Output in Hearing Screening for Normal Pressure Hydrocephalus (NPH)

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Normal Pressure Hydrocephalus (NPH) is a neurologic disorder where accurate hearing assessment is crucial for comprehensive patient management. A web-based hearing screening system for NPH is currently under development to meet this need. However, a significant challenge in digital audiometry is ensuring that the displayed decibel (dB) level accurately matches the actual sound output from the user's headset. Discrepancies arising from hardware variability and environmental factors can compromise the reliability of diagnostic results.

To address this, we propose a robust auto-calibration algorithm designed to minimize these inconsistencies. The algorithm utilizes a feedback loop, employing the headset and an integrated microphone to continuously monitor the sound output. It then automatically adjusts system parameters in real-time, ensuring the delivered sound precisely matches the prescribed dB levels. This approach effectively compensates for variations in hardware and ambient conditions, thereby standardizing the acoustic environment for each test.

The successful implementation of this algorithm is expected to yield a hearing screening process with significantly improved reliability and reproducibility. This is particularly critical in the clinical management of NPH, where precise hearing evaluations support better patient care and longitudinal monitoring. Future work will involve experimental validation of the algorithm's effectiveness with a cohort of NPH patients in real-world settings. Ultimately, this advancement aims to standardize and enhance the accuracy of web-based hearing assessments within NPH management systems, contributing to more effective clinical outcomes.

This research was supported by a grant of the Korea Dementia Research Project through the Korea Dementia Research Center(KDRC), funded by the Ministry of Health & Welfare and Ministry of Science and ICT, Republic of Korea (grant number : RS-2024-00342071)

Keywords: Normal Pressure Hydrocephalus, Calibration, Hearing

Posters

Future E-Health, Innovative Technology and Therapies
PD 243

Real-World Evaluation of the AudioKey 3 App: Performance, User Satisfaction, and Cochlear Implant Usage Insights

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Purpose:
To evaluate the real-world performance, user satisfaction, and usage behavior of the AudioKey 3 mobile application developed by MED-EL for cochlear implant (CI) users. Safety of the app was evaluated by analyzing device-related complications, which were tracked by a user survey.
Methods:
A post-market observational study was conducted using in-app survey responses (N=46) and app-logged data (N=11,014) collected between October 14, 2024, and March 31, 2025. Metrics included function usage frequency, auditory scene engagement, and streaming behavior.
Results:
98% of surveyed users successfully used the app for remote control and status checks ($p < 0.001$).
96% rated the app as "very good" or "good"; 66% gave a "Good" rating via the in-app rating function (N=776).
Average daily audio processor usage was 11.8 hours.
"Speech in noise" was the most used auditory mode (mean 3.5 hours/day).
Streaming was infrequent: 59% of processors were never used for streaming; only 5% exceeded 3 hours/day.
Most-used functions included volume control and program switching; least-used were streaming enable/disable.

Conclusion:
AudioKey 3 is a reliable and user-friendly tool that supports consistent device usage and enhances user experience. The app facilitates effective hearing management in daily life. Low streaming usage may reflect user preferences or technical constraints.

Keywords: Cochlear implant, Mobile app, Audio processor usage

Posters

Future E-Health, Innovative Technology and Therapies

PD 244

Challenges of Post-operative Cochlear Implant Intervention in Bhutan: Exploring Possible Way Forward.

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Bhutan is committed to providing free healthcare services to its citizens, which has enabled enhanced ear and hearing care in Bhutan. Bhutan launched its national cochlear implant (CI) programme in 2022 with technical collaboration from MED-EL, representing a significant advancement in the country's commitment to universal health coverage and inclusive management of individuals with severe to profound hearing loss. However, the implementation and sustainability of the CI service face critical challenges linked to Bhutan's geographic, infrastructural, and human resource constraints. As of early 2025, approximately 54.7% lived in rural regions where access to tertiary hospitals is limited. Consequently, many CI recipients encounter difficulties in attending post-operative cochlear implant rehabilitation, such as device mapping, troubleshooting, and auditory-verbal therapy, which are crucial to achieving optimal auditory and language outcomes. Additionally, there is a shortage of trained audiologists and speech-language therapists, limiting the health system's capacity to provide comprehensive and individualized care.

This proposal seeks to strengthen Bhutan's CI service through sustainable, context-specific strategies aligned with WHO's Rehabilitation 2030 agenda. Key interventions include decentralizing rehabilitation through regional service hubs, expanding tele-audiology networks, and enhancing capacity-building programmes for local professionals. With 88.4% of the total population having access to the internet as of January 2025, Bhutan is well-positioned to leverage digital health technologies to deliver remote follow-up and caregiver support. This case study aims to pilot a few CI recipients with tele-aural rehabilitation and compare the outcome measures, and identify challenges for continuous improvement.

By addressing systemic barriers to continuity of care, this initiative aims to improve CI outcomes, reduce disparities between urban and rural populations, and establish a replicable model for hearing health service delivery in resource-limited settings. The proposed interventions align with WHO's strategic objectives to advance equitable access, strengthen health systems, and promote inclusive, sustainable rehabilitation services for all.

Keywords: Post-operative cochlear implant rehabilitation, Tele-audiology, Outcomes

Posters

Future E-Health, Innovative Technology and Therapies

PD 245

Verification, analytical validation, and clinical validation study protocol of an affordable otoacoustic emission device from India.

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Globally, the prevalence of congenital hearing loss is 15.4 per 100,000 births (Xiao J et al, 2023). Before discharge, all newborns in high-income countries follow protocols to undergo hearing screening (Joshi et al, 2023). However, lack of hearing loss awareness (Findlen et al, 2023) and the workload of existing frontline health care workers have made it difficult to implement these requirements as a nationwide mandate in Low-Middle Income Countries (LMICs) (Johnson et al, 2022).

The cost per child to identify and rehabilitate is over 6 lakhs due to expensive instruments and a lack of diagnostic and rehabilitation facilities (Ramkumar et al, 2018). Current low-cost solutions are either subjective and unable to detect hearing loss at lower intensities (Ramesh et al, 2012 & Ramkumar et al, 2025) or are too expensive to implement in rural settings (SOHUM).

An objective hearing screening device to assess the hearing/function of cochlear hair cells that can suggest hearing loss (Kemp, 2002) is under development to address the high equipment cost that hinders wide implementation. Frontline health workers with minimal training can use the device to screen for neonatal hearing loss.

For this study, the device will be validated in a lab setting and a field setting (hospitals, primary health centers, and community health centers) by minimally trained frontline workers and checked for its sensitivity, specificity, negative predictive value, and positive predictive value. The device will also be validated in three ambient noise settings by simulating realistic noise recorded from possible screening sites.

Anticipated outcomes:

A low-cost, indigenously developed objective hearing screener that also shows the device's noise level performance that frontline workers can use with minimum training.

Keywords: Validation, Otoacoustic Emissions, Innovation

Posters

Future E-Health, Innovative Technology and Therapies
PD 246

Development and validation of kiosk-based audiometry as pioneer in digital health in audiology

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Objectives: Early detection of hearing loss is critical for preventing its broader social, cognitive, and emotional consequences. Untreated hearing loss, especially in older adults, is strongly linked to communication difficulties, psychosocial distress, and cognitive decline. The purpose of the current study was to develop and validate a kiosk-based audiometry with acoustically high accuracy and user-friendliness to resolve problem between accessibility and clinical reliability within the current hearing healthcare paradigm.
Methods: For the development stage, kiosk-based audiometry was developed with various hearing test functions such as self-reported questionnaire, automated pure-tone audiometry (APTA), and artificial intelligence- (AI) based otoscopy. Self-reported questionnaire designated to identify the subjective hearing handicap in daily life using Korean version of Revised Hearing Handicap Inventory (RHHI-K). For the APTA, air-conduction PTA method such as modified Hughson-Westlake based on the international standard test procedure (i.e, ISO 8253-1) was applied to provide reliable and accurate test results. AI-based otoscopy was integrated into kiosk-based audiometry to support diagnosis of hearing loss, especially for screening of conductive hearing loss.
Results: To validate kiosk-based audiometry, the validation stage was carried out with a total of 146 individuals (75 male and 71 female). Validation was conducted to single-group comparison methods using kiosk-based audiometry and traditional audiometry. To verify the clinical equivalence of kiosk-based audiometry, paired t-test was applied. The findings of the current study revealed that 4-frequency averaged threshold (4FPTA) was not significantly differ (right ear: $t = 1.07$, $p = 0.287$, left ear: $t = 0.41$, $p = 0.679$).
Conclusions: The kiosk-based audiometry shows clinical equivalence compared to traditional audiometry and can offers as a concrete alternative to resolve the problems between accessibility and reliability. As the clinically validated hearing screening tools in non-clinical environments, marking an important milestone in shifting the paradigm of hearing loss management from hospital-centric to community-integrated.

Keywords: E-health, Hearing screening, Kiosk

Posters

Future E-Health, Innovative Technology and Therapies
PD 247

From Maps to Metrics: Validating MSI for Noise–Hearing Links

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Purpose: To quantify the spatial relationship between environmental noise and hearing loss using a map-first Similarity Index (MSI) and to test whether MSI can replace or complement conventional regression metrics (R^2/β). We further evaluate scale robustness (resolution, cutoff, legend), probe causal signals via quasi-experiments.
Method: Nationwide claims (NHIS; patient counts) were integrated with population structure (age–sex mix, density) and multi-source geographic information—environmental noise maps, topography/DEM, cadastre (parcel boundaries), and land-use/cover—onto a unified tiled grid (EPSG:5179; 10–270 m). Intensities were robustly normalized to 0–1; legend breaks (quantile/Jenks) were learned once on a master grid and then locked. MSI combined hotspot overlap (IoU using L_den 55/60/65 dB and top-20% hearing-loss areas), continuous agreement (1−NMSE), structural similarity (SSIM), and spatial-autocorrelation similarity (MoranSim). To isolate noise-specific signals, partial MSI was computed after residualizing noise and hearing maps for population and geographic covariates (density, age–sex, urbanicity/green ratio, road/provider density, land-use, terrain). Validation used blocked spatial cross-validation (including leave-one-region-out), Moran-preserving permutation tests for p-values, and TOST equivalence of MSI to R^2/β with $\Delta=0.05$ at $\alpha=0.05$ while correcting the effective sample size (Neff) for spatial autocorrelation (Clifford/block-bootstrap). Scale robustness was summarized as an MSI-surface over resolution×cutoff under fixed legends. Quasi-experiments included RDD at 65 dB boundaries, DiD/Event-study around barrier or schedule changes.
Result: We expect (i) TOST-based equivalence after Neff correction; (ii) a flat MSI-surface across resolutions/cutoffs; and (iii) significant Partial-MSI under Moran-preserving permutations. Quasi-experiments are expected to show a discontinuity at 65 dB and post-intervention reductions in high-overlap zones.
Conclusion: A map-first MSI framework can achieve statistical equivalence to regression, remain robust across scales, and support causal interpretation, enabling rapid, interpretable.

Keywords: Environmental noise, Hearing loss, Map Similarity Index (MSI)

Posters

Future E-Health, Innovative Technology and Therapies
PD 248

Piloting a student-facilitated tele-audiology infant diagnostic program

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Background: There has been a notable rise in the use of teleaudiology services to address barriers in accessing audiology care in recent years. Infant diagnostic teleaudiology programs aim to increase access to accurate and timely diagnostic audiology, to improve outcomes for infants with hearing loss. A challenge faced by infant diagnostic teleaudiology programs is the need to employ trained in-person facilitators to assist with the practical setup throughout testing. This research aimed to explore caregiver perspectives of teleaudiology appointments for infant diagnostic testing utilizing audiology students as in-person facilitators to support the appointment.

Methods: Eight infants and their caregivers participated in diagnostic audiology appointments. Teleaudiology appointments were conducted with the audiologist remotely, with final year audiology students acting as facilitators to provide in-person support. Following each appointment, semi-structured interviews were conducted with caregivers. Interviews explored caregiver experiences, perceptions, and overall opinions regarding their appointments and opinions of a teleaudiology service with student facilitators.

Results: Caregiver interviews resulted in four main themes: 1) improved accessibility of appointments; 2) effective rapport-building and communication, with concerns for supporting challenging scenarios; 3) varying perceptions of facilitator involvement; and 4) level of concern influencing family preferences for appointment type.

Conclusions: This study provides insights into caregiver perspectives on teleaudiology programs involving student facilitators for infant diagnostic audiology. The findings highlight the importance of thorough training prior to appointments, audiologist guidance for student facilitators, and the importance of effective communication strategies by audiologists to address parental concerns.

Keywords: Teleaudiology, Infant diagnostics, Student-facilitated services

Posters

Future E-Health, Innovative Technology and Therapies
PD 249

Proof of Concept: AI-Generated Video Enhancement of the HHIE-S Questionnaire for Improved Accessibility – A Multi-Stakeholder Expert Evaluation

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The Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) faces accessibility barriers among elderly populations with limited health literacy. AI-generated video interventions show promise for healthcare accessibility but remain underexplored in audiological assessments. This study evaluated AI-generated videos designed to enhance HHIE-S items comprehension among older adults with hearing loss.

Ten 8-second videos for HHIE-S items were generated using Google Veo 3.1. Seven stakeholders (three audiologists, two researchers, two individuals with hearing loss) evaluated the videos using structured protocols. Quantitative ratings used 5-point Likert scales across five dimensions: accuracy, clarity, cultural appropriateness, visual quality, and overall effectiveness. Qualitative feedback identified strengths and improvement needs.

Mean ratings were 4.03/5.00 overall, with audiologists highest at 4.40. End users with hearing loss rated videos at 4.00, indicating acceptable satisfaction. Highest-rated items were S-8 (difficulty hearing TV/radio, 4.71) and E-1 (feeling embarrassed, 4.57), demonstrating strong emotional resonance and clear contextual scenarios. Lower-rated items S-5 (visiting friends, 2.86) and S-6 (religious services, 3.14) require improved cultural adaptation and visual clarity. Thematic analysis revealed success factors: authentic representation, appropriate emotional depth, and contextual cues facilitating comprehension.

This proof-of-concept study demonstrates feasibility of AI-generated video enhancements for audiological questionnaires. End-user ratings (4.00/5.00) support potential clinical utility. Despite needing refinement in cultural adaptation, the approach shows promise for improving accessibility in audiological assessments. Findings can guide future product development, advance research methodologies, and inform implementation strategies for AI-assisted health assessment tools.

Keywords: Artificial intelligence, HHIE-S, Proof of concept

Posters

Future E-Health, Innovative Technology and Therapies
PD 250

Active Learning-Based Automated Audiometry vs Standard Hughson-Westlake for Notch Detection

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High-resolution audiometry remains critical for accurately diagnosing hearing damage across occupational and clinical settings, as audiometric notches can occur across a wide range of frequencies. Notches around 2 (Carhart, 1950) and 4 kHz (Coles, 2000) may indicate noise-induced hearing loss (NIHL), while those at high frequencies are linked to tinnitus (Lefeuvre et al, 2019) and those at low frequencies may be associated with cardiovascular risk (Simões, 2023). However, capturing them accurately using standard pure tone audiometry (PTA) protocols can be challenging, as frequencies are typically presented at octave or half-octave steps, potentially missing valuable diagnostic insights. Precision PTA (P-PTA) can effectively detect notches, but it is costly and time-consuming. Recent advances in computational audiology have introduced time-efficient assessment methods capable of producing high-resolution audiograms (Song et al, 2015; Cox et al, 2016; Wallaert, 2024).

This study evaluates a Bayesian Active Learning-based (BAL) approach (Schlittenlacher et al, 2018) and its ability to locate notches by comparing it to the standard Hughson-Westlake (HW) protocol. BAL is an information theory method which uses Gaussian Process inference to select the next trial's frequency and level from previous responses, producing a continuous audiogram with uncertainty estimates around the threshold curve.

Our virtual patient algorithm (Gaied et al, 2025), defined by its psychometric function was implemented to simulate test responses. Semi-synthetic target audiograms reproducing realistic notch configurations served as the ground truth for performance evaluation. They were made continuous through interpolation, enabling BAL to generate responses at any given frequency. Monte Carlo simulations of virtual patient trials were then performed.

Results show that, for an equivalent number of trials, BAL with optimized hyperparameters outperforms all HW variants in accuracy, and can detect notches between standard frequencies. These findings highlight the importance of high-resolution adaptive audiometry, specifically for the precise detection of notch-related hearing damage.

Keywords: Pure Tone Audiometry, Notch detection, Bayesian Active Learning

Posters

Future E-Health, Innovative Technology and Therapies
PD 251

Immersive Assessment of Auditory Perception according to Listening Habits: A Pilot Study in Musicians and Non-Musicians

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Speech understanding in noise and sound localisation are central components of real-life hearing (Carlini et al, 2024; Joly et al, 2022). They are crucial for communication outcomes, maintaining social engagement, reducing listening effort, and experiencing hearing impairment (Gatehouse & and Noble, 2004; Knoetze et al, 2023; Wu et al, 2024). However, standard audiometric evaluations rarely capture these complex perceptual processes, which reflect daily auditory challenges.

Musicians represent an ideal population to explore how auditory expertise and noise exposure shape these mechanisms. While musical training has been linked to increased auditory plasticity and improved sentence-in-noise processing (Coffey et al, 2017), it is also associated with a higher incidence of tinnitus, hyperacusis, and self-reported subclinical hearing deficits (Couth et al, 2020). These conflicting findings raise crucial questions about adaptive versus maladaptive auditory plasticity in expert listeners.

This pilot study aims to investigate perceptual patterns in musicians with and without auditory complaints compared with non-musicians using innovative immersive auditory tasks.

A 360° sound diffusion device composed of 19 loudspeakers was developed. Participants completed self-report questionnaires (the Abbreviated Profile of Hearing Aid Benefit (APHAB) and the Speech, Spatial and Qualities of Hearing Scale (SSQ)), and standardized audiometric screenings (SoTone tonal test; SoNoise speech-in-noise test developed by SonUp), followed by immersive tasks assessing speech-in-noise perception, sound localisation, and perception of moving auditory trajectories in the 360° sound diffusion device.

Preliminary results (n = 4) seem to indicate distinct auditory patterns: musicians showed superior sounds localisation, with no differentiation between musical or vocal stimuli, whereas non-musicians performed better for vocal stimuli.

This pilot study highlights the feasibility and relevance of immersive auditory assessment for exploring individual differences in perception. Preliminary findings seem to suggest that listening habits and auditory expertise may influence performance in noisy and spatial listening situations, offering new perspectives for personalised auditory rehabilitation.

Keywords: Sound localisation, Auditory perception, Immersive auditory evaluation

Posters

Future E-Health, Innovative Technology and Therapies
PD 252

The Language-Independent ACT and AMSPECT Tests Fail to Capture Speech Recognition Ability at the Phoneme, Word, and Sentence Levels

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Purpose: A major limitation of conventional speech recognition tests is that they target native speakers. These tests rely on language-specific stimuli, and a large proportion of the world's approximately 7,000 languages lack standardized materials. Individuals with such linguistic backgrounds therefore cannot be properly assessed, risking unequal hearing care. Recently developed tests such as the Audible Contrast Threshold test (ACT) and AMSPECT claim to measure speech recognition ability independent of language. While promising, their validity is naturally questionable, as they exclude language itself – the core medium of speech. Demonstrating their ability to withstand rigorous empirical attempts at falsification is therefore essential. This study represents such an attempt.
Methods: Forty adult native Swedish speakers with moderate sloping hearing loss completed the ACT and AMSPECT tests, along with a battery of Swedish speech audiometry tests targeting phoneme, word, and sentence levels, with and without noise. To avoid spurious correlations with hearing loss, all participants had highly similar audiograms. Test results were analyzed with pairwise correlations – controlling for remaining inter-subject hearing-level variations – and principal component analysis (PCA).
Results: While the outcomes of each conventional speech test were significantly correlated with at least two other conventional speech tests, ACT and AMSPECT outcomes were significantly correlated only with each other ($r \approx 0.5$) but not with any of the conventional tests. The PCA clustered the ACT and the AMSPECT together, clearly separated from the other tests.
Conclusion: The assumption that results from the language-independent ACT and AMSPECT tests could serve as proxies for speech recognition ability was not supported by the findings of this study. Therefore, using these tests to replace language-specific speech audiometry cannot be recommended. Nonetheless, the results indicate that these language-independent tests do measure something; in the next stage of this project, we aim to determine what that is.

Keywords: Language-independent tests, ACT, AMSPECT

Posters

Future E-Health, Innovative Technology and Therapies
PD 253

Evaluation of outer hair cell function based on contralateral suppression of distortion-product otoacoustic emissions: Numerical analysis using a human cochlear model

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Contralateral suppression (CS) of distortion-product otoacoustic emissions (DPOAEs) is a key non-invasive measure that reflects the functional integrity of outer hair cells (OHCs) and the medial olivocochlear (MOC) efferent system. The magnitude of CS may serve as an early indicator of subclinical cochlear dysfunction, such as hidden hearing loss (HHL). Moreover, the MOC reflex is thought to enhance speech perception in noisy environments (i.e, the cocktail party effect). However, the mechanisms linking contralateral acoustic stimulation to tonotopic patterns of OHC suppression remain poorly understood.
The DPOAE input–output (I/O) curve captures the nonlinear characteristics of OHCs and is well-suited for studying MOC-mediated modulation. This study aimed to clarify the relationship between CS-DPOAEs and OHC activity by analyzing changes in the DPOAE I/O curve using a human cochlear computational model. OHC activity was modified to simulate MOC-induced suppression, including uniform suppression and gradients decreasing from base to apex along the basilar membrane (BM). The resulting I/O functions were then compared with experimental CS-DPOAE data from young adults with normal hearing.
The model successfully replicated key experimental findings, including I/O curve saturation and reduced suppression at higher stimulus levels. Notably, distinct I/O curve changes associated with different OHC suppression patterns offer a computational explanation for individual variability observed in experimental data.
This study establishes a quantitative framework linking CS-DPOAE features to OHC–MOC interactions. Our findings support the potential of CS-DPOAEs as sensitive, non-invasive markers of early cochlear dysfunction and offer insight into neural mechanisms underlying speech perception in noise and HHL.

Keywords: Medial olivocochlear reflex, Hidden hearing loss, Early diagnostics

Posters

Future E-Health, Innovative Technology and Therapies
PD 254

Expanding Clinical Exposure through Simulation: A Theoretical Framework for Audiology Training in African Contexts

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Audiology access in many African countries audiology services are limited, because there are only a few African countries that provide audiology training. Where training is available, there is limited access to diverse clinical cases, and limited professionals for clinical supervision. These challenges further hinder the development of audiological knowledge, clinical reasoning and diagnostic competence among students. This theoretical paper explores the transformative potential of simulation-based education to transform audiology training programs in Africa , focusing on the use of Otosim, Carl Pro, and Baby Isao technologies.

Drawing on constructivist and experiential learning theories, we propose a framework for integrating simulation into audiology curricula to enhance clinical exposure, particularly in electrophysiology, otoscopy, and paediatric assessment. The framework emphasises contextual adaptation, to ensure cultural, linguistic, and systemic relevance. We argue that simulation can democratise access to clinical learning, improve access to clinical training, and develop confidence in managing diverse audiology cases.

The paper also discusses strategies for access, via a tele-platform. This will include the need for technological infrastructure, training and collaboration needs and identification of potential partners for piloting. By reimagining simulation as a tool for equity and innovation, this work contributes to the growing discourse on decolonising health professions education in Africa.

Keywords: Simulation-based learning, Experiential learning, Technology

Posters

Future E-Health, Innovative Technology and Therapies
PD 255

Validation of an m-health based hearing screener for children below 6 years of age in India and evaluation of its usability among grassroots workers

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Introduction: An affordable mHealth-based subjective hearing screener (SRESHT) for children was developed as part of a project to support contextualized hearing screening for developing countries. SRESHT hearing screener was developed with calibrated commercial headphones and speakers at 60 dB HL with the target goal of identifying children with moderately severe or above degrees of disability (WH0, 2019). The SRESHT hearing screener includes Behavioral Observation Audiometry (BOA) based screening module (0 to 1 year of age), Speech Spectrum Awareness Task (SSAT) module (1 to 3 years of age), Speech Recognition Task (SRT) module (3 to 6 years of age) and High Risk register (HRR) and Parental Questionnaire (PQ) module (0 to 6 years).

Aim

This study was undertaken to validate the SRESHT hearing screener for children against a reference standard test and also to evaluate its usability and acceptance among grassroots level workers in rural communities.

Method:

Suitable stimuli/items were identified for each test module and pilot tested before undertaking the full validation. The final modules were tested on children and the pass/refer results were validated against the reference standard tests. Usability and acceptance of the SRESHT hearing screener was evaluated on GRWs as they are the primary target users of the hearing screener.

Results

In all, 316 children were screened. Sensitivity and specificity of BOA based screening was found to be 0.86 and 0.88, SSAT was 0.98 and 0.85 and SRT screening was 0.95 and 0.88. More than two third of the GRWs found the SRESHT screener as usable and acceptable.

Conclusion:

The study showed that SRESHT screener is a valid tool and can be used to support hearing screening efforts at the community level

Keywords: Low Middle Income Countries, MHealth technology, Pediatric hearing screening

Posters

Future E-Health, Innovative Technology and Therapies

PD 256

Exploring stakeholders' perspectives on artificial intelligence (AI) integration in hearing healthcare

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Context. AI is increasingly integrated into hearing healthcare, from assessment tools to signal processing in hearing aids. This shift raises concerns about the quality of information available to patients and their relatives, and professionals' confidence in using these tools. To investigate these issues, two projects were conducted: 1. An analysis of Reddit discussions on AI in hearing aids among patients, their relatives, and professionals. 2. A survey exploring professionals' perceptions of AI integration in clinical practice and their training needs.

Method. 1. A total of 5046 comments across 378 Reddit threads were analyzed to identify key topics related to AI and hearing aids. 2. An online survey was distributed to audiologists and hearing-aid acousticians in Quebec, Canada. It included validated tools to assess digital health literacy, AI perceptions, and self-efficacy. Participants also reported their sociodemographic data, AI usage, and training needs.

Results. 1. Reddit discussions were abundant but focused mainly on specific products and manufacturers. Professional presence was noted, but inconsistent across communities. AI was rarely a central topic, with users prioritizing practical concerns. 2. Among 114 survey respondents, those already using AI reported more positive perceptions and higher self-efficacy. All participants expressed a need for training, preferring delivery through professional orders or private companies over postsecondary institutions.

Conclusion. Social media platforms have promising potential as channels for patient information, but current content remains limited. Educating patients about the quality of online information is a challenge that needs to be addressed, especially since professionals are not present in all online communities. Among professionals, those already using AI in their practice tend to have more positive perceptions and a stronger sense of self-efficacy. There is broad consensus on the importance of developing training programs to support AI integration in the field.

Keywords: Artificial intelligence, Hearing healthcare, Hearing aids

Posters

Future E-Health, Innovative Technology and Therapies

PD 257

Posters

Future E-Health, Innovative Technology and Therapies
PD 258

LLM-Assisted Wikipedia Editing in Undergraduate Audiology Training

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Large language models (LLM) are affecting information production and education. Wikipedia is a relevant and widely accessed health information source. It functions as a crowdsourced learning and hearing health communication instrument. This study hypothesizes that LLM-assisted editing influences students' Wikipedia contributions. We report a cross-sectional educational experience and qualitative assessment in an undergraduate clinical audiology course. STROBE conference abstract recommendations were followed. Ethical approval was granted (n. #6.823.110). Brazilian undergraduates edited Portuguese Wikipedia entries on audiology. They related core pathologies, such as otitis media and presbycusis, to clinically relevant Wikipedia hearing-health content. Twenty-two students were trained in Wikipedia editing and LLM usage principles. They randomly edited different articles using ChatGPT-5 (web-accessed) during editing sessions in October 2025. Articles were selected using LiftWing's machine learning model for Wikipedia articles' quality scores. We allocated entries rated 2 to 4 (intermediate quality) for improvement. Students responded to an anonymous self-report open-ended item (Google Forms) on the perceived impact of LLM: "How did chatbot use influence your Wikipedia editing?" We performed a thematic content analysis (Bardin's method) on students' responses (n=22). Responses could be grouped into different categories. Seven categories emerged and were analyzed using Python (Visual Studio Code IDE) to calculate chi-square statistics ($p < 0.05$), 95% confidence intervals (CI), and effect sizes (φ). Significant categories: rapid information retrieval (14/22–56.0% of students, $p<0.001$, $\varphi=1.19$, CI 37.1–73.3%), editing-speed achievements (10/22–40.0% of students, CI 23.4–59.3%, $p<0.001$, $\varphi=0.73$), and text readability improvement (9/22–36.0% of students, CI 20.2–55.5%, $p=0.001$, $\varphi=0.62$). Non-significant categories: support to understand scientific content (6/22–24.0%), content reliability verification (5/22–20.0%), formatting and structuring references (5/22–16.0%), and translating content into general language (5/22–16.0%). LLM-assisted Wikipedia editing appeared to facilitate faster retrieval and clearer writing. Further research should address this study's descriptive limitation through comparative and extensive analysis of LLM contributions to students' Wikipedia editing.

Keywords: Wikipedia, Large Language Model, Education

Posters

Future E-Health, Innovative Technology and Therapies
PD 259

Wikidata Datathon on Audiology Evidence: Building Data and Computational Literacy for Open Science

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Data and computational literacy are valuable for hearing-science training in artificial intelligence and data-driven and evidence-based practices. Audiology curricula nevertheless rarely include such competencies. Wikidata serves as an open knowledge-graph database for structuring health ontologies. It is widely used in datathons to support data structuring and open-science practices. We theorize that using Wikidata could introduce students to data and computational competencies. This communication reports a datathon involving 41 Brazilian hearing-science students (undergraduate and graduate). Students produced open data on scientific evidence in audiology and related topics. It scopes data-driven learning and science dissemination approaches. STROBE conference abstract recommendations were followed. Students received training on data editing in Wikidata and open science evidence retrieval. Participants collaborated in editing sessions in September 2025 on structuring Brazilian bibliographic data of articles, theses, dissertations, books, and researcher profiles. The workflow included (i) selecting scientific evidence from journals and databases, (ii) identifying relevant metadata and identifiers, (iii) creating data schemas for Wikidata, and (iv) publishing entries as data items. Wikidata utilizes a triple data structure based on the Resource Description Framework. It enables the construction of a knowledge graph through relationships among data triples. We used the Programs & Events Dashboard (campaign monitor using Wikimedia projects) to assess the datathon's outreach in terms of participants and data items edited or created. Ethical approval was not required (strictly open and publicly available data were analyzed). Results showed participants created 223 Wikidata items related to scientific articles and researchers, edited 273 academic production items, and made 2005 edits. Datathons on Wikidata may construct literacy frames and mobilize students as knowledge producers in digital ecosystems oriented toward data and open science communication. Further research may employ more detailed methodologies and comparative models to overcome this study's limitations in mapping data and computational literacy competencies developed through Wikidata.

Keywords: Wikidata, Computational Audiology, Open Science

Posters

Future E-Health, Innovative Technology and Therapies
PD 260

Advancing Hearing Health through Digital Innovation in Sub-Saharan Africa: A Systematic Review (2014–2024) and the Case of KnewEar AI

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Background: Hearing impairment in Sub-Saharan Africa (SSA) presents significant public health challenges, especially among children, compounded by limited access to traditional audiological services. Digital innovations, including tele-audiology, mHealth, and AI-driven platforms, offer promising alternatives, yet rigorous evidence of their effectiveness and sustainability in this region is scarce.
Objectives: This systematic review assesses the impact of digital hearing health interventions in SSA from 2014 to 2024. It also introduces KnewEar AI, a prototype from Tanzania, aiming to analyze regional challenges, evaluate digital intervention outcomes, and identify key insights for future AI-based solutions.
Methods: Adhering to PRISMA 2020 guidelines, we searched six databases (PubMed, Scopus, Cochrane Library, Web of Science, CINAHL, WHO Global Health Library) for studies published between 2014 and 2024, including RCTs, cohort studies, and pre–post designs. Risk of bias was evaluated using the Cochrane RoB 2 tool and the Newcastle–Ottawa Scale.
Results: Twenty-four studies from ten SSA nations were included. Interventions featured mobile hearing tests, tele-audiology services, SMS-based counseling for caregivers, and remote hearing aid fittings. The meta-analysis indicated that digital interventions reduced diagnosis time by approximately 25% and increased hearing-aid usage by about 30%, with moderate to large effect sizes (Standardized Mean Difference ≈ 0.6). KnewEar AI is introduced as an offline-first, bilingual, culturally tailored platform designed for early detection, caregiver education, and speech-language monitoring for children under five.
Conclusions: Digital technologies are improving the accessibility, cost-effectiveness, and user satisfaction of hearing care across SSA. KnewEar AI highlights the potential of region-specific, AI-powered solutions to bridge service deficiencies. Nonetheless, more comprehensive trials are crucial to confirm both clinical efficacy and developmental outcomes.

Keywords: Digital audiology, Sub-Saharan Africa, Artificial intelligence

Posters

Future E-Health, Innovative Technology and Therapies
PD 261

Need and Implementation of Automated Method for Testing Auditory Sensitivity (AMTAS) in Industrial Audiology in Malaysia - A Study Protocol

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Noise-induced hearing loss (NIHL) remains one of the most prevalent and preventable occupational diseases in Malaysia, despite the enforcement of the Occupational Safety and Health (Noise Exposure) Regulations 2019. Industrial hearing surveillance is challenged by limited access to audiologists, constraints in conducting periodic audiometry, and the logistical demands of sound-treated environments. Automated hearing assessment technologies, such as the Automated Method for Testing Auditory Sensitivity (AMTAS), have demonstrated strong validity and reliability in clinical settings, yet their application in industrial audiology remains unexplored in the Malaysian context. This study proposes a two-phase research protocol to investigate the need, feasibility, and implementation of AMTAS for industrial hearing assessment.

Phase I aims to explore existing practices, challenges, and readiness for adopting automated audiometry through in-depth interviews (n=15) with industrial audiologists, occupational health doctors, and registered competent personnel, followed by a nationwide survey (n=100). Guided by the Technology Acceptance Model (TAM), this phase will identify perceived usefulness, ease of use, and contextual barriers influencing adoption.

Phase II focuses on the implementation and validation of AMTAS among industrial workers across two testing environments: a sound booth and an on-site quiet room. Validation will involve comparing AMTAS thresholds with conventional pure-tone audiometry, assessing test–retest reliability, evaluating usability using the Malay version of the mHealth Application Usability Questionnaire (M-MAUQ), and analysing AMTAS performance under industrial ambient noise conditions. Stakeholder feedback will further inform the development of draft guidelines for incorporating automated audiometry into industrial hearing conservation programmes.

This study will provide the first Malaysian evidence on AMTAS applicability in industrial settings, addressing workforce limitations and supporting more efficient, accessible, and standardized hearing surveillance for noise-exposed workers.

Keywords: Industrial Audiology, Automated Audiometry, Noise-Induced Hearing Loss

Posters

Future E-Health, Innovative Technology and Therapies
PD 262

Exploring Telehealth Solutions for Auditory Processing Assessments: A Pilot Study

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Objectives: This study aimed to compare the effectiveness of in-clinic auditory processing disorder (APD) assessments with two telehealth approaches in school-aged children: audiologist-led Zoom assessments and independent assessments using remote applications.

Methods: Thirty-nine children (mean age 9.1 years, SD 1.7) with parent or teacher-reported listening difficulties underwent three APD assessments: in-clinic, via Zoom with an audiologist, and independently using the Feather Squadron iPad application. Assessments included tests of speech recognition in noise, dichotic listening, diotic listening, temporal sequencing, and auditory memory. Results were compared using Bland-Altman analyses and correlation coefficients.

Results: Zoom-based assessments showed poor to fair agreement with in-clinic results for two-channel tasks (speech recognition in noise, dichotic listening), but good agreement for single-channel tasks (temporal sequencing, diotic listening). Feather Squadron results showed poor agreement with in-clinic assessments for speech recognition in noise and dichotic listening, fair agreement for auditory memory, and moderate correlation for temporal sequencing.

Conclusion: Face-to-face APD assessment remains the gold standard, but this study shows promise for telehealth applications. Some auditory processing skills can be reliably assessed remotely, particularly via audiologist-led video conferencing. However, challenges persist for complex binaural tests and independent remote assessments. Future research should focus on addressing technical limitations and expanding the range of remotely assessable skills to improve access to APD assessments while maintaining clinical standards.

Keywords: Auditory processing disorder, Telehealth, Remote assessment

Posters

Future E-Health, Innovative Technology and Therapies
PD 263

Insights from the use of the COSI 2.0 in audiological clinical practice: Evidence from a large-scale pilot study

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Background:
The Client Oriented Scale of Improvement (COSI™) is recognised as a cornerstone of audiological rehabilitation, enabling clients to identify and prioritise listening goals in collaboration with their clinician. However, after nearly three decades, evolving models of care, digital innovation, and increasing client expectations have prompted the development of COSI™ 2.0 - an AI-powered, digital tool designed to enhance goal-setting, improve clinical efficiency, and provide consistent client outcomes.

Objective:
This study aimed to evaluate the feasibility, clinical impact, and perceived value of COSI 2.0 in real-world clinical practice. Specifically, we examined whether COSI 2.0 improved client–clinician interactions, positively influenced client outcomes, and was perceived as worthwhile by both clients and clinicians.

Methods:
The pilot was conducted over 12 weeks across over 20 clinic sites across Australia. Participants were adult clients attending assessment appointments during the data collection period and clinicians trained to integrate COSI 2.0 into their workflow.
Data collection combined quantitative metrics such as client usage and device fitting rates, with qualitative insights from surveys, interviews, and the analysis of the COSI 2.0 interactions.

Results:
Preliminary findings indicate strong uptake and sustained engagement, with approximately 50% of clients completing the initial online COSI 2.0 interaction and a significant proportion completing follow-up outcomes measures.
Clinicians reported that COSI 2.0 increased client preparedness and encouraged deeper, more meaningful conversations with their clients. Most clients were able to complete the COSI 2.0 interaction and outcomes measure without assistance and rated the tool positively. Importantly, early analysis suggests positive impacts on business metrics, including fitting rates and uptake of higher-level technology.

Conclusion:
This large-scale pilot demonstrates that COSI 2.0 is both feasible and valuable in routine clinical practice. By combining evidence-based principles with digital innovation, it has the potential to streamline workflows, enhance client engagement, and elevate hearing care outcomes.

Keywords: Adult rehabilitation, Artificial Intelligence, Patient-centred care

Posters

Tinnitus and Hyperacusis
PD 264

Tinnitus and Hyperacusis in High-Functioning Autism children: Clinical Insights and Usefulness of Desensitization Therapy

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Background: Tinnitus and hyperacusis are well-documented in adults, both with and without cochlear hearing loss (Rosing et al, 2016). However, their assessment and treatment in autism spectrum disorder (ASD) or Asperger Syndrome remain limited. A meta-analysis of 67 studies involving over 13,000 participants reported approximately 60% of children with ASD experience hyperacusis (Williams et al, 2021). Despite this prevalence, few studies have systematically evaluated interventions in this population (Danesh et al, 2015).
Objective:* Evaluate the usefulness of "desensitization therapy" for tinnitus and hyperacusis in children with Asperger Syndrome.

Methods: Ten children (5–10 yrs) with confirmed Asperger Syndrome and receiving speech-language therapy for over a year were enrolled. Tinnitus and hyperacusis were assessed using custom questionnaires, Loudness Discomfort Levels (LDL), tinnitus octave match, the Tinnitus Handicap Inventory (THI), and the Sound Sensitivity Rating Scale (SSRS). Participants completed a 6-week desensitization program with twice-weekly sessions, involving individualized sound hierarchies, graded exposure, sound playback, positive reinforcement, and caregiver involvement. Pre- and post-intervention data were analyzed using non-parametric statistics.

Results: Post-intervention, THI and SSRS scores showed a 40–60% reduction in symptoms. LDL thresholds improved significantly ($p < 0.05$), and tinnitus octave match results indicated reduced perception. Caregivers reported improvements in children's sound tolerance, emotional comfort, and participation in daily activities.

Conclusion: Desensitization therapy can effectively reduce tinnitus and hyperacusis in children with Asperger Syndrome. Improvements in sound tolerance and daily functioning support its feasibility and clinical relevance. Well-controlled studies are warranted to confirm these findings.

Keywords: ASD : AUTISM SPECTRUM DISORDER, THI :Tinnitus Handicap Inventory, LDL : Loudness Levels

Posters

Tinnitus and Hyperacusis
PD 265

Educational Counseling for Tinnitus Management: A Scoping Review of Intervention Structure, Content, and Outcomes

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Purpose
Educational counseling is a key component of tinnitus management, helping patients understand the underlying mechanisms, reduce distress, and adopt adaptive coping strategies. However, there is no standardized protocol, and notable variability exists in delivery methods, content, and outcome evaluation. This scoping review systematically examined the literature on educational counseling interventions in tinnitus management, with the objective of characterizing intervention structure, content frameworks, and patterns of reported outcomes. The findings provide groundwork for developing evidence-based and clinically applicable counseling guidelines.

Methods
A literature search was conducted in February 2025 using PubMed and Google Scholar. Ten studies published between January 2010 and December 2024 were included if they provided educational counseling as a primary or adjunctive intervention for tinnitus and reported outcomes related to tinnitus severity, psychological distress, or quality of life.

Results
Of the ten studies, three used educational counseling alone and seven in combination with other treatments. Most provided core content in early sessions. Six used individual face-to-face formats, while some compared group or remote delivery. Three studies presented explicit theoretical bases. Common topics included auditory anatomy and tinnitus pathophysiology; however, they were often omitted in studies with shorter session durations. Nine included practical management strategies, and five offered individualized counseling based on hearing and tinnitus profiles. All used self-report measures, most frequently the Tinnitus Handicap Inventory (THI). Reported outcome patterns varied across studies, reflecting differences in counseling structure, content emphasis, and delivery formats.

Conclusions
This scoping review found substantial variation in how educational counseling for tinnitus is delivered, structured, and evaluated. Nevertheless, counseling—whether provided alone or alongside other treatments—consistently showed benefits in reducing tinnitus-related distress and improving quality of life. The frequent use of the THI indicates some agreement in outcome assessment, while differences in session length and content emphasize the need for evidence-based standardization.

Keywords: Tinnitus, Counseling, Tinnitus Management

Posters

Tinnitus and Hyperacusis

PD 266

Predictors of the effectiveness of cochlear implantation in the rehabilitation of patients with tinnitus due to sensorineural hearing loss

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Introduction: Chronic tinnitus significantly impairs quality of life and is highly prevalent in patients with sensorineural hearing loss (SNHL). Conventional therapies offer limited relief. This study evaluates the efficacy of cochlear implantation (CI) in suppressing chronic tinnitus and identifies predictors of successful outcomes.

Methods: We conducted a retrospective analysis of 385 patients with bilateral profound SNHL and tinnitus who underwent CI. Tinnitus severity was assessed using a Visual Analogue Scale (VAS) preoperatively and at multiple post-operative intervals up to 60 months.

Results: A significant reduction in tinnitus intensity was observed immediately after the initial processor activation. At the 6-month mark, VAS scores decreased to 0–3 in most patients, an effect sustained at the 5-year follow-up (86% responders). A notable subset experienced residual inhibition even with the processor deactivated. The clinical case of single-sided deafness confirmed these findings, demonstrating a substantial improvement: THI decreased from 62 (severe) to 32 (mild), and VAS from 8 to 2–3. Statistical analysis identified key positive prognostic factors: higher pre-operative tinnitus severity (VAS ≥4) and a shorter duration of auditory deprivation (<2 years) prior to implantation.

Conclusion: Cochlear implantation is a highly effective intervention for reducing chronic tinnitus in patients with severe SNHL. The therapeutic effect is mediated by direct electrical stimulation of the auditory pathway, inducing cortical reorganization, combined with acoustic masking. Patient selection based on the identified predictors—significant baseline tinnitus and shorter deafness duration—can optimize rehabilitation outcomes, positioning CI as a powerful dual-modality tool for restoring auditory function and alleviating debilitating tinnitus.

Keywords: Tinnitus, Cochlear implantation, Cortical reorganization

Posters

Tinnitus and Hyperacusis
PD 267

Objective Neurophysiological Correlates of Behavioral Interventions for Tinnitus: A Scoping Review of EEG and ERP Evidence

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Tinnitus affects approximately 740 million adults globally and involves complex neural mechanisms, including cochlear damage and hyperactivity in auditory pathways and limbic system, resulting in persistent phantom sounds. Common behavioral treatments include tinnitus retraining therapy(TRT), cognitive behavioral therapy(CBT), sound/music therapy, and customized sound relief. However, their effectiveness is often evaluated using subjective measures that can introduce biases. This review analyzes 16 EEG/qEEG/ERP studies to objectively assess neurophysiological changes indicative of treatment efficacy.

Post-treatment changes were mainly seen in auditory cortical areas, including primary and secondary auditory cortices, as well as limbic regions such as insula, anterior cingulate cortex, and orbitofrontal cortex. These regions showed measurable shifts in spectral power across delta, theta, alpha, beta, and gamma bands, indicating restored excitation-inhibition balance and neuroplasticity. Functional connectivity demonstrated increased coupling within fronto-parietal-temporal networks and between auditory and limbic circuits, supporting improved integration of sensory and emotional processing after therapy. ERPs like enhanced mismatch negativity and higher brainstem auditory response amplitudes further point to improved auditory predictive coding and cortical plasticity following interventions.

Behavioral improvements measured by standardized scales, mainly Tinnitus Handicap Inventory(THI), Visual Analogue Scales(VAS), and Tinnitus Functional Index(TFI), showed strong correlations with these electrophysiological changes. Anxiety and depression assessments (HADS, SAS) further provided context for cognitive-emotional benefits, especially in combined music-CBT interventions. The solid links between neurophysiological markers and behavioral outcomes emphasize EEG/ERP techniques as useful objective tools for validating therapeutic effectiveness and guiding personalized treatment.

These findings highlight that EEG and ERP offer objective, biologically valid measures that complement subjective reports, enabling more accurate assessment of behavioral therapy effectiveness and personalized treatment plans. Overall, these results better illustrate the complex neural plasticity caused by behavioral treatments. This underscores the vital role of electrophysiological biomarkers in improving understanding and management of tinnitus beyond self-report measures.

Keywords: Tinnitus, Treatment efficacy, Neurophysiological correlates

Posters

Tinnitus and Hyperacusis

PD 268

Diagnostic Accuracy of Simple Screening Questions for Hyperacusis in Patients with Tinnitus: Comparing Loudness Discomfort Levels and the Hyperacusis Questionnaire

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Background: Hyperacusis, defined as decreased sound tolerance, frequently co-occurs with tinnitus and significantly affects quality of life. However, its clinical identification remains challenging due to the lack of universally accepted diagnostic criteria and the time-consuming nature of formal assessments such as the Hyperacusis Questionnaire (HQ) and Loudness Discomfort Level (LDL). Brief screening tools could facilitate early detection in clinical settings. Objective:To assess the diagnostic accuracy of the LDL, HQ, and two simple screening questions for identifying hyperacusis in adults with tinnitus.Methods:This cross-sectional diagnostic accuracy study included 70 adults (mean age = 60.54 years; 50% female) attending a Tinnitus Clinic. All participants reported tinnitus for ≥6 months, completed the HQ, underwent LDL testing (0.25–8 kHz), and answered two hyperacusis screening questions (Scheckelmann et al, 2015) related to sound intolerance and sound-induced pain. Hyperacusis was defined according to Aazh & Moore (2017) as LDLmin ≤ 77 dB HL (most sensitive ear) and/or HQ ≥ 22, and three diagnostic reference conditions were tested: (1) combined LDL and HQ, (2) LDL alone, and (3) HQ alone.Results:Mean HQ score was 12.5, and 18.6% of participants met the criterion for hyperacusis. Abnormal LDLs were found in 50% of right ears and 52.9% of left ears. The first screening question showed high sensitivity (0.846–1.000) but low specificity (0.344–0.386), while the second question had high specificity (0.828–0.860) but low sensitivity (0.308–0.400). Conclusion:A brief two-question screening showed consistent diagnostic performance across criteria. The first question is suitable for initial screening, and the second for diagnostic confirmation. Combined with LDL and HQ, these tools can enhance clinical efficiency in identifying hyperacusis among tinnitus patients.

Keywords: Hyperacusis, Tinnitus, Diagnostic accuracy

Posters

Tinnitus and Hyperacusis
PD 269

Electroencephalographic Biomarkers in Tinnitus: A Traditional Review of Current Approaches and Clinical Perspectives

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Background
Tinnitus, the perception of sound without external stimuli, significantly impairs patients' quality of life through cognitive dysfunction, emotional disturbances, and sleep disorders. Although tinnitus comprises both perceptual and reactive components, current clinical assessments rely predominantly on subjective self-report questionnaires, which are susceptible to situational and psychological influences. As a result, the consistency and objectivity of evaluation outcomes are limited, and the absence of objective biomarkers remains a critical obstacle to accurate diagnosis and treatment evaluation. Electroencephalography (EEG) has increasingly been used as a noninvasive method to investigate tinnitus mechanisms, offering high temporal resolution for analyzing neural dynamics through spectral power, functional connectivity, microstates, and entropy. Recent studies have documented increased gamma activity, altered auditory-limbic connectivity, and elevated frontal entropy in tinnitus patients, suggesting widespread neural reorganization extending beyond the auditory cortex.
Purpose
This review examines EEG studies on tinnitus, synthesizing findings on key EEG indices such as spectral power, functional connectivity, microstates, and entropy to clarify neurophysiological characteristics and identify EEG patterns related to tinnitus symptom severity and relief as potential objective biomarkers.
Results
EEG analyses revealed significantly increased gamma power accompanied by widespread spectral alterations across delta to beta bands in individuals with tinnitus. Enhanced auditory-limbic-prefrontal connectivity demonstrated a significant positive correlation with Tinnitus Handicap Inventory (THI) scores. Microstate analysis showed significant alterations in duration and transition probability, reflecting impaired brain network stability and abnormal state-switching dynamics. In addition, elevated entropy relative to healthy controls indicated increased neural nonlinearity and irregularity, indicative of greater neural instability.
Conclusions
This review suggests that tinnitus involves maladaptive neural reorganization beyond auditory cortex engagement, and EEG-derived measures show promise as objective biomarkers for tinnitus-related distress and therapeutic monitoring. Nevertheless, larger prospective studies with well-established gold-standard criteria are essential to ensure reproducibility and establish clinical utility.

Keywords: Tinnitus, Electroencephalography, Biomarkers

Posters

Tinnitus and Hyperacusis
PD 270

The association between smoking and tinnitus based on population data in Korea

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Background: Smoking could be a risk factor for tinnitus inducing vascular dysfunction and arteriosclerosis. However, there have been insufficient studies about the association between smoking and tinnitus. The association of smoking to tinnitus was investigated using population-based data in Korea.
Methods: The 8th Korea National Health and Nutrition Examination Survey data from 2019 to 2021 were used. The association between smoking and tinnitus was evaluated using the questionnaire by people aged 40 years or older. Differences in the distribution of sex, age, tinnitus, and moderate or worse hearing loss between current or ex-smoker group and non-smoker group, and associated factors for tinnitus were analyzed.
Results: The number of current or ex-smoker group was 4044 and that of non-smoker group was 6108. Among them, 506 and 634 people had experienced tinnitus for 5 minutes or more in current or ex-smoker group and non-smoker group, respectively. The proportion of people who had experienced tinnitus for 5 minutes or more was significantly higher in current or ex-smoker group than non-smoker group. Among people who had experienced tinnitus for 5 minutes or more, the proportion of people who experienced tinnitus lasting for 6 months or more was significantly higher in current or ex-smoker group than non-smoker group. However, old age, moderate or worse hearing loss, and occupational noise exposure were associated factors for tinnitus lasting 6 months or more, but smoking was not in a multivariate analysis.
Conclusion: Smoking revealed no association with tinnitus in a multivariate analysis with other factors including sex, age, moderate or worse hearing loss, noise exposure in this cross-sectional population-based study.

Keywords: Tinnitus, Smoking, Population-based study

Posters

Tinnitus and Hyperacusis

PD 271

App-Based Digital Therapy for Chronic Tinnitus: Clinical Outcomes from a Multicenter Prospective Study

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Purpose: By integrating cognitive behavioral therapy (CBT) modules with notch-filtered sound therapy, a mobile digital platform may simultaneously target both the cognitive–emotional and perceptual aspects of tinnitus. This study aimed to evaluate the clinical efficacy of an app-based digital therapy for Korean patients with chronic subjective tinnitus and to examine whether baseline clinical or psychological characteristics influenced treatment outcomes.
Methods: This prospective, single-arm, multicenter study evaluated SoriClear (Neurive Inc, Seoul, Korea), a mobile application providing CBT-based education, thought journaling, and individualized notch-filtered sound therapy. Participants with chronic subjective tinnitus were recruited from four tertiary hospitals between January and December 2024 and engaged in a six-week intervention consisting of five sessions per week. Outcomes were assessed using the Tinnitus Handicap Inventory (THI), Tinnitus Functional Index (TFI), Visual Analog Scales (VAS), Beck Depression Inventory (BDI), and Beck Anxiety Inventory (BAI) at baseline, week 2, and week 6. Statistical analyses were performed using paired t-tests and nonparametric equivalents.
Results: Among 305 screened patients, 167 completed the study. The mean THI score decreased from 42.3 at baseline to 28.4 at week 6 ($p < 0.001$), and the mean TFI score from 42.3 to 27.3 ($p < 0.001$). Depression and anxiety also improved significantly (BDI: 12.1 to 8.6, $p < 0.01$; BAI: 9.5 to 6.5, $p < 0.001$). VAS ratings for negative emotions and thoughts decreased significantly (both $p < 0.001$). Participants reported high satisfaction (mean ≥ 4.3/5), particularly among females.
Conclusion: The app-based digital CBT combined with notch-filtered sound therapy significantly reduced tinnitus-related distress and psychological symptoms, demonstrating clinical efficacy, feasibility, and high user acceptability. This mobile digital therapy may represent a scalable and accessible treatment option for chronic tinnitus.

Keywords: Tinnitus, Digital therapy, Cognitive behavioral therapy

Posters

Tinnitus and Hyperacusis

PD 272

Evaluating the Effectiveness of Custom Hearing Aids with Occlusive Earmolds for Sound Tolerance in Individuals with Hyperacusis

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Hyperacusis is characterized by reduced tolerance to everyday sounds, often leading to significant discomfort. While passive earplugs are commonly used to protect against loud sounds, they can impair environmental awareness and speech audibility. An alternative approach involves using custom-molded earmolds paired with hearing aids (HAs) programmed to amplify soft to moderate sounds. This configuration offers physical protection from intense sounds while preserving access to relevant auditory cues. Unlike passive protection, this solution allows personalized adjustments based on individual discomfort profiles. This study evaluates the effectiveness of this approach in improving sound tolerance in individuals with hyperacusis, for both artificial (narrowband noise) and natural (soundscape) stimuli, without compromising speech audibility. This approach relies on conventional HAs and standard fitting procedures. Twenty adults (aged 20–60) with hyperacusis and clinically normal hearing (≤ 20 dB HL) will be tested. In addition to standard screening (audiometry and questionnaires), participants' detection thresholds and discomfort levels (DLs) will be measured for narrowband noises (0.5 to 8 kHz, octave steps) and two natural soundscapes (cafeteria and daycare) in a free-field setup under three randomized conditions: bare ear (BE), earmolds with hearing aids off (E-HA-OFF), and hearing aids on (E-HA-ON). HAs are individually programmed to ensure transparency for soft and moderate sounds while limiting output below discomfort thresholds. For soundscapes, the minimum level required to disrupt reading (Als) will also be measured across conditions. Speech detection thresholds will be assessed in all three conditions. Preliminary data (n = 10) suggest increased discomfort thresholds for both artificial and natural sounds in the E-HA-OFF and E-HA-ON conditions. Speech detection thresholds remained unaffected in the E-HA-ON condition. Full results will be presented at the conference. This HA-based approach may offer a promising alternative to passive hearing protection for improving sound tolerance in hyperacusis, while maintaining speech audibility and environmental awareness.

Keywords: Hyperacusis, Hearing aids, Rehabilitation strategy

Posters

Tinnitus and Hyperacusis
PD 273

Assessing Hearing Health Risks and Prevention Attitudes Among Musicians: A Pilot Study

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Purpose:
This pilot project explored the risks associated with musicians' overexposure to loud sounds in music practice and attitudes towards prevention strategies. The long-term aim of this study is to develop a protocol tailored to music professionals' needs that increases the culture of prevention within this population and that protects their hearing health and well-being.

Methods:
The study includes group discussions, hearing screenings, acoustic measurements in playing environments and a questionnaire developed by an interdisciplinary team of researchers in music and audiology that assessed musicians' knowledge on hearing health, their habits, and preventive practices. The questionnaire's data was analyzed applying chi-square tests, ANOVA, and t-tests to explore correlations between knowledge, lifestyle, and hearing symptoms.

Results:
65 music students (ages 18-67, mean age = 26 ± 9) participated to the questionnaire and 10 of them to the hearing screening. Results show that the knowledge score on the impacts of loud sound on hearing is negatively correlated with the tinnitus frequency measure ($r=-0.292$; $p=.018$). Lifestyle habit scores (attendance to concerts, bars, festivals, nightclubs) are positively correlated with frequency of hearing fatigue or hypersensitivity ($p < 0.001$) and risk perception is positively correlated with the use of protection strategies ($p < 0.001$). The most sensitive hearing tests for early detection of hearing loss were high-frequency audiometry and otoacoustic emissions and the acoustic measurements included readings of up to 95 dB, surpassing the safety recommendations, in certain practice environments and notably within brass instruments.

Conclusion:
These findings highlight the importance of not only educational programs but also the need for broader preventive strategies, such as implementing early hearing loss detection protocols, creating safer and acoustically controlled practice environments, and ensuring access to protective measures to address the risks of noise overexposure in both professional and social settings for musicians.

Keywords: Musicians, Tinnitus, Sound Overexposure

Posters

Tinnitus and Hyperacusis
PD 274

Applying the Tinnitus Thermometer Tool in Person-Centered Tinnitus Rehabilitation: Clinical Correlations with the THI

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Objective:
This study aimed to evaluate the clinical applicability of the Tinnitus Thermometer Tool (TTT) within the framework of person-centered care (PCC) for tinnitus rehabilitation and to examine its relationship with the Tinnitus Handicap Inventory (THI).
Design:
A retrospective clinical analysis was conducted on 54 adults with subjective tinnitus. Data were collected on THI total scores and the four TTT components: Q1 (subjective perception), Q2 (improvement expectation), Q3 (daily impact period), and Q4 (irritability rating). Text responses for Q1–Q3 were categorized, and associations between TTT variables and THI scores were examined using correlation and variance analyses.
Results:
THI total scores showed a strong positive correlation with Q4 irritability ratings ($r = 0.690$, $p < 0.001$) and a significant association with Q1 perception categories ($F = 17.196$, $p < 0.001$). Age was negatively correlated with THI ($r = -0.278$, $p = 0.041$). Q2 and Q3 were not significantly correlated with THI but provided additional information regarding patient expectations and the contextual variation of tinnitus perception.
Conclusions:
The present findings indicate that the TTT yields clinically relevant information that complements the THI. Significant associations of Q1 and Q4 with THI suggest that the TTT effectively captures perceptual and emotional dimensions of tinnitus distress, while Q2 and Q3 provide additional context on patient expectations and daily variability. Comparing THI, the Tinnitus Thermometer Tool is quick and easy to be used , it can facilitates patient–clinician communication and supports person-centered assessment and rehabilitation planning in tinnitus management.

Keywords: Tinnitus Rehabilitation, Tinnitus Handicap Inventory, Person-Centered Care

Posters

Tinnitus and Hyperacusis
PD 275

Audiological and Otologic Characteristics of Patients with Musical Hallucinations

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BACKGROUND: Musical hallucinations have a great impact on a patient's life, but because of the rare frequency of occurrence and multiple causes, not enough research has been conducted on this topic yet, especially in Korea. Many patients with musical hallucinations have audiological and otologic problems. This study investigated the clinical manifestations of musical hallucinations in patients.
METHODS: The authors retrospectively analyzed clinical data from patients with musical hallucinations who visited the outpatient clinic of the Department of Otorhinolaryngology at Severance Hospital, Seoul, Republic of Korea, for 7 years, from January 1, 2015, to December 31, 2021.
RESULTS: Seven of 9 patients were female, the average age was 67.1 (52-89) years, and post-lingual hearing loss was diagnosed in all patients. They listened to songs 1-3 over and over again for 5.4 (±6.1) years. Four patients had chronic otitis media or underwent tympanomastoidectomy surgery because of chronic otitis media. Audiological rehabilitation was performed, including cochlear implantation surgery, in one patient.
CONCLUSION: In most cases, patients with musical hallucinations had audiological and otologic symptoms. Therefore, when patients complaining of musical hallucinations visit the hospital, it is essential to perform an audiological and otologic evaluation, and treatment for their symptoms should be considered.

Keywords: Musical hallucination, Auditory hallucination, Hearing loss

Posters

Tinnitus and Hyperacusis

PD 276

Clinical Case Report: Evolution of the emotional impact of Tinnitus over 12 weeks of Cognitive-Behavioral Therapy (CBT), evaluated Using the THI

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Introduction: Tinnitus is an auditory symptom that can cause significant emotional distress, affecting concentration, sleep, and overall well-being. The Tinnitus Handicap Inventory (THI) is a validated tool that measures tinnitus impact across functional, emotional, and catastrophic dimensions. Scores range from 0 to 100, classified as slight (0–16), mild (18–36), moderate (38–56), severe (58–76), and catastrophic (78–100).

Objective: To describe the evolution of the emotional impact of tinnitus in a patient undergoing cognitive behavioral therapy (CBT), using the THI as the assessment instrument.

Case Description: A 46-year-old male, "Mr. A," presented with bilateral tinnitus for six months, marked anxiety, early depressive symptoms, and hopelessness. Initial assessment: THI = 48/100, emotional subscale indicating moderate impact (Grade 3). At this level, tinnitus is perceived even in noisy environments, affecting sleep and quality of life.

Intervention: Weekly CBT-based psychotherapy sessions over 12 weeks, including cognitive restructuring, Mindfulness, and stress management related to tinnitus, with discussions on coping with chronic suffering. After 12 weeks: THI = 20/100, emotional impact mild (Grade 2). At this stage, tinnitus is easily masked by environmental sounds and often forgotten during daily activities. The patient reported reduced anxiety and improved emotional well-being. A Cochrane review on CBT for chronic tinnitus found an average THI reduction of 10.91 points compared to controls after interventions of 3–22 weeks (Fuller et al, 2020).

Discussion: This case suggests CBT combined with Mindfulness can substantially reduce tinnitus-related emotional distress, supporting evidence from prior studies on psychological interventions. Limitations include the single-case nature and lack of control group.

Conclusion: The intervention produced a marked reduction in tinnitus-related emotional impact, highlighting the relevance of CBT and individualized multidisciplinary care. Clinical case reports such as this help refine therapeutic strategies in practice.

Keywords: Tinnitus, Cognitive-behavioral therapy, Tinnitus Handicap Inventory

Posters

Tinnitus and Hyperacusis
PD 277

Features of tinnitus in patients with acoustic trauma

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Tinnitus is a common problem significantly reducing the quality of life of patients. A special group consists of people with acoustic trauma, in whom noise has specific characteristics. The study of these features is important for differential diagnosis and the development of personalized rehabilitation methods.
The aim of the study was to identify the specific characteristics of ear noise in patients with acoustic trauma using audiological and psychoacoustic methods.
Materials and methods: 50 patients with tinnitus were studied: 15 people had acoustic trauma and 35 people had noise of a different etiology. Psychoacoustic testing (evaluation of noise frequency and volume), THI (Tinnitus Handicap Inventory) and VAS (visual analog scale) questionnaires.
Results: in patients with acoustic trauma, the noise frequency was recorded at 3-6 kHz, which correlates with the area of damage to the hair cells. According to VAS: average intensity — 7.2±1.5 points, according to THI — 58±12 points (moderate to severe distress). Psychoacoustic tests revealed narrowband noise with a dominant frequency, less often a tonal component. Patients with a different etiology had a wide range of frequencies (0.5–10 kHz), a variety of characteristics of tinnitus (broadband, pulsating, low-frequency noise). The VAS and THI scores also varied depending on the underlying disease.
Conclusions
1. Acoustic trauma leads to the formation of high-frequency ear noise (3-6 kHz), which is associated with damage to the cortical organ in the basal cochlea.
2. Patients in this group show a higher level of THI distress, which requires comprehensive rehabilitation.
3. Differences in noise characteristics allow the use of psychoacoustic testing for differential diagnosis.
The findings emphasize the need for an individual approach to the management of patients with ear noise, especially after acoustic trauma. Further research should be aimed at developing targeted treatment methods that take into account the frequency and psychoacoustic parameters of noise.

Keywords: Tinnitus, Acoustic trauma, Psychoacoustic testing

Posters

Tinnitus and Hyperacusis
PD 278

Can tinnitus cause speech in noise deficit?

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Tinnitus is a phantom perception of sound in the ears or head. Individuals with tinnitus often have trouble understanding speech-in-noise (SIN). Studies investigating SIN deficits in individuals with tinnitus revealed mixed results. Genetic variants associated with tinnitus and SIN deficits was identified by recent genome wide association study (GWAS). The present study investigated SIN deficits in individuals with tinnitus and conducted complementary analyses using GWAS summary statistics to identify tissues and molecular pathways shared between the two phenotypes.

216 normal hearing (hearing thresholds ≤20 dB HL for 250-8000 Hz) young adults, aged 18-37 years participated in the study. Speech, Spatial, and Quality of Hearing scale (SSQ12) and QuickSIN were used to evaluate SIN perception. Extended high-frequency audiometry and dichotic digit test (DDT) were performed. A linear mixed model was used to identify the influence of tinnitus on audiological measures. GWAS summary statistics for SIN deficits were obtained from open resources. MAGMA-based gene set enrichment analysis was performed. The results for SIN deficits were compared with published reports of tinnitus to identify shared enrichment result.

Significantly elevated hearing thresholds, lower SSQ12, and poorer DDT scores were obtained for young adults with tinnitus. Elevated hearing thresholds and lower SSQ12 were associated with high LNE and firearm use. Several brain tissues, such as the brain cortex, frontal cortex, anterior cingulate cortex , caudate, amygdala, hippocampus, and hypothalamus, were identified by MAGMA based analysis, which was shared between tinnitus and SIN deficits. Outer hair cells were associated with tinnitus but revealed a modest association with SIN deficits.

Results suggests that young adults with chronic tinnitus experience significant SIN deficits. Self-reported auditory-cognitive measures could be more sensitive than performance-based measures for evaluating SIN perception. The shared enrichment of genomic signals points toward the central origin of SIN deficits in normal-hearing young adults with tinnitus.

Keywords: Tinnitus, Speech in noise, Genome wide association study

Posters

Tinnitus and Hyperacusis

PD 279

Anxiety in patients with hyperacusis and tinnitus

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Introduction
Hyperacusis is a specific auditory disorder characterized by an increased sensitivity to sounds, which is often accompanied by a significant psychological component. Some studies suggest that individuals with hyperacusis exhibit greater anxiety compared to the general population. However, it remains unclear, whether gender influences the relationship between hyperacusis and anxiety. Therefore, the aim of our study was to investigate the role of gender in the interplay between hyperacusis, tinnitus, and anxiety.

Material and methods
The study group consisted of 106 patients with hyperacusis and tinnitus. There were 55 women and 51 men. Women were aged between 20 and 72 years (M = 44.9; SD = 12.8), men were aged between 19 and 72 years (M = 45.4; SD = 12.0).
Clinical interview, audiological examination and three questionnaires (State-Trait Anxiety, Hyperacusis Assessment Questionnaire, and Tinnitus Handicap Inventory) were conducted.

Results
The level of anxiety in women and men was similar, but exceeded normative values established for the general population. In women hyperacusis was not a significant predictor of anxiety ($\beta = 0.13$, $p = 0.340$), while tinnitus severity was ($\beta = 0.47$, $p = 0.002$). In men, both hyperacusis ($\beta = 0.36$, $p = 0.004$) and tinnitus severity ($\beta = 0.48$, $p < 0.001$) significantly predicted anxiety.

Conclusions
This study highlights the complex interplay between gender, hyperacusis, tinnitus and anxiety. The findings suggest that interventions for subjects with hyperacusis and tinnitus should be gender-specific.

Keywords: anxiety, hyperacusis, tinnitus, gender

Posters

Tinnitus and Hyperacusis

PD 280

Correlation Between Quantitative EEG and Tinnitus Handicap Inventory: Identifying qEEG Parameters as Potential Indicators of Subjective Tinnitus Severity

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Introduction: Chronic subjective tinnitus affects 10–15% of the population, and approximately 2.4% experience significant disturbances including sleep impairment, depression, and cognitive dysfunction. Despite its prevalence, effective treatments remain limited, in part due to the absence of objective measures for evaluating tinnitus severity. Quantitative electroencephalography (qEEG) provides real-time assessment of brain activity and may offer an objective correlate of tinnitus burden. This study investigated the relationship between qEEG parameters and Tinnitus Handicap Inventory (THI) scores to evaluate the potential of qEEG as an objective tool for assessing subjective tinnitus severity.
Methods: Adults aged ≥18 years with chronic tinnitus for more than 3 months were enrolled. Tinnitus modulation was performed using tinnitus retraining therapy (TRT) and cognitive behavioral therapy (CBT). TRT consisted of directive counseling and self-guided sound therapy via a smartphone application, while CBT was delivered through Neurive's Sori-CLEAR program. Participants attended weekly clinic visits for six weeks. Tinnitogram, THI and qEEG (Neuron-Spectrum 4/P)—were conducted at baseline, immediately after treatment, and three-months post-treatment. qEEG data were analyzed using Neurostat.
Results: Significant positive correlations were identified between THI scores and high-beta activity across widespread cortical regions, including F3, F4, F7, F8, C3, C4, T3, T4, T5, T6, P3, P4, O1, and O2 ($P < 0.05$). Gamma and high-gamma activities in these areas demonstrated similar positive associations with THI ($P < 0.05$). Overall, increased high-beta, gamma, and high-gamma activity throughout much of the cerebral cortex was associated with greater tinnitus severity. In addition, changes in THI before and after treatment were correlated with high-beta activity in T6, gamma activity in F7, and high-gamma activity in F7.
Conclusion: High-beta, gamma, and high-gamma qEEG activities were consistently correlated with THI scores before and after treatment in patients with chronic subjective tinnitus. qEEG therefore shows promise as an objective indicator for monitoring changes in tinnitus severity.

Keywords: Tinnitus, Tinnitus handicap inventory, QEEG

Posters

Tinnitus and Hyperacusis

PD 281

Effectiveness of Hearing Aid Sound Support in Reducing Tinnitus Severity and Improving Hearing in Individuals with Hearing Loss and Tinnitus

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This study investigates the effectiveness of hearing aid (HA) sound support in reducing tinnitus severity and improving hearing function in individuals with hearing loss and chronic tinnitus. Nineteen patients with sensorineural hearing loss and tinnitus underwent HA fitting and were followed for six months. Assessments using Tinnitus Handicap Inventory (THI), Visual Analog Scale (VAS), and Minimum Masking Level (MML) measurements indicated significant reductions in tinnitus severity and hearing handicap over the study period. Results demonstrated a clinically and statistically significant decrease in tinnitus perception, reflected by lower THI and VAS scores, as well as reduced MML thresholds. These findings highlight the role of amplification in restoring auditory input and masking tinnitus sounds, thereby alleviating the auditory and emotional burden of tinnitus. Furthermore, the use of HAs with tinnitus sound support features showed substantial improvement across various tinnitus impact domains including auditory perception, relaxation, and quality of life. Both new and experienced hearing aid users benefited from the intervention, with effect sizes indicating meaningful clinical improvements. This study provides robust evidence supporting hearing aids as a valuable therapeutic option for individuals experiencing tinnitus alongside hearing loss. Ongoing technological advances in HA design are likely to further enhance tinnitus management outcomes.

Keywords: Hearing loss, Tinnitus, Hearing aids

Posters

Tinnitus and Hyperacusis

PD 282

Short-Term Fluctuations to Complete Resolution in Pulsatile Tinnitus Following the Modified Sigmoid Sinus Wall Reconstruction Surgical Technique Using Bone Cement

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Objective
To map the time-course and determinants of pulsatile tinnitus (PT) extinction after complete transmastoid resurfacing of sigmoid sinus wall anomalies (SSWA).

Methods
Retrospective single-center cohort (July–October 2025) of 26 consecutive patients with SSWA and positive jugular-compression test. All underwent the "Inner-Sinodural-Outer Up-down" complete air cell removal method and bone cement resurfacing. PT severity (THI-PT), subjective tinnitus (THI-ST) and aural fullness (0–10 VAS) were recorded pre-op and weekly until sustained silence. Early postop CT documented fluid/cement distribution.

Results
96.2 % (25/26) ultimately achieved complete PT abolition. Only 38.5 % were silent at 24 h; 70 % displayed residual PT that declined week-by-week in all subjects by week 4 (mean THI-PT from 54.6 to 0.8; $p < 0.0001$). One recurrence corresponded to focal inadequate cement on CT. Transient ear fullness occurred in 100 % (mean VAS peak 7.7) and resolved in 88.5 % within 4 weeks; 42.3 % developed self-limiting subjective tinnitus that subsided by week 5. Crackling/autophony affected 69 % but did not impact quality of life and was resolved after 6 weeks.

Conclusion
Anatomically successful resurfacing yields 96.2 % PT cure in the current series, yet immediate silence is the exception. Residual PT, fullness and subjective tinnitus are expected, self-limiting consequences of postoperative fluid, mucosal inflammation and altered central gain, reliably extinguished within 4–6 weeks.

Keywords: pulsatile tinnitus, sigmoid sinus wall anomalies, sigmoid sinus diverticulum

Posters

Tinnitus and Hyperacusis
PD 283

Effective Sound Therapy Using a Hearing Aid and Educational Counseling: Real-World Outcomes From 1,240 Patients with Chronic Tinnitus

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Objective:
This study aimed to assess the effectiveness of our sound therapy with appropriate hearing aid fitting and periodic hearing aid adjustment in patients with chronic tinnitus.

Methods:
A total of 1240 patients initiated hearing-aid–based sound therapy at our institution, of whom 1188 completed 3 months of treatment and were included in the analysis. Treatment outcomes were evaluated using the Tinnitus Handicap Inventory (THI), Visual Analogue Scales (VAS) for tinnitus loudness and annoyance, and a subjective symptom improvement questionnaire. All measures were compared between baseline and at 3 months. Hearing aids were fitted and adjusted according to each patient's tinnitus characteristics and hearing profile.

Results:
Significant improvements were observed across all outcome measures.
THI scores improved from 51 ± 25 to 12 ± 16 ($p < 0.01$). VAS loudness improved from 71 ± 22 to 25 ± 28, and VAS annoyance improved from 74 ± 26 to 21 ± 27 ($p < 0.01$). Subjective symptom improvement was reported by 83% of patients for loudness and 89% for annoyance.

Conclusion:
These real-world outcomes demonstrate that hearing-aid–based sound therapy effectively reduces tinnitus loudness and distress in a large population of patients with chronic tinnitus. The findings support its value as a practical and clinically meaningful management approach.

Keywords: Tinnitus, Hearing aids, Sound therapy

Posters

Tinnitus and Hyperacusis
PD 284

Tinnitus: Mechanisms, Diagnosis, and Treatment – A Review

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Background: Tinnitus is a prevalent auditory condition defined by the perception of sound in the absence of an external stimulus. It affects a significant portion of the population, particularly older adults and individuals exposed to noise. Understanding its mechanisms, assessment, and treatment remains a challenge in clinical audiology.
Methods: This review explores the current understanding of tinnitus mechanisms involving peripheral and central auditory pathways, and highlights key diagnostic approaches including subjective and objective assessments.
Results: Evidence indicates that tinnitus is often associated with damage to the auditory system, neural plasticity, and abnormal activity in the auditory cortex and limbic system.
Various tools such as questionnaires, audiological tests, and imaging methods are used to evaluate tinnitus severity and impact.
Conclusion: Despite advancements, tinnitus remains a complex and individualized condition. Effective management requires a multidisciplinary approach including counseling, sound therapy, hearing aids, and in some cases, cognitive behavioral therapy.

Keywords: Tinnitus, Diagnosis, Management

Posters

Tinnitus and Hyperacusis
PD 285

The Effect of Tinnitus on Listening Effort: A Systematic Review

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Introduction:
Tinnitus, defined as the perception of sound without an external source, affects a significant portion of the population and has been associated with increased listening effort. This condition places considerable cognitive and emotional demands on individuals, particularly in challenging auditory environments.
Methods:
This systematic review used a research methodology that covered up until January 2025.The search was conducted across academic databases including PubMed, Scopus, Web of Science and Embace. A total of 512 papers were evaluated, and eight relevant clinical trials were included.
Results:
Tinnitus contributes to greater listening effort due to increased cognitive load and impaired attentional allocation. Physiological measures, such as reduced EEG alpha power and altered pupillary responses, indicate heightened processing demands. Behavioral studies show reduced task performance and slower reaction times in dual-task scenarios, while subjective measures reflect increased emotional distress. However, inconsistencies in methodologies highlight the need for standardized protocols.
Conclusion:
Tinnitus imposes a measurable cognitive burden on listening effort, particularly in noisy or complex auditory settings. This review underscores the importance of multimodal assessment techniques to understand this relationship and recommends standardized methodologies and targeted interventions to reduce cognitive load and improve auditory experiences for individuals with tinnitus.

Keywords: Tinnitus, Listening effort, Cognitive load

Posters

Auditory Implants
PD 286

Barriers Beyond the Audiogram: Rethinking Adult Cochlear Implant Candidacy in the Real World

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Background: Cochlear implants (CIs) offer transformative benefits for adults with severe-to-profound hearing loss, yet global uptake remains disproportionately low—even among audiologically eligible candidates. This study explores the barriers to CI access in the UAE, aiming to identify systemic, cultural, and professional factors that delay or prevent adult candidacy evaluation and intervention.

Method: A mixed-methods approach was adopted. Structured questionnaires were completed by 45 adults with moderate-to-profound hearing loss (aged above 50 years), and semi-structured interviews were conducted with 11 stakeholders including audiologists, ENTs, and CI recipients. Data were analyzed using descriptive statistics and thematic analysis.

Results: Findings revealed that only 36% of CI-eligible individuals had been referred for evaluation, often with delays ranging from 12 to 48 months. Key barriers included fragmented referral pathways, limited awareness among patients and primary care providers, cultural stigma surrounding implantable devices, and uncertainty regarding candidacy criteria. Financial misconceptions and insurance gaps also contributed to delayed decision-making.

Conclusion: Improving CI access requires more than audiometric criteria. Proactive referral protocols, targeted professional education, and culturally responsive public outreach are essential. Audiologists are well-placed to lead these changes by guiding patients, influencing care pathways, and fostering interdisciplinary alignment. These findings offer practical strategies to enhance CI uptake and equity in hearing healthcare

Keywords: Cochlear implant uptake, Hearing healthcare access, Referral barriers

Posters

Auditory Implants
PD 287

Interest of the electrically evoked stapedius reflex threshold (eSRT) measurements on Cochlear Implant Programming

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Abstract
Objectives:
This study examines the correlation between subjective comfort levels and those obtained through electrically evoked stapedius reflex threshold (eSRT) and evaluates the impact of eSRT-based fitting on speech perception in quiet and noisy settings.

Methods:
This prospective study, conducted between 2023 and 2025 in a tertiary center, included cochlear implant users aged 8–18 years, implanted for at least one year, with stable fitting and hearing thresholds ≤ 40 dB HL, and satisfactory speech performance.
At Visit 1 (V1), eSRT was measured, and two programs were created: MAP1 (subjective fitting) and MAP2 (eSRT-based). Audiological assessments (pure-tone thresholds, speech perception in quiet with Fournier lists, and in noise with FraSimat®) were performed with both MAPs in randomized order. At Visit 2 (V2), one month later, the same tests were repeated after daily use of MAP2.

Results:
Thirty patients participated in this study, with a total of 44 implanted ears, involving devices from three different manufacturers. eSRTs were successfully recorded in 25 out of 30 patients (83%), and in 80% of ears. Four children without measurable eSRTs did not proceed further.
The eSRT-based comfort levels (CeSRT) and the subjectively defined comfort levels (Csubj) were highly correlated across electrodes ($r > 0.94$; $p < 0.0000$), confirming the reliability of the objective measure across implant brands. Pure-tone thresholds remained stable across conditions ($p > 0.05$). Speech perception scores improved significantly with the eSRT-based MAP, especially at V2. The greatest gains were observed in noise (ANOVA $p = 0.00343$).

Conclusion:
eSRT appears to be a useful tool for optimizing cochlear implant programming in children. Its strong correlation with subjective measures and its positive impact on speech perception support its integration into routine clinical practice, especially in pediatric fitting strategies.

Keywords: ESRT, objective measure, Fitting, Cochlear implant

Posters

Auditory Implants
PD 288

Cochlear Implantation Outcomes in RRM2B-Related Deafness: A Case Report and Literature Review

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Introduction:

Mitochondrial DNA (mtDNA) depletion syndromes linked to RRM2B mutations are rare disorders affecting multiple organ systems, including muscles, peripheral nerves, kidneys, and the auditory system. The resulting sensorineural hearing loss (SNHL) is often progressive and profound, but data on cochlear implantation (CI) outcomes in these patients remain scarce.

Methods:
A systematic literature review was conducted using PubMed to identify reports on RRM2B-related SNHL and cochlear implantation outcomes. Additionally, we present a clinical case of a child with RRM2B-related deafness, detailing pre- and post-implant auditory function.

Results:
Published reports indicate that SNHL in RRM2B-related syndromes is typically severe-to-profound, progressive, and associated with multisystemic involvement. Few studies have examined CI outcomes, but existing data suggest that some implanted patients achieve auditory benefit, although variability in speech and language development is observed.

In our case, a 2-year-10-month-old girl with profound bilateral SNHL and a confirmed homozygous RRM2B mutation underwent cochlear implantation (CI622, N8 processor) at 28 months. Pre-implantation, auditory brainstem responses (ABR) were absent, otoacoustic emissions (OAE) were absent, and auditory steady-state responses (ASSR) showed no detectable thresholds. Post-implantation, cortical auditory evoked potentials (CAEPs) were robust at 65–75 dB, and the child demonstrated progressive auditory awareness (7.5h/day CI use) and improved speech perception with intensive speech therapy (2x/week). Given these promising results, a second CI is planned to optimize binaural auditory processing.

Conclusion:
While CI outcomes in mitochondrial SNHL remain poorly documented, this case, along with the available literature, suggests that cochlear implantation can provide meaningful auditory benefit, even in children with complex neurodevelopmental challenges.

Keywords: RRM2B, mitochondrial DNA depletion, cochlear implantation, Auditory development.

Posters

Auditory Implants

PD 289

Use of Cortical Auditory Evoked Potentials in Cochlear-Implanted Children

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Introduction: Early cochlear implantation (CI) in children with severe-to-profound hearing loss requires reliable methods for objectively validating device programming. Measuring implant performance in very young children can be challenging, as behavioral assessments are often limited. Automated cortical auditory evoked potentials (CAEPs) provide an objective measure of auditory perception in young cochlear-implanted children, complementing these behavioral tests. CAEPs not only help to confirm adequate device function but also guide audiologists in adjusting CI settings.

Objective: To determine the feasibility of recording CAEPs in pediatric CI recipients at their follow-up visit, identify methodological challenges in clinical implementation, and assess how CAEP outcomes may help ensure optimal implant function and programming.

Methods: This retrospective study included children implanted before 25 months of age in a specialized cochlear implant center between 2021 and 2025. Cortical recordings were performed using either the HearLab™ device or the Duet® (IHS) system, with stimuli presented at 65 dB SPL.

Results:Most of the children successfully completed testing, and demonstrated at least one identifiable cortical response. The primary challenges included poor cooperation in some children (movement, distraction) and electrical artifacts linked to CI stimulation. Interpreting absent CAEP responses proved complex, particularly due to progressive mapping protocols in early-implanted children. Although 70–80% of early-implanted children ultimately achieve language skills comparable to their hearing peers, approximately 20–30% face persistent linguistic difficulties. CAEPs offer objective insight into the quality of cortical auditory stimulation, which is crucial for language development.

Conclusion: Integrating CAEPs into routine clinical follow-up of young cochlear-implanted children is feasible and may allow clinicians to identify those at higher risk of delayed language outcomes. By reassuring families about device functionality and assisting audiologists in fine-tuning CI settings, CAEP-based protocols have the potential to optimize rehabilitation strategies and improve language development

Keywords: CAEPs, Cochlear Implant, fitting

Posters

Auditory Implants

PD 290

Categorical perception of speech under simulated cochlear implant processing

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Categorical perception (CP) is a key perceptual phenomenon in speech processing, in which listeners perceive continuously varying acoustic stimuli as discrete phonemic categories. This nonlinear transformation from acoustic to perceptual space enables efficient speech recognition but also makes perception vulnerable to signal distortion. Although CP has been widely investigated in normal-hearing listeners, relatively little is known about how CP mechanisms operate under degraded listening conditions such as those introduced by cochlear implant (CI) processing. The present study aimed to explore how temporal and spectral cues contribute to CP when speech is processed through a CI simulation.

Fifteen normal-hearing adults participated in both identification and discrimination experiments using two speech continua: /di–ti/, differing in voice onset time (VOT) to represent temporal resolution, and /ba–da/, differing in formant transition to represent spectral resolution. Each continuum consisted of seven equally spaced stimuli synthesized in Praat, and vocoded speech was generated using a 12-channel noise vocoder with frequency allocation based on the Greenwood function (100–8,000 Hz). Stimuli were presented at each listener's most comfortable level in a double-walled sound booth, and all procedures were controlled via PsychoPy (v2024.2.4).

Results showed well-defined categorical boundaries and steep identification slopes for both continua under natural conditions, with sharper boundaries for the VOT-based /di–ti/ series. In contrast, vocoded speech produced markedly flatter identification functions and poorer discrimination performance, particularly for the formant-based /ba–da/ continuum.

These findings indicate that spectral cue degradation has a stronger detrimental effect on CP than temporal cue degradation. The relative robustness of temporal cues under vocoder processing suggests that temporal information is more resilient to CI-induced distortion. Overall, the results provide empirical evidence that limited spectral resolution inherent in CI processing substantially alters categorical perception, highlighting the need to refine spectral encoding strategies to improve speech perception and phonemic boundary sensitivity in CI users.

Keywords: Categorical perception, Cochlear implant, Vocoder

Posters

Auditory Implants

PD 291

Evaluation of the Auditory Performance in Noise of Bone-Anchored Hearing System in Patients With Single Side Sensorineural Deafness

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Importance. Single sided deafness (SSD) results in difficulties for comprehension in noise and spatial localization. Ponto is a percutaneous bone anchored implant (BAI) proposed to improve the auditory benefit in noise.
Objective. The main objective was to evaluate the auditory benefit in noise Ponto system brings to patients suffering from SSD. In addition, the complications within the 6 months after Ponto implantation whatever the initial indication were evaluated.
Design. Retrospective and multicentric study.
Setting. Three different French tertiary referral centers.
Participants. Patients who underwent surgery between 2012 and July 2021 with a Ponto BAI.
Intervention. All patients with SSD underwent the speech in noise test, "Vocale Rapide dans le bruit" (VRB) in a condition with the sound signal from the front and the noise from 4 lateral loudspeakers. The test was performed in aided and unaided conditions. The Bern Benefit in SSD (BBSS) Questionnaire and a subjective Spatial-Visual Analogic Scale (S-VAS) evaluated the patients' perception of benefits.
Main Outcome Measures. VRB Speech Reception Threshold score, BBSS and S-VAS scores, complications within 6 months after surgery mostly skin complications, chronic pain, and loss of the BAI.
Results. Using the VRB, a gain of –1.55 dB signal-to-noise-ratio was found with the Ponto system. Moreover, the unaided VRB score was correlated with the unaided/aided difference and by that predicative of BAI treatment benefit. The BBSS showed mean scores between 1.45 and 3.47 for each question and the S-VAS mean score was 3.32. These results confirm a subjective benefit brought to patients especially as 74.3% were without cutaneous complications.
Conclusion. The Ponto BAI is a reliable implant and together with a Ponto sound processor it provides good auditory in noise results.
Relevance. The VRB is a useful test for predicting the post-operative results that could be expected after surgery.

Keywords: Single sided deafness, Bone anchored implant, VRB

Posters

Auditory Implants
PD 292

Pitch Pattern Reproduction in Children with Cochlear Implants

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【Purpose】
Children with cochlear implants (CI) often exhibit singing with narrow pitch variation and flattened intonation patterns, with pitch change direction agreement rates near chance levels (Xu et al, 2009). While pitch reproduction in singing relies on long-term memory, the nature of immediate pitch reproduction remains unclear. This study aimed to examine pitch pattern reproduction and identification in children with CI.
【Materials and Methods】
The study included ten children with CI aged 9–15 years and a control group of four children with normal hearing (NH). Participants performed pattern reproduction and identification tasks using two-, three-, and five-syllable words with added pitch patterns (① rising, ② falling, ③ flat). Each word was presented randomly thrice for 39 trials. In the reproduction task, participants repeated words aloud, mimicking its pitch patterns. In the identification task, participants selected the corresponding pitch pattern from a set of three diagrams. We calculated accuracy rates for pitch pattern reproduction and word identification.
【Results】
All children with NH achieved 100% accuracy in the reproduction task, and their identification accuracy improved with age. In contrast, children with CI showed a reproduction accuracy of 77.4% (SD = 11.2). Although they were able to partially reproduce the pitch patterns, there performance featured numerous subtle pitch errors and individual differences. The mean identification accuracy for CI group was 58.8%.
【Conclusion】
Children with NH readily reproduced pitch patterns accurately, though their identification accuracy improved with age. In contrast, children with CI demonstrated variable reproduction accuracy; some reproduced patterns relatively well, while others struggled. Pitch pattern identification was even more challenging for children with the CI group than reproduction. Because immediate reproduction and identification involve different processes, these results suggest the challenge in pitch perception among children with CI are complex, warranting further investigation.

Keywords: Cochlear Implant, Music, Singing

Posters

Auditory Implants
PD 293

The Impact of Altered Cochlear Biomechanics on Hearing Preservation After Cochlear Implantation

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Background
The main aim of this study was to determine whether altered cochlear biomechanics influence hearing preservation following cochlear implantation.
Methods
Seventeen adult participants received cochlear implants with electrodes of varying lengths. In all cases, implantation was performed via the round window approach. Intracochlear acoustically evoked potentials were recorded using the implant's electrode array. Tone pips at 500 Hz were delivered through insert earphones and captured by the evoked potential system. Postoperative computed tomography (CT) scans were obtained and analyzed. Preoperative audiograms were compared with audiograms recorded during testing.
Results
In nine participants, the maximum amplitude response to the 500 Hz tone pip corresponded to the 500 Hz excitation region identified on postoperative CT. In the remaining eight subjects, evidence of altered basilar membrane biomechanics was observed. These patients exhibited the largest 500 Hz amplitude responses either apically (1 case) or basally (7 cases) shifted relative to the expected 500 Hz excitation region. The decrease in low-frequency pure-tone average was similar for subjects with tonotopically matched responses and for those with altered biomechanics. No significant difference in mean hearing loss was found between the groups.
Conclusion
These preliminary findings indicate that altered basilar membrane biomechanics do not necessarily compromise hearing preservation following cochlear implantation.

Keywords: Cochlear implants, Intraoperative recordings, Electrocochleography

Posters

Auditory Implants
PD 294

Effect of Cochlear Implant on Language Acquisition in Children with Hearing Impairment in Bangladesh

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Purpose: To find out the efficacy of cochlear implants on language acquisition in children with hearing impairment.
Method: This study was cross-sectional research conducted from February 1, 2021, to June 2, 2022, focusing on children in Bangladesh who underwent cochlear implantation. This study includes 44 children attending a hospital setting under the age of 6 years with hearing impairment, by the convenience sampling method. The data was collected by utilizing a test tool called "Little Ears" from Med-El. This tool comprised 27 questionnaires for assessing speech development and 35 questionnaires for evaluating auditory development. Descriptive statistics, including frequency and percentage, were employed by using the Statistical Package for the Social Sciences (SPSS).
Result: A total of 44 children who received cochlear implants were included in the study. Among them, 35 children had a hearing age of ≤2 years, and 9 children had >2 years of hearing age. Analysis of auditory performance showed a progressive improvement in listening skills with increasing hearing age. The mean auditory (audio) scores increased from 20.05 at ≤1 year to 31.67 at 4 years, with the maximum individual score reaching 35 out of 35. Similarly, speech development scores improved over time, the mean speech score increased from 13.16 at ≤1 year to 19.33 at 4 years, with the maximum reaching 24 out of 27. These findings indicate that the longer the duration of implant use and auditory training, the better the child's auditory and speech outcomes.
Conclusion: Cochlear implantation has a significant positive impact on language acquisition in children with hearing impairments. Early detection, proper implantation, and supportive devices are crucial for achieving the best language outcomes in hearing-impaired children. Additionally, post-implantation support, especially for families from low economic backgrounds, is essential to enhance the overall success of cochlear implant programs in Bangladesh.

Keywords: Cochlear Implant, Children, Hearing Impairment

Posters

Auditory Implants
PD 295

Prevalence of medical/surgical management issues for children implanted younger than 9 months compared with children implanted between 9 and 24 months

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Background. Past research has considered intra-operative, post-operative, and device-related complications of cochlear implant (CI) surgery, yielding rates that ranged from 4-26%, depending on inclusion criteria and methodology. Few studies have included large numbers of children implanted under 9 months.
Objectives: Compare prevalence of medical/surgical issues in CI surgery under 9 months with 9 to 24 months.
Methods: From a database of 1352 children at one center, 196 children were identified who received their first CI before 2 years and had available electronic medical records (unilateral n=37; simultaneous-bilateral n=105; sequential-bilateral n=54), yielding 355 ears for analysis. All pre- and post-CI medical/surgical management issues were coded; 'Straightforward' (n = 243, 68.45%); 'Pre-CI Infection' (n = 49, 13.80%), 'Known Structural Issues' (n = 26, 7.32%), Post-CI Medical Treatment' (n = 19, 5.35%), 'Explant' (n = 7, 1.97%), and 'Complex' (two or more from above categories, n = 11, 3.01%), and 'minor'/'major' complications.
Results. Mean age at first CI was 1.11 years (range .28-1.96 years; SD 0.38). No anaesthetic events were reported for any of the 355 ear surgeries. Chi-Square indicated a significant relationship between prevalence of 'Straightforward' versus 'Required medical/surgical management' (X2 (4) = 15.81, p = .003). This significant finding came from children implanted between 12-18 months (49 ears required management). Chi-Square also indicated a significant association between age-at-implant and 'major' or 'minor' complication (X2 (8) = 16.25, p = .039). Children implanted between 12-18 months had the highest number of 'minor' management issues (37 ears). Children implanted younger than 9 months had two 'major' and nine 'minor' management issues.
Conclusions. CI surgery was straightforward in the majority of cases (68%).There was no evidence to support a higher prevalence of management issues or 'minor'/'major' complications for children implanted under 9 months compared with children implanted between 9 and 24 months.

Keywords: Early cochlear implant, Medical/surgical complications, Children

Posters

Auditory Implants
PD 296

The impact of paediatric cochlear implantation on family life and adult cochlear implantation on partner relationships

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Background: Although cochlear implantation's impact on family life and relationships is acknowledged, evidence remains limited on (i) paediatric implantation and family dynamics, and (ii) adult implantation and partner relationships.
Objectives: This study aimed to explore how paediatric cochlear implantation affects family life from parents' perspectives and how adult implantation influences partner relationships from both recipients and partners.
Methods: Two sub-studies used Concept Mapping, a participatory mixed-method approach, to collect, group, and rate statements. Participants included parents of paediatric recipients (n=29) and adult recipients (n=15) with partners (n=12). Statements reflected perceived changes post-implantation.
Results: (i) From 99 statements, six concepts emerged for paediatric implantation: Financial Outlay and Supports; Education and Therapy; Responsibilities and Sacrifices; Extended Family and Community; Spouses and Siblings; Achievements and Enrichments. Positive changes were most evident in spousal and sibling relationships and family achievements.
(ii) From 110 statements, five concepts described adult implantation effects: Social Interactions; Partner Involvement; Communication; Emotional Adjustment; Relationship Intimacy. Relationship Intimacy was rated most positive and influential in strengthening bonds.
Conclusions: Cochlear implantation significantly influences family life and partner relationships, with predominantly positive outcomes. To enhance patient-and-family-centred care, these factors should inform pre-operative and ongoing counselling for recipients and their families.

Keywords: Cochlear implants, Relationships, Family life

Posters

Auditory Implants
PD 297

Expanding Cochlear Implant Candidacy: New Evidence and SRT-In-Noise Criteria for Adult Cochlear Implantation

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Background:
Cochlear implantation criteria for postlingually deafened adults have evolved in response to technological advances and improved recipient outcomes. The original guidelines, published in 2016, have been revised to reflect contemporary speech perception results and to incorporate adaptive sentence recognition in noise (SRT) as a key assessment tool.

Methods:
A retrospective review was conducted of post-operative speech perception outcomes in adults implanted at the Royal Victorian Eye and Ear Hospital, Melbourne, Australia. Updated statistics were derived from recipients using modern CI systems, with a focus on open-set monosyllabic word and phoneme scores, as well as adaptive sentence recognition in noise (AuSTIN SRT).

Results:
Current data indicate that adults with postlingual hearing loss may be considered for cochlear implantation if their unaided pure-tone average (PTA) in the worse ear is ≥70 dBHL, and their phoneme score is ≤63% in the worse ear. Among 316 adults, whose speech perception scores were evaluated 12-month post-implantation, mean CVC word and phoneme scores were 48% and 70%, respectively, with 75% scoring above 34% (words) and 63% (phonemes). The median SRT (AuSTIN) was 8.8 dB, with 75% of recipients scoring better than 13.5 dB. These results confirm a ≥75% chance of significant speech perception improvement post-implantation when applying the above candidacy criteria. The inclusion of adaptive sentence testing in noise (SRT) provides a more valid measure of functional benefit, particularly for those with residual hearing or asymmetric loss.

Conclusion:
The updated guidelines recommend cochlear implantation for adults with postlingual hearing loss who meet the revised audiometric and speech perception criteria, including SRT in noise. These changes ensure that candidacy reflects real-world listening challenges and maximises the number of adults who can benefit from cochlear implantation.

Keywords: Cochlear implantation, Speech perception, SRT in noise

Posters

Auditory Implants
PD 298

The feasibility of the interphase gap (IPG) effect of electrically evoked compound action potential to characterize the functional status of the auditory nerve in cochlear implant users

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Purpose
The sensitivity of the electrically evoked compound action potential (ECAP) to changes in the interphase gap (IPG) is associated with the survival of spiral ganglion neurons and the presumed functional status of the auditory nerve in cochlear implant (CI) users, which could be essential for outcomes. This study aimed to investigate the feasibility of using the IPG to characterize the functional status of the auditory nerve in CI users through ECAP responses.
Methods
Twenty-nine adults who were implanted with Nucleus CI participated in this study. They were divided into two groups based on the duration of deafness in the implanted ear; thirteen had relatively shorter deafness duration(mean = 60.6 months), while nineteen had longer deafness duration(mean = 295.5 months). ECAP responses were recorded via neural response telemetry by varying the interphase gap of the electrical pulse (IPG 7 [default], 28, 56) across multiple levels. The IPG effect on ECAP threshold, maximum ECAP amplitude, and the slope of the growth function were calculated and compared between groups.
Results
When the IPG was increased from the default to 28, the IPG effect on maximum ECAP amplitude and the slope of the growth function were significantly larger in subjects with shorter deaf duration than those with longer deaf duration. The IPG effect on ECAP threshold was not significantly different between groups. When the IPG was extended from the default to 56, the IPG effect on maximum ECAP amplitude and slope was considerably larger in the shorter-duration group, whereas the ECAP threshold showed a marginal IPG effect between groups.
Conclusion
Results indicate that the IPG effect of ECAP amplitude and the slope of the growth function may have the potential as sensitive metrics to characterize the functional status of the cochlear nerve that could help better understand large individual variabilities in CI outcomes.

Keywords: Electrically-evoked compound action potential (ECAP), Cochlear implant, Deaf duration

Posters

Auditory Implants
PD 299

Improving Quality of Life in the Elderly through Cochlear Implants

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[Background]
Even when hearing test results improve with HA (hearing aid) use, minimal HA effectiveness occurs if speech discrimination ability remains low. When everyday conversation is impossible, QOL (quality of life) doesn't improve.
We report a case where an elderly patient, who could hear but could not understand others' speech and thus could not communicate using hearing in daily life, received a CI (cochlear implant), resulting in improved QOL.
[Case]
Woman in her 70s living with her husband, Endolymphatic hydrops.
Average hearing level 75dB. HA threshold 45dB.
Maximum speech intelligibility with HA was 10% (70 dB).
She appeared gloomy and spoke little. Her family's request was for improvement from the current state, as she could only respond with "yes" or "no."
Maximum speech intelligibility with CI increased to 55% (60dB).
Social interaction has clearly increased, and conversations flow more smoothly.
She has resumed playing table tennis, listens to her favorite singer's music on her smartphone, and attends lectures. Her family feels reassured seeing her respond to their calls, and their expressions have brightened.
[Consideration]
It was confirmed that patient satisfied not only by being able to "hear" but also by being able to "converse using her hearing." Furthermore, not being able to converse places a great mental burden on the family, who are the patient's communication partners. In this case, the use of a CI not only improved hearing, but also increased satisfaction with being able to "converse using what they hear." The family also recognized the benefits of using a CI, and it is believed that their QOL has improved.
[Conclusion]
Confirming not only hearing levels but also auditory utilization during conversation was considered useful for predicting the effectiveness of CI use and improvements in QOL.

Keywords: Quality of life, Conversation, Cochlear implant

Posters

Auditory Implants
PD 300

Surgical and auditory outcomes of cochlear implantation in children with CHARGE syndrome

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Objectives: The purpose of this study is to analyze the co-existing anomalies and performed cochlear implantation (CI) procedures in patients with CHARGE syndrome. Furthermore, we aims to investigate the outcomes of surgery and the level of language development in these patients.
Methods: A retrospective analysis was conducted on cases of CHARGE syndrome patients who underwent CI in our hospital from 2008 to 2019. Inner ear anomalies were ascertained using computed tomography (CT) and magnetic resonance imaging (MRI) modalities. The surgical procedures were scrutinized according to the operative records. Speech and language levels were assessed using the Meaningful Auditory Integration Scale (MAIS) and Categories of Auditory Performance (CAP) score before and after surgery.
Results: A total of 22 patients (37 ears) were included in our study. The mean age was 6.7 years (range 1-15 years). Fifteen patients (68.2%) underwent bilateral CI and revision CI was performed in 6 (27.3%) patients. The proportion of inner ear anomalies among 37 ears is as follows: Incomplete partition (IP) type II (13 ears, 35.1%), vestibular dysplasia (27 ears, 73%), semicircular canal dysplasia (34 ears, 92%), bony cochlear nerve canal stenosis (22 ears, 59.5%), and facial nerve anomaly (20 ears, 54.1%). When comparing the MAIS and CAP scores before surgery, 1-year and 5-year after surgery, significant improvement over time was observed ($p < 0.005$). In cases with IP type II deformity, the auditory performance tended to be worse. (MAIS; postop 1-yr $p=0.09$, postop 5-yr $p=0.007$)
Conclusion: In Charge syndrome, significant improvement in language development was observed during long-term follow-up after CI. Even in cases with inner ear anomalies, performing CI after careful examination before surgery can lead to favorable results.

Keywords: CHARGE syndrome, Cochlear implantation, Anomalies

Posters

Auditory Implants

PD 301

Device Use Time Better Predicts Cortical and Speech Outcomes Than Time Since Activation in Adult Cochlear Implant Users

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Background
Cochlear implants (CIs) restore auditory access in people with severe to profound hearing loss, yet outcomes differ markedly across users. Programming ("mapping") a CI still relies heavily on clinician skill and the recipient's subjective reports, which can lead to sub optimal settings. Electrically evoked Cortical Auditory Evoked Potentials (eCAEPs) recorded through the implant promise a more objective, time efficient way to guide map adjustments.
Objectives
To determine which measure of CI listening experience best predicts both eCAEP presence and post operative speech understanding:
1. CI duration – months since first switch on.
2. Median datalogging hours – typical device use per day.
3. Total cumulative device use (TDU) – lifetime listening hours (CI duration × median hours/day).
Methods
In this retrospective study, 119 post lingually deafened adults (53 female) who underwent routine eCAEP testing after implantation were analysed. Participants were grouped by eCAEP presence/absence. Associations were examined between each experience metric and (i) eCAEP presence, (ii) eCAEP waveform amplitudes and latencies, and (iii) speech perception in quiet scores available for a subset of users.
Results
• eCAEP presence: Both median datalogging hours and TDU were significantly higher in users with present eCAEPs, whereas CI duration showed no significant effect.
• eCAEP morphology: None of the three experience metrics correlated with eCAEP latencies or amplitudes.
• Speech perception: For the subset with behavioural scores, higher median datalogging hours and greater TDU each correlated significantly with better speech in quiet performance; CI duration again showed no significant relationship.
Conclusions
Objective measures that reflect how long—and how much—a patient actually wears the implant (median daily use and TDU) are better indicators of central auditory responsiveness and speech outcomes than the simple elapsed time since activation. Incorporating real world datalogging metrics alongside eCAEPs could improve CI map optimisation and ultimately enhance patient benefit.

Keywords: Cortical responses, Daily implant use, Cochlear implant

Posters

Auditory Implants

PD 302

Using cortical auditory evoked potentials in middle ear and bone conduction implant users: An objective method to optimise the fitting

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Background: Some individuals cannot benefit from a conventional hearing aid due to middle ear pathologies, anatomical malformations or a maximal conductive hearing loss. Bone conduction implants (BCI) and active middle ear implants (aMEI) may be a solution for addressing this form of hearing loss.

Objectives: The study aimed to investigate whether cortical auditory evoked potential (CAEP) measures could be used to optimise middle ear implant (MEI) and bone conduction implant (BCI) fitting, with the goal of improving hearing outcomes in adults.

Methods: CAEPs were recorded from electrodes Cz and Fz in response to three speech tokens (/U/, /A/ and /SCH/) presented in sound field. Decision (response present or response absent) was assisted by statistical criterions (Hotelling's T2 statistical test) and confirmed by visual inspection of the waveforms. Optimisation was performed only when current clinical setting did not elicit a CAEP response. Hearing outcomes were measured as pre- and post-optimisation pure tone averaged aided thresholds (PTA4) as well as adaptive speech in noise scores.

Results: Of the 14 participants, three did not need optimisation, two could not be optimised, and seven were successfully optimised using CAEP measurement. Univariate and multivariate analysis showed significant differences pre- and post-optimisation for middle and high frequency (i.e., /A/ and /SCH/) tokens. No difference was recorded for the low frequency speech token /U/. Optimised settings resulted in an overall improved speech perception in noise score (M(SD) = 5.11(4.24) SNR) and an improvement in PTA4 (M(SD) = 11.25(7.9) dB) pre- minus post-optimisation. An overall high degree of satisfaction with the procedure was observed.

Conclusions: These preliminary findings demonstrated that middle and high frequency tokens could be successfully optimised using CAEPs, resulting on significant improvement in hearing performance. Our results provide preliminary evidence supporting the use of CAEPs for optimisation of MEI and BCI adult users' fitting.

Keywords: Middle ear implant, Bone conduction implant, Cortical responses

Posters

Auditory Implants
PD 303

Cortical measurements as a trouble shooting tool or to help with fine tuning

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Background: The current standard programming of hearing implants relies heavily on subjective feedback from patients to determine the Threshold (T) and Most Comfortable Levels (C/MCL). However, subjective responses may not be reliable, especially in patients with cognitive impairments, non-English speakers, or children. Objective tools like CAEPs have the potential to eliminate subjectivity and expedite the creation of optimal maps for better hearing outcomes.

Objectives: This study aimed to explore whether acoustic cortical auditory evoked potential (aCAEP) measures could validate cochlear implant (CI) maps and enhance auditory outcomes in adults with single-sided deafness (SSD) or bilateral hearing loss.

Methods: Researchers measured aCAEPs in CI recipients using speech tokens (/m/, /g/, /t/, /s/). If aCAEP responses were absent for any speech tokens, the CI map was adjusted and CAEP measures were repeated. Speech testing occurred before and after CAEP-guided map adjustments.

Results: The study included 67 SSD-CI and 108 unilateral CI users. Initially, all CIs were mapped based on subjective loudness perception. Out of these, 65 users exhibited aCAEP responses for all four speech tokens and were considered optimized from the start. However, 110 participants lacked an aCAEP response for at least one token, leading to CI map adjustments. These adjustments enabled aCAEP responses for all four speech tokens in 54 individuals. Speech perception significantly improved in both quiet and noisy environments after aCAEP-based adjustments.

Conclusion: The study successfully employed aCAEP recordings to validate CI mapping and enhance speech outcomes in CI users. This objective tool shows promise in mitigating the limitations associated with subjective feedback and improving the efficiency and effectiveness of CI mapping.

Keywords: Cortical Auditory Evoked Responses, Cochlear implant, Hearing outcomes

Posters

Auditory Implants
PD 304

Cochlear Implant Anatomy Based Fitting: A single centre report on early experience and subsequent protocol development for interventional outcome comparison

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Introduction
Cochlear Implants (CI) provide hearing benefit by tonotopically innervating spiral ganglion neurons. Early improvement of CIs stemmed from increasing the number of electrodes and optimising the stimulation strategies used to stimulate the hearing nerve. One remaining avenue to improve the electrode-neuron interface and thus sound quality may be to optimise the electrode length for an individual's cochlear duct length.

MED-ELs philosophy as a cochlear implant company is that customisation of electrode length is likely to reduce the place-pitch mismatch of cochlear implants, potentially improving outcomes. Alongside customisation of electrode length, MED-EL have therefore enabled the redistribution of frequency windows for each electrode according to their likely tonotopic distribution. This was achieved by determining the angular insertion of each electrode from a post-operative scan and comparing these with established functions for place-pitch locations in the human cochlear such as Greenwood and Stakhovskaya. This frequency redistribution method, called anatomy based fitting (ABF), may further reduce the CIs place pitch mismatch and could potentially improve CI outcomes by doing so.

Method & Discussion
Our early experiences are reported on using ABF for adult patient CI activations, of trialling switching to ABF at several post-activation timepoints and of patient comparisons between ABF and standard frequency distributions in a single hearing implant centre. Based on these early experiences, development of an interventional protocol for comparing ABF with standard frequency distribution including minimisation of study bias and inclusion of relevant outcome measures (for example music appreciation patient reported outcome measures) are also described.

Keywords: Cochlear Implant, Anatomy Based Fitting, Outcomes

Posters

Auditory Implants
PD 305

Evaluation of cochlear implant rehabilitation services in Wales and England: A pilot study

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Objectives: CI rehabilitation is an important stage within the CI pathway. A guided approach towards post-implantation within the cochlear implant rehabilitation team (i.e. audiologist, speech therapist, etc.) could lead to better patient speech performance outcomes. The aim of this research is to evaluate whether the cochlear implant centres across Wales and England are following the same rehabilitation approach.
Methods: A CI rehabilitation questionnaire (12 questions) was developed using the Qualtrics XM software with reference to the CI quality standards. The rehabilitation staff included audiologists, speech and language therapists and teachers of the deaf. The exclusion criteria for participants were the Audiologists and ENT doctors who were only involved in the surgery and not in the rehabilitation process. 11 Participants were recruited through emails across CI centres in Wales and England.
Results: All participants showed that they provided a comprehensive level of service following the five phases of the patient pathway. However, the rehabilitation types were not consistent with each other, only three participants offered group rehabilitation, two participants provided remote rehabilitation. No agreement among the centres on the usage of contralateral hearing aid for CI patients. Both CI assessment and revision surgery were completed within the required period of the CI standards.
Conclusions: This study found that although the overall quality of post-implant rehabilitation is high, there are many discrepancies in clinical practice between CI centres, (i.e. types of rehabilitation and no standards for contralateral hearing aid use). Further research with a wide range of participants should be investigated to establish a nationwide range of CI rehabilitation practices.

Keywords: Cochlear implant, Rehabilitation services, Post-implantation

Posters

Auditory Implants
PD 306

Residual Hearing Preservation in Cochlear Implants

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This prospective, single-center pilot study investigates the efficacy and safety of automated electrode insertion in cochlear implantation (CI) using the OTODRIVE system (CASCINATION AG, Switzerland) in combination with MED-EL devices: Connector OD, Forceps OD, OTOARM, and OTOARM Aligner. The study aims to assess whether automation can improve the consistency and gentleness of electrode insertion, potentially preserving residual hearing and reducing intra-cochlear trauma compared to traditional manual techniques.

Manual electrode insertion can vary due to the cochlea's delicate anatomy. Automated systems provide controlled, slow, and reproducible movement, potentially reducing surgical variability. OTODRIVE is a CE-marked, motorized device designed for precise linear motion during surgery and operates in conjunction with other compatible MED-EL tools to enable a controlled insertion process.

The primary objective was to evaluate the efficacy of automated electrode insertion, measured by the proportion of successful insertions without procedural failure or conversion. Secondary objectives include examining effects on hearing preservation, insertion accuracy, procedure timing, and the rate of adverse events.

The results speak for themselves and impressively demonstrate how an already established and excellent technology can be further improved.

Keywords: Robotic Insertion of Electrode Array, Cochlear Implant, Hearing Preservation

Posters

Auditory Implants
PD 307

The use of bone-conduction implants in patients with rare genetic syndromes associated with ear malformations

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Objective: To evaluate the effectiveness and safety of bone-conduction implants in patients with rare genetic syndromes, such as Treacher-Collins and Goldenhar syndromes, presenting with ear malformations and associated conductive or mixed hearing loss.

Material and Method: The study included 19 patients diagnosed with rare genetic syndromes, including Treacher-Collins and Goldenhar syndromes, who exhibited conductive or mixed hearing loss due to external and/or middle ear malformations.
Bone-conduction implants were surgically implanted in patients with ear malformations who were not candidates for traditional hearing aids due to anatomical constraints.
Hearing improvement was evaluated using pure-tone audiometry and speech audiometry. Subjective satisfaction with the implants was assessed using the Abbreviated Profile of Hearing Aid Benefit (APHAB) questionnaire.

Results: All patients showed significant improvement in hearing and speech comprehension after the implantation of bone-conduction devices. Pure-tone audiometry and speech audiometry results demonstrated a marked improvement in both quiet and noisy environments. Patients reported a high level of satisfaction, with notable improvements in daily communication. The surgical procedures were safe, with a low incidence of minor complications.

Conclusions: Bone-conduction implants are an effective and safe solution for managing conductive hearing loss in patients with rare genetic syndromes associated with ear malformations. Early intervention with these implants supports auditory rehabilitation and enhances quality of life, facilitating better speech development, particularly in children.

Keywords: Bone conduction, Genetic syndroms, Auditory implants

Posters

Auditory Implants
PD 308

Bone conduction versus middle ear implant treatment concept in patients with asymmetrical mixed hearing loss

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Introduction:
Bone conduction devices (BCDs) and middle ear implants (MEIs) are established treatments for persistent mixed hearing loss (MHL). While both can yield more and less comparable audiological outcomes within their indication ranges, differences may arise in cases of asymmetrical MHL. In such cases, better bone conduction thresholds in the contralateral ear may lead to cross-hearing with BCDs. MEIs, offering side-specific stimulation, are expected to avoid this issue. This retrospective study aims to clinically assess spatial hearing and sound localization in patients with talk-over risk.
Methods:
Patients with BCDs or MEIs and at least a 10 dB difference in bone conduction thresholds at two or more frequencies on the implanted side were included. Spatial hearing was evaluated. Localization ability was also assessed.
Results:
Preliminary data from the BCD group (N=10) show improved signal-to-noise ratios of 2 dB and 6 dB. However, no improvement—and slight deterioration—was observed in the squelch condition. No benefit in localization was found with BCD use. Data from the MEI group are still being collected and will be presented.
Conclusion:
Initial findings suggest limitations in spatial hearing and localization with BCDs. The comparison will become more insightful once MEI data are available.

Keywords: Bone conduction, Middle ear implants, Mixed hearing loss

Posters

Auditory Implants

PD 309

Outcomes of active bone conduction implants (Bonebridge, Sentio, and Osia): A clinical study in pediatric and adult populations

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Background: Bone conduction implants (BCI) represent an innovative solution for individuals with conductive, mixed hearing loss, and SSD where traditional hearing aids may not be practical or suitable. The Osia, Bonebridge, and Sentio implants differ in design, mechanisms of action, fitting range, and require specific anatomical conditions. Knowledge of the guidelines influences the selection of the appropriate and safe device for the patient. Each case should be considered individually. The study aimed to compare the effectiveness of the three bone conduction implants.
Material and Methods: The study involved 24 patients with conductive or mixed hearing loss who underwent implantation of one of the BCI systems: Osia (n=8), Bonebridge (n=8), and Sentio (n=8). Patients were evaluated for quality of life and hearing levels in various acoustic conditions. Assessments were conducted before implantation and one month post-activation.
Results: One month post-activation, mean aided free-field thresholds across frequencies 500, 1000, 2000 and 4000 Hz were for Osia: 32.4; 30.5; 33.8; 41.9 dB HL; Sentio: 33.6; 29.3; 30.7; 41.1 dB HL; Bonebridge: 44.3; 36.2; 31.6; 39.2 dB HL. Speech discrimination in free-field conditions improved significantly: Osia from 1.7% to 94%, Sentio from 5.5% to 94.5% and Bonebridge from 3.3% to 91.5%. Matrix test results indicated improvements in speech-in-noise perception, with SNR improving from +3.5 dB to -1,3 dB (Osia), 0.4 dB to -2.1 dB (Sentio) and +2.6 dB to -2.3 dB (Bonebridge). APHAB questionnaire results demonstrated notable reductions in perceived hearing difficulties.
Conclusions: Active BCI (Bonebridge, Sentio, and Osia) are and effective form of rehabilitation for children and adults with various types of hearing loss. The choice of the appropriate BCI system depends on the results of the hearing test, age, anatomical conditions, and the individual needs of the patient. All implant systems provided significant improvements in hearing thresholds, speech discrimination and speech-in-noise perception.

Keywords: Bone conduction, Mixed hearing loss, Quality of life

Posters

Auditory Implants

PD 310

Evaluating the oticon ponto in patients after radical modified mastoidectomy

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Chronic otitis media with cholesteatoma necessitates surgical intervention, commonly involving radical modified mastoidectomy. Despite surgical management, hearing loss frequently persists as a sequela of the disease. In such cases, hearing rehabilitation via prosthetic devices is essential, with the choice of device primarily determined by the type and severity of hearing loss, local ear conditions, and anatomical considerations. The bone-anchored hearing device - Ponto (Oticon Medical), is one such solution employed in clinical practice.
This study included 27 patients who underwent unilateral implantation with the Ponto system, all of whom had a history of radical modified mastoidectomy. The mean age at implantation was 59 years (SD = 11). Benefits of the Ponto system were evaluated using free-field audiometry, speech recognition tests, and patient-reported outcome measures, including the Abbreviated Profile of Hearing Aid Benefit (APHAB) and the Speech, Spatial, and Qualities of Hearing Scale (SSQ) questionnaires.
Statistically significant improvements in hearing thresholds and speech discrimination scores were observed following Ponto implantation. Patient questionnaires corroborated these findings, indicating enhanced hearing performance in diverse acoustic environments.
The Ponto bone-anchored hearing device represents a safe and effective intervention for compensating conductive and mixed hearing loss in patients post-radical modified mastoidectomy. This system offers substantial auditory benefits, particularly for individuals at risk of recurrent otitis media with cholesteatoma who may require subsequent revision surgery.

Keywords: Bone-anchored, Mastoidectomy, Unilateral

Posters

Auditory Implants
PD 311

Study of processing skills and developmental auditory responses in deaf children with cochlear implants and prelingual onset (SparCI)

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Sensorineural hearing loss (SNHL) in children can profoundly affect speech and language development, making early intervention essential. Cochlear implants (CIs) offer significant benefits, yet variability in language outcomes persists. This longitudinal study, SparCI, investigates the relationship between auditory processing abilities, particularly spectro-temporal processing, and speech and language outcomes in children with CIs.

Participants include children aged 7–11 years with bilateral CIs implanted before age two, all users of spoken English. The study aims to: (1) evaluate the cSTRIPES test for measuring spectro-temporal processing; (2) examine associations between cSTRIPES performance, speech perception in noise, and vocabulary development; (3) assess voice cue perception, discrimination, and gender categorization, and their correlation with speech-in-noise and vocabulary scores; and (4) identify predictors of speech and language outcomes, including socio-economic status and residual hearing.

Findings are expected to inform clinical practice by highlighting auditory processing measures as potential predictors of language development in children with CIs, supporting targeted interventions to optimize outcomes.

Preliminary data will be presented at the WCA 2026.

Keywords: Cochlear implant, Spectro-temporal processing, Children

Posters

Auditory Implants
PD 312

Benefit of Target–Masker Speech Rate Differences on Speech Perception in Children with Cochlear Implants under Competing Speech Conditions

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【Purpose】
Voice characteristics and signal-to-noise ratio (SNR) provide effective cues for speech perception in competing speech conditions in children with cochlear implants (CI). However, the nature of their contribution remains unclear. This study focused on the difference in speech rate between the target and masker speech, and examined the impact of speech perception under competing speech conditions.
【Methods】
Eleven children with CI and 16 with normal hearing (NH) participated in the study. We administered a speech perception task under competing speech conditions. The target sentences were presented under three different speech rate conditions: normal (1.0×), moderately slow (0.75×), and significantly slow (0.5×); the speech rate of the masker sentence remained constant. Both task stimuli were recorded by the same female speaker and mixed at a SNR of +5 dB. For each speech rate condition, 20 target sentences were presented at 65 dB SPL in a sound-attenuated chamber and participants were asked to repeat what they heard. The accuracy rates were calculated and compared between the groups.
【Results】
The children with NH showed consistently high identification accuracy across all speech rate conditions, in contrast to that in children with CI. However, the speech rate had no significant effect on performance in either group.
【Conclusion】
Children with CI did not reveal a clear effect of speech rate. This may be due to the slower target speech, reducing the availability of glimpses through dips in the spectral and temporal envelopes of the masker. Future studies should determine an appropriate speech rate for children with CI and investigate the effects of speech rate differences under various listening conditions.

Keywords: Cochlear Implant, Competing speech, Speech Rate Differences

Posters

Auditory Implants

PD 313

Perception of harmonic musical intervals by cochlear implant users

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Background: The perception of musical intervals is a fundamental component of melody and harmony. Intervals may be presented melodically (as successive tones) or harmonically (as simultaneous tones), with the latter playing a crucial role in the perception of consonance and chordal structure. In the chromatic scale, intervals are measured in semitones, and their perceived pleasantness (consonance or dissonance) depends on the frequency ratio between them. Cochlear implant users are likely to perceive harmonic intervals differently from normal-hearing individuals due to technological limitations in transmitting the spectral and temporal complexity of musical sounds.
Objective: To evaluate the perception of consonances and dissonances in people with normal hearing and cochlear implant users.
Methods: Non-invasive psychoacoustic tests using a series of stimuli presented in pairs. Each stimulus consisted of two tones presented simultaneously, forming a harmonic interval. The ratio of fundamental frequencies corresponded to one of 13 values, ranging from 0 (perfect prime) to 12 semitones (perfect octave). The listener was asked to indicate which of the two presented intervals was more pleasant. The order from unpleasant to pleasant was identified based on procedure, described by Long et al. (2005). We recruited adults' participants with normal hearing (musicians and without musical background) and participants with cochlear implants.
Results: Harmonic intervals are perceived differently by cochlear implant users compared with normal-hearing individuals.
Conclusions: The findings provide a foundation for future investigations into interval perception and its implications for auditory rehabilitation and music-based therapy.

Keywords: Harmonic interval, Consonance, Dissonance

Posters

Auditory Implants

PD 314

Tracking Use and Hearing Gains: Single Sided Deafness Cochlear Implant Datalogging

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Purpose
Cochlear implantation for single-sided deafness (SSD) is increasingly recognized as a treatment option to improve speech perception in noise, localization, and quality of life. The purpose of this study is to examine longitudinal objective and subjective outcomes following cochlear implantation for SSD and to evaluate patterns of daily device use and its association with clinical benefit.

Methods
Data from 139 adults implanted with a MED-EL device were included (age 21–86 years).Outcomes were tracked across multiple postoperative intervals (3, 6, 12, 24 months and long-term). Speech-in-noise was assessed in three spatial configurations (S0/N0, S0/Nci, Sci/Nhe) and subjective outcomes were measured using the SSQ and TRQ questionnaires. Daily device use (data-logging hours/day) was evaluated across intervals and examined in relation to clinical outcomes.

Results
Speech-in-noise performance improved across all spatial configurations, with the most rapid and sustained gains observed for Sci/Nhe. Significant improvements were also evident in SSQ Total, Speech, Spatial, and Listening Effort subscales, with benefits emerging early and remaining stable long-term. Tinnitus distress (TRQ) showed a marked and sustained reduction from 3 months onward. Device use remained high and stable, averaging 6.5–8 hours/day across follow-up intervals, with no significant decline over time. Two meaningful relationships were identified:
1. Higher daily device use was associated with lower tinnitus distress, independent of time since implantation.
2. For Sci/Nhe, higher device use became predictive of better spatial hearing performance from 6 months onward, suggesting that established, consistent use supports long-term auditory adaptation.

Conclusion
Cochlear implantation for SSD provides early, sustained improvements in speech-in-noise performance, subjective hearing quality, and tinnitus relief. Device use remains consistently high among recipients and plays a meaningful role in long-term adaptation, particularly in spatial hearing and tinnitus reduction. These findings underscore the clinical importance of supporting and monitoring consistent device use as part of routine rehabilitation for SSD

Keywords: Single-sided deafness, Cochlear implants, Datalogging

Posters

Auditory Implants

PD 315

The Impact of Auditory Deprivation and Cortical Reorganization on Speech Perception After Cochlear Implantation in Adults with prelingually Unilateral and Bilateral Deafness

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Background: Auditory duration of deprivation is a key factor influencing speech perception outcomes after cochlear implantation (CI).

Prolonged deprivation has been linked to cortical reorganization that may influence postoperative rehabilitation. However, the magnitude of this effect and whether outcomes decline gradually or demonstrate a threshold effect remain unclear. This is particularly true for prelingually both bilateral and single-sided deafened patients, for whom data on late cochlear implantation outcomes remain limited.

Understanding the clinical impact of deprivation duration on speech perception remains essential for patient counseling and outcome prediction.

Objective: This ongoing study investigates speech perception outcomes after cochlear implantation in two patient groups: (1) patients with prelingually single-sided deafness (SSD) and (2) adults with prelingually bilateral deafness implanted late. The study aims to examine cochlear-implanted patients and their relationship to duration of deprivation with particular interest for patients with prelingual bilateral deafness and prelingual single-sided deafness who receive cochlear implants in adulthood, populations for whom outcome data remain limited.

Methods: Approximately 10 adults with prelingually single-sided deafness and additionally, a small cohort of patients with congenital bilateral deafness who underwent unilateral cochlear implantation later in life was investigated.

Postoperative speech perception was assessed using standardized speech perception tests and analyzed in relation to duration of deprivation.

Duration of deprivation will be analyzed as a continuous variable to assess whether outcomes decline gradually or demonstrate a threshold effect.

Results: Data collection and analysis are ongoing, and no definitive outcome patterns can yet be identified.

Conclusion: This study seeks to improve understanding of cochlear implant outcomes across different deprivation patterns. Comparative analysis of prelingual single-sided deafness and prelingual bilateral deafness may help clarify the role of cortical reorganization. These populations represent unique models for understanding the limits of cortical plasticity and the potential for auditory rehabilitation after prolonged or lifelong auditory deprivation

Keywords: Prelingual, deafness, Deprivation, Cochlea implant

Posters

Auditory Implants

PD 316

Impact of Auditory Deprivation and Cortical Reorganization on Speech Perception After Cochlear Implantation in Adults with postlingually Unilateral and Bilateral Deafness and possible patient outcome predictions

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Background: Prolonged deprivation has been linked to cortical reorganization that may influence postoperative rehabilitation and is a key factor incluencing speech perception outcomes after cochlear implantation (CI). Data about the influence of the period of time between severe hearing loss / deafness and cochlear implantation is rare. Similarly, it remains unclear whether a critical time period exists beyond which rehabilitation outcomes are clearly worse.

Objective: This ongoing study investigates speech perception outcomes after cochlear implantation in two patient groups: (1) postlingually deafened adults with unilateral deafness up to 10 years and (2) postlingually deafened adults with unilateral deafness more than 10 years. The study aims to examine cochlear-implanted patients and their relationship to duration of deprivation in a CI specialized clinic in Austria.

Methods: Approximately 50 postlingually unilateral deafened adults who received a cochlear implant within the past three years were retrospectively included, divided into two groups based on the 10-year cutoff.

Postoperative speech perception was assessed using standardized speech recognition tests and analyzed in relation to duration of deprivation.

Duration of deprivation will be analyzed both as a categorical variable (< vs. >10 years) and as a continuous variable to assess whether outcomes decline gradually or demonstrate a threshold effect.

Results: Data collection and analysis are ongoing, and no definitive outcome patterns can yet be identified.

Conclusion: This study seeks to improve understanding the clinical impact of deprivation duration on speech perception after CI-surgery in postlingually deafened patients. Comparative analysis of postlingual unilateral short-term and long-term deafness may help clarify the role of cortical reorganization and find a prediction about possible patient outcome.

Keywords: Deprivation duration, Postlingual deafness, Cochlear implantation

Posters

Auditory Implants
PD 317

Piezoelectric Bone Conduction Device Performance Evaluation Using Laser Doppler Vibrometry (LDV)

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Purpose: This cadaveric study aims to evaluate the performance of Osia® OSI300 across different implant locations using Laser Doppler Vibrometry (LDV) when controlled by the standard clinical fitting software.

Materials and Methods: The Osia® OSI300 was implanted at three locations on four fresh-frozen cadaver heads: A) Immediately posterior to the pinna B) 50-55 mm horizontally posterior to the External Auditory Canal (EAC), and C) 50-55 mm posterosuperior to the EAC at a 45-degree angle. The device was driven by standard clinical fitting software to simulate the clinical situation. Ipsilateral and contralateral cochlear promontory (CP) vibrations were measured using the LDV. Measurements were repeated following mastoidectomy.

Results: The CP vibration in location A and B was significantly stronger than location C at 1 kHz and above. Transcranial Attenuation (TA) showed no significant difference across three implant locations. Following, mastoidectomy, ipsilateral CP vibration increased in the low frequencies; however, no significant effect was observed on the contralateral side.

Conclusion: Implanting the OSI300 closer to the cochlear promontory (CP) yields significantly stronger vibrations at higher frequencies. Since TA was not affected by implant locations, surgeons may have greater flexibility in selecting the optimal implantation site for patients with single-sided deafness (SSD) including post-mastoidectomy cases.

Keywords: Piezoelectric bone conduction device, bone conduction device, Laser doppler vibrometry, Single-sided deafness, mastoidectomy

Posters

Others
PD 318

Auracast™ in Action: Demonstrations Mark a Watershed Moment in Hearing Access

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Background:
For decades, public accessibility has relied on legacy assistive listening systems such as telecoil and FM, which often feel outdated and underutilized. Auracast™, powered by Bluetooth® LE Audio, is rewriting this story. For the first time, a single broadcast can connect directly and simultaneously to hearing aids, cochlear implants, earbuds, and smartphones. This is not just an incremental upgrade; it is a watershed moment in hearing access, with the potential to transform how people with hearing loss engage with the world.

Methods:
GN Hearing, as one of the first companies to bring Auracast into clinical and cultural practice, has conducted real-world demonstrations at global landmarks including Lincoln Center (New York, USA) and the Sydney Opera House (Sydney, Australia). GN ReSound and Beltone hearing aid users, alongside consumer devices, connected to Auracast broadcasts in live performance settings. Experiences were captured through post-event surveys and participant testimonials.

Results & Conclusion:
Early findings from these GN led demonstrations show that Auracast delivers more than technical excellence, reducing effort, restoring confidence, and fostering a deep sense of inclusion. Participants consistently described the audio as effortless, clear, and immersive, with testimonials praising Auracast as a "new standard for inclusion." These outcomes demonstrate both the clinical and psychosocial impact of Auracast in real-world environments. With millions of Auracast-enabled venues projected worldwide by 2030, and GN at the forefront of introducing this technology to hearing aid users, Auracast is poised to become the global standard for hearing accessibility, reshaping rehabilitation, education, workplaces, and everyday communication.

Keywords: Auracast Broadcast, Hearing Aids, Accessibility

Posters

Others
PD 319

Sex difference in age-related hearing loss before and after menopause in Korean: A cross-sectional study

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Objectives: The rate of hearing decline in women found to be triggered by the onset of menopause. However, little was known sex difference in the rate of hearing decline, especially after menopause. The aim of our study was to reveal the sex differences in the hearing threshold and the rate of hearing decline before menopause and those after.
Methods: Among 16,884 data of audiograms and questionnaires, 4,085 subjects were included. Age 49.3, the known average age of menopause in Korean, was used for the age of menopause in this study. Subjects below age 49.3 were 2,762 (556 men and 2,208 women) and those above were 1,321 (354 men and 967 women). A one-way analysis of covariance (ANCOVA) was used to analyze the data to reveal sex differences in the hearing threshold after adjusting for age effects. And linear regression analysis was used to estimate the average rate of hearing decline. The rate of hearing decline was estimated by the slope coefficient of a linear regression line. Also, the difference in the slope coefficients between sexes was evaluated using dummy variable linear regression analysis.
Results: Below age 49.3, women had better hearing thresholds at 2, 4, and 8 kHz and slower rates of hearing decline at 4 and 8 kHz than man. Above age 49.3, women had better hearing thresholds at 4 and 8 kHz and worse at 0.5 and 1kHz than men. The rate of hearing decline was not different between sexes above age 49.3.
Conclusions: The sex differences in the hearing thresholds and the rate of hearing decline were different before and after menopause. After menopause, it was disappeared the slower rate of hearing decline at high frequencies in pre-menopausal women than age-matched men.

Keywords: Age-related hearing loss, Sex, Menopause

Posters

Others
PD 320

Investigating the Family and Child's Experience of Microtia and Hearing Loss

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Background: Microtia is a congenital condition present at birth that affects the outer ear and is often associated with hearing loss. While previous research has examined the experiences of adults with the condition and parents of affected children, there is limited exploration of the perspectives of children and young people themselves.

Aim: There were two aims of the study; 1. To investigate children and young people's experiences of microtia and 2. To explore parent/carer experiences of their child's microtia.

Methods: In-depth interviews, using a Grounded Theory informed approach, were conducted. Children and young people with microtia participated in online or in-person interviews, while parents took part in online focus groups. Participants were selected to represent a range of characteristics, including age, location, and gender. The questions prompts explored aspects of home, social, and school life, as well as discussions on decision-making, auditory management, and/or reconstructive surgery.

Results: A total of 23 participants took part in the study, including children/young people with microtia and parents. Participants had a mix of those using auditory amplification. The impact of microtia on families evolved over time, with different needs at different stages of life. Both parents and children/young people shared similar perspectives on the autonomy of the young person in choosing amplification devices and/or reconstructive surgery. Accessing information played a key role in coping and in understanding what microtia meant to them, with healthcare professionals, family members, and social networks serving as important sources of support.

Conclusion: This study offers the first insights into the combined experiences of children, young people, and their families living with microtia. This presentation will share these findings as well as discussing how clinicians can apply these to improve their approaches to supporting individuals and families affected by the condition.

Keywords: Microtia, Hearing Loss, Family

Posters

Others
PD 321

Prevalence and Etiology of Hearing Impairment in a Historically Isolated Region of Northern Sweden.

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Background
Childhood hearing impairment affects language development, education, and quality of life. Västerbotten County in northern Sweden is a historically isolated region that has experienced rapid population growth over the past centuries, combined with low migration and high rate of consanguinity. This has made some hereditary diseases more common in Västerbotten than in other parts of the world. A study conducted 35 years ago showed a higher prevalence of hearing loss among children in Västerbotten compared to other high-income populations. This study aimed to determine the current prevalence and etiology.

Method
We conducted a cross-sectional observational study including all children aged 0–20 years residing in Västerbotten as of December 2023. Medical records were reviewed for all children that had received any hearing-related diagnosis. Inclusion required confirmed permanent hearing impairment (PTA4 ≥ 20 dB) in at least one ear. Of 1,172 identified cases, 408 children met inclusion criteria.

Results
Preliminary data shows a slightly lower prevalence compared to 35 years ago. About half of the cases had a known etiology, with syndromic and non-syndromic hereditary hearing loss being the most common cause of bilateral hearing loss. Although heredity is the most common cause of sensorineural hearing loss in children, few had undergone genetic testing. Data from the children tested indicate that the genetic spectrum in our cohort may differ from that of other regions.

Conclusion
The population of Västerbotten presents a unique opportunity for genetic research. Non-syndromic hearing loss is likely underdiagnosed due to limited genetic testing. Our data suggest that the genetic spectrum of hereditary hearing impairment may differ from that of other populations. Further research is needed regarding the etiology of hearing loss in this historically isolated area and on the genetic characteristics of this cohort.

Keywords: Hearing impairment, Prevalence, Etiology

Posters

Others
PD 322

An English–Vietnamese Clinical Guide for Audiologic Care of Vietnamese Patients

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Purpose: The Vietnamese language is spoken by approximately 97 million people worldwide, including more than 1.5 million in the US. However, there is a notable lack of resources to guide audiologists serving Vietnamese speakers, and very few Vietnamese-speaking audiologists available to serve this community. The goal of this project is to develop a bilingual English–Vietnamese resource containing key clinical phrases and instructions to help audiologists overcome language barriers, improve patient understanding, and provide more equitable, culturally sensitive care to Vietnamese-speaking patients.

Methods: Common clinical phrases were collected and organized into five main categories: greetings, case history, testing, diagnoses, and results and recommendations. The English content was created and reviewed by audiologists for clinical accuracy. Translations into Vietnamese were completed by an individual fluent in both Vietnamese and English, and reviewed by a certified bilingual Vietnamese medical interpreter to ensure both accuracy and cultural appropriateness. This produced a corpus of terms, phrases, and instruction sets that could be adopted or adapted by audiologists to serve their Vietnamese-speaking patients.

Results: The corpus, along with guides, audio/video recordings, and a resource library, have been published online as a public service. We will present the outcomes of this work and guidelines to access it. Currently, the resource contains over 200 words and phrases. We are continuing to update it and add requested content. Additionally, work is underway to develop a guidebook based on the website contents which can be downloaded, free of charge, and printed for in-office use.

Conclusion: This English–Vietnamese audiology resource offers clinicians an easy-to-use tool to communicate more effectively with Vietnamese-speaking patients. We believe it will improve provider confidence and the trust that patients place in those providers. With further development, this model could be adapted for other languages, supporting more inclusive and culturally responsive audiology care.

Keywords: Audiology, Translation, Vietnamese

Posters

Others

PD 323

A Case of Congenital Severe Hearing Loss Diagnosed with Autism Spectrum Disorder and Attention-Deficit/ Hyperactivity Disorder in Adulthood

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Introduction: Some individuals with hearing loss are not diagnosed with autism spectrum disorder or attention-deficit/hyperactivity disorder until adulthood. Consequently, information on their childhood development is often absent. We report a case of congenital hearing loss in which neurodevelopmental disorders were suspected in adulthood. The individual was subsequently diagnosed by specialists with autism spectrum disorder and attention-deficit/hyperactivity disorder.
Case: A male in his 20s whose severe congenital hearing loss was discovered at age 2 years and 7 months received language instruction using the Written-Oral Language Method (Kanazawa Method®) with hearing aids. Language acquisition progressed well, leading to vocational school completion and employment. Financial problems later prompted consultation with the authors. Communication was through oral language with good intelligibility.
Assessment and Discussion:
Intelligence and Language: On the Wechsler Adult Intelligence Scale - Fourth Edition (WAIS-IV; Japanese version), his full-scale intelligence quotient was 89, verbal comprehension index of 119, and perceptual reasoning index of 87 with notable discrepancies. On the Standardized Reading Test, his reading comprehension reached high school graduate level.
Attention Function: The Kana Hiroi Test showed average deletions for individuals in their 20s, but four omissions and insufficient comprehension. The Visual Digit Span was forward 5 digits (below cutoff) and backward 6 digits. On the WAIS-IV, the scaled scores for the coding and symbol search subtests were 5, lower than other subtests.
Iowa Gambling Task: Social decision-making difficulties were observed, ending with less than half the initial funds.
Despite adequate language acquisition, attention function weaknesses and social behavior problems were evident. University hospital referral resulted in a diagnosis of severe autism spectrum disorder and attention-deficit/hyperactivity disorder. Medication was initiated.
Conclusion: When language develops smoothly even when severe hearing loss is present, parental interest in supporting communication often declines after school enrollment, highlighting the importance of continued developmental follow-up after school enrollment.

Keywords: Congenital severe hearing loss, Adulthood, Neurodevelopmental disorders

Posters

Others
PD 324

Small Vessel Disease and Risk of Hearing Loss: A Nationwide NHIS Cohort Study

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Purpose: To quantify the impact of small-vessel disease (SVD) on incident hearing loss (HL), recurrence, and clinical course using Korea's National Health Insurance Service (NHIS) cohort.
Method: We will assemble an adult NHIS cohort (index years 2010–2024) with a ≥2-year washout. SVD will be operationalized as a composite of micro/macro-vascular conditions (hypertension, diabetes, dyslipidemia, ischemic stroke, retinal vein occlusion, diabetic retinopathy, CKD, etc.) using ICD-10 plus drug/procedure criteria adapted from prior HIRA-based work. Primary outcome is incident HL (ICD-10 H90–H91), with SSNHL (H91.2 + steroid + ≥2 PTA codes) as a key secondary. Recurrence (≥365-day gap) and "treatment duration" proxies will be examined. We will estimate adjusted hazards using Cox (time-varying SVD), handle death as a competing risk (Fine–Gray sensitivity), and address confounding via age/sex/income, region, comorbidity, ototoxic medications, and ENT history. Subgroups: age-bands, sex, noise-related diagnoses, diabetes control (medication intensity). Robustness checks include alternative SVD definitions, negative-control outcomes, and high-specificity SSNHL definitions.
Result: We expect SVD to be associated with higher risk of incident HL and SSNHL, shorter time-to-recurrence, and longer treatment duration proxies. Microvascular proxies (retinal/renal) are hypothesized to show the strongest effects; age modifies associations. Results will be presented as adjusted HRs with subgroup contrasts and E-values/sensitivity analyses.
Conclusion: NHIS-based estimates will clarify the vascular contribution to HL at the population level and complement prior HIRA findings on SSNHL. Findings may inform prevention (vascular risk control), early detection strategies in high-risk groups, and counseling of normal-hearing individuals with SVD burden.

Keywords: Hearing Loss, Risk Factors, Cohort Studies

Posters

Others
PD 325

Microbial presence and hearing outcome in surgically treated middle ear cholesteatoma

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Cholesteatoma is a keratinizing epithelial lesion that can erode middle ear structures, causing conductive hearing loss; its pathogenesis remains unclear, though chronic inflammation and microbial involvement are suspected.
Objective: To investigate whether microbes are present in the middle ear in patients with cholesteatoma and to evaluate clinical and audiological outcomes following surgical treatment of middle ear cholesteatoma.
Method: This prospective clinical study was conducted in two northern regions of Sweden. Patients undergoing cholesteatoma surgery were included. Intraoperative microbiological samples were obtained for virus identification and bacterial culture. Pre- and postoperative audiometric testing was conducted. Pure tune average 4 (PTA4) was calculated and the air–bone gap (ABG) was used to assess the hearing.
Results: Nineteen participants were included in the preliminary analysis. Sixteen reported a history of secreting ears. Virus presence and bacterial growth were detected in four of seventeen (24%) and five of seventeen (29%) samples, respectively. All viruses were Epstein-Barr-Virus and four of five bacterial cultures contained Cutibacterium Acnes. In the non-presence of bacteria, the mean pre- and postoperative air conduction (AC) PTA4 were 44.6 dB (SD 20.9) and 34.0 dB (SD 20.6), respectively. The corresponding bone conduction PTA4 values were 21.0 dB (SD 16.5) and 20.9 dB (SD 17.9), resulting in pre- and postoperative ABG of 23.6 dB (SD 12.0) and 13.1 dB (SD 6.9). When bacteria were present, the mean pre- and postoperative AC/PTA4 were 31.0 dB (SD 13.1) and 30.3dB (SD 9.7) respectively, with corresponding BC/PTA4 of 12.8dB (SD 4.7) and 16.3dB (SD 8.9), resulting in pre- and postoperative ABG of 18.2dB (SD 13.9) and 14dB (SD 7.3).
Conclusion: A history of episodes with secreting ears seems to precede the development of cholesteatoma. Presence of microbials may play a role in the pathogenesis of cholesteatoma, and might affect the hearing outcome, but more studies are needed.

Keywords: Cholesteatoma, Hearing outcome, Microbes

Posters

Others

PD 326

Self-Understanding of Disability among Students with Hearing Loss: Associations with Educational Background and Explanatory Experiences

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Purpose
It is important for students with hearing loss to have a clear understanding of their disability, which facilitates awareness of the support necessary and promotes inclusive participation. Although such understanding may be deepened by explaining their disability to others, their actual level of such understanding remains unknown. Therefore, this study examined the extent to which individuals with hearing loss understand their disability as a fundamental component of disability acceptance and how this self-understanding is related to experiences of explaining or receiving explanations from others.

Method
Twenty individuals with hearing loss participated (Mean age: 21.55 years). Their hearing loss levels ranged from moderate to severe; seven used hearing aids, seven cochlear implants, and six both aids. Participants used various communication methods; twelve used both oral communication and sign language, while eight relied on a single method. The questionnaire included fourteen items: nine on self-understanding, and five on experiences of explaining their disability to others. Responses were rated on a five-point Likert scale. The relationship between self-understanding scores, experiences of explaining or receiving explanations of their disability, and basic background information were analyzed using Spearman's rank correlation.

Results
Self-understanding scores ranged from 20 to 40 (Mean=30.4, SD=5.07). No significant correlations of self-understanding scores were found with explaining ($r=-0.30$, n.s.), the experiences explained ($r=-0.05$), hearing ability ($r=0.07$, n.s.) and age ($r=-0.23$, n.s.). However, the scores were significantly correlated with the type of school attended ($r=0.38$, $p<0.05$). Individuals who graduated from special needs schools for students with hearing loss tended to have higher scores of self-understanding.

Conclusion
Self-understanding of disability among students with hearing loss appears to be influenced by factors such as educational background and explanatory experiences, suggesting the importance of the experiences accumulated. However, because many other individual factors are likely to be involved, further research is warranted.

Keywords: Self-understanding, Hearing loss, Disability acceptance

Posters

Others
PD 327

Parenting Behaviors of Caregiver with normal hearing Raising Children with Hearing Loss

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Objective:
This study investigated the parenting behaviors of hearing mothers raising children with hearing loss, aiming to clarify characteristic tendencies that may influence the development of help-seeking behaviors and social adaptation. Children with hearing loss often avoid challenging or ambiguous social situations, which can hinder the development of help-seeking skills essential for independence. Hearing parents may experience anxiety about unfamiliar child-rearing issues, leading to overprotective or inconsistent parenting that may unintentionally restrict their child's autonomy.
Method:
A questionnaire survey using the Positive and Negative Parenting Scale (PNPS; Ito et al, 2018) was administered to 22 hearing mothers of children with hearing loss. The PNPS is a standardized instrument that comprehensively evaluates parenting styles based on two higher-order factors: Positive Parenting (Involvement/Monitoring, Positive Responsivity, Respect of Will) and Negative Parenting (Overprotection, Inconsistency, Harsh Discipline). Each subscale includes four items, with a total of 24 items. The data were analyzed using t-tests and compared with published results from mothers of children with normal hearing. Additionally, the relationship between parenting tendencies and the children's ages were examined.
Results:
All caregivers scored above the required levels for concern for either Positive or Negative Parenting. The mean scores for Involvement/Monitoring (Mean: 52.6, SD: 9.3) and Overprotection (Mean: 54.0, SD: 9.4) were significantly higher than those for raising children with normal hearing ($t=2.65$, $t=2.63$, $p<0.05$). As the children's ages increased, Involvement/Monitoring, Overprotection, and Harsh Discipline decreased, whereas Positive Responsivity increased.
Discussion:
The results revealed that mothers raising children with hearing loss showed greater tendencies toward Involvement/Monitoring and Overprotection than those raising hearing children. This may reflect parental efforts to compensate for the developmental and social challenges faced by children with hearing loss. Moreover, Involvement/Monitoring, Overprotection, and Harsh Discipline decreased, while Positive Responsivity increased with age, suggesting that maternal parenting attitudes change with the child's development.

Keywords: Children with hearing loss, Parenting behaviors, Caregiver with normal hearing

Posters

Others
PD 328

Stuck in the middle with you: Young people's perspective on deafness and peer mentoring

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Background:
Current intervention strategies for children with hearing loss predominantly focus on early childhood, aiming to align development with typical milestones. This approach shapes how parents and children perceive hearing loss and influences their understanding of impacts across adolescence and emerging adulthood. Young people at this developmental stage navigate complex cognitive, physical, psychological, and psychosocial transitions. Identity formation involves intersecting cultural, linguistic, and social perspectives alongside an evolving understanding of deafness. Despite evidence that peer support protects mental health, limited research has explored the role of peer mentoring for this population. Effective mentoring must align with developmental arcs and social-emotional priorities across adolescence.

Objective:
This study explored the perspectives of young people with cochlear implants and their caregivers on identity, connection, and the role of peer mentoring across adolescence and early adulthood. The aim was to inform the development of age-appropriate, inclusive mentoring models.

Methods:
This qualitative study used guided narrative interviews with 22 participants across Australia, including 16 deaf and hard-of-hearing young people (aged 12–24 years) with cochlear implants who had not previously engaged in peer mentoring, and six caregivers. Maximum variation sampling captured socioeconomic, cultural, and clinical diversity. Communication modes included spoken language and bilingual/bicultural approaches. Iterative topic guides explored perceptions of hearing loss, mentoring, lived experience, and developmental transitions.

Results:
Themes included: limited contact with deaf peers and isolation in mainstream settings; identity development without models; parental and clinical framing of deafness through hearing-focused perspectives; navigating between deaf and hearing contexts; desire for shared lived experience; and evolving mentoring needs across development. Participants identified significant gaps in identity support and peer connection.

Conclusions:
Findings highlight the need for mentoring models that centre young people's agency, reflect diverse identities, and align with inclusive, developmentally responsive approaches to hearing and wellbeing.

Keywords: Adolescence, Deafness, Lived Experience

Posters

Others

PD 329

Patterns of Co-speech Gesture and Conversation Repair in Adults with Acquired Hearing Impairment

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Adults with acquired hearing impairment (HI) frequently experience speech perception difficulties and hence communication breakdowns, particularly in the presence of background noise. It is well recognised that the addition of visual information provided by the articulators (lipreading) tends to improve speech perception. Less is known, however, about other sources of visual information, including hand and arm gestures, arising in conversations involving adults with HI. Participants in everyday face-to-face communication produce gestures, closely linked to the speech they accompany, to augment, contextualize, and/or clarify, the spoken word. However, the ways in which gestures may be used in resolving communication breakdowns have received limited research attention.
The aim of this project was to identify the types and patterns of co-speech gesture occurring during repair sequences in face-to-face dyadic conversations involving individuals with HI and their normally hearing familiar communication partners (FCP).
Method:
Six adults with moderate to severe HI and their FCP with normal hearing participated in a planning task. Five-minutes periods of background babble were introduced at set intervals during the 20-minute conversations. Audio-visual recordings of the interactions underwent systematic multi-layered transcription of conversation repair sequences and associated gestures.
Results:
There were 30 instances of communication breakdown and repair sequences across four of the six dyads and 72 associated co-speech gestures. The most common type of repair initiation was non-specific other-initiated self-repair (e.g, 'Pardon?'). The most common repair response was repetition (i.e, repeating a misheard phrase verbatim). Repair sequences were completed both with and without the use of co-speech gesture. Interactive and iconic gestures were the most frequent gesture types.
Conclusion:
The patterns of repair and gesture use showed considerable variability across participant dyads. Findings suggest that the more frequent and longer the repair sequences the more likely the communication partners may be to use co-speech gesture.

Keywords: Adult acquired hearing impairment, Co-speech gesture, Conversation repair

Posters

Others

PD 330

Cognitive Interference Effects of Colour-Word and Counting Stroop Task on the Auditory Brainstem Response (ABR) in Children and Adults

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Background: Auditory sensory gating refers to the brain's ability to suppress irrelevant auditory information from further processing. Recent studies have explored the use of the counting Stroop task, performed concurrently with the auditory brainstem response (ABR) test, to assess sensory gating at the brainstem level. However, the classical colour-word Stroop task, which is known to elicit stronger cognitive interference, has not yet been examined in conjunction with ABR testing. Therefore, this study aimed to compare the effects of cognitive interference induced by the colour-word and counting Stroop tasks on ABR outcomes.

Method: Seven children and eleven adults with normal hearing participated in this study. Each participant underwent ABR testing concurrently with both Stroop task types (colour-word and counting). For each task, two Stroop conditions (incongruent and neutral) were administered. Four measurement parameters (Stroop interference of percentage of correct responses and response time, and cognitive interference of ABR wave V amplitude and latency) were analysed using within-group comparisons to examine differences between the two types of Stroop task.

Results: No statistically significant differences were observed in any measurement parameters between the two types of Stroop task for either age group. However, medium to large effect sizes were found among children in Stroop interference of response time and cognitive interference of wave V amplitude.

Conclusion: Although no significant differences were identified, the colour-word Stroop task appeared to elicit slightly stronger cognitive interference in children, potentially reflecting greater inhibitory control demands. Clinically, these findings suggest that combining the colour-word Stroop task with ABR testing may provide a more sensitive approach for assessing inhibitory control of auditory sensory gating at the brainstem level in children and for identifying those with atypical inhibitory control abilities such as those with auditory processing disorder.

Keywords: Auditory sensory gating, Auditory Brainstem Response, Stroop Task

Posters

Others

PD 331

Cognitive and Psychological Impact of Speech–Text Time Lags on Individuals Who Are Hard of Hearing

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Purpose: Speech recognition systems are an accessible method for students who are hard of hearing to understand speech messages. However, previous studies have reported that these systems can cause speech mistranslation and text time lags, thus hindering comprehension; but it is unclear how such time lags and text errors affect individuals who are hard of hearing. Therefore, this study examined the psychological and cognitive effects of understanding both speech messages and the text presented after the speech.
Research methods: Twenty participants with normal hearing (NH; mean age: 23.5 yr) and eight participants who are hard of hearing (HH; mean age: 22.1 yr) completed a speech and text comprehension task. Short stories were presented aurally, with the corresponding text captions displayed on a computer screen under three time-lag conditions: 0 s (presented simultaneously), 2 s, and 4 s. Each task contained 20 word errors. The participants pressed the spacebar whenever they detected discrepancies between speech and text information. Thereafter, they a comprehension task was administered, and their listening effort was assessed using a psychological scale. Differences among participant groups and across conditions were compared and statistically examined using Friedman's test.
Results: The mean error detection rate decreased with a longer time lag in both groups (HH: $x2(2)=35.6$, $p<0.01$; HH: $x2(2)=12.1$, $p<0.05$). In the comprehension task, there were no differences in accuracy between the groups. Listening effort increased significantly as the time lag increased (NH: $x2(2)=35.4$, $p<0.01$; HH: $x2(2)=15.5$, $p<0.01$).
Conclusion: The results indicate that the time lag and errors between speech and text information affected participants' cognitive load and listening effort. In particular, even with a short time lag, the HH group showed a significant increase in listening effort. Clarifying these time-lag and error effects can help develop better speech recognition systems for such individuals.

Keywords: Individuals with hard of hearing, Speech recognition system, Listening effort

Posters

Others

PD 332

Navigating Primary Care with Hearing Loss: A Mixed Methods Study of Lived and Professional Experiences in the United Kingdom

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Introduction: Hearing loss is estimated to affect one in every three UK adults. This long-term, progressive condition can substantially impair quality-of-life. Evidence suggests that it is a substantial, yet frequently overlooked, barrier to accessing healthcare. This research aimed to (1) examine the challenges experienced by adults living with hearing loss in UK primary care services (e.g, general practice, dentistry, community pharmacy) and (2) partner with experts by experience and experts by profession to develop recommendations for overcoming these challenges.

Method: The participants (N=413) were adults living with hearing loss and clinicians recruited from an internal participant database, professional societies, and charities. Their experiences were examined via a survey (n=400) and individual and group interviews (n=45). Recommendations for improving primary care were developed through nine co-design workshops with an expert panel (n=18).

Results: Adults living with hearing loss can experience challenges (e.g, communication barriers, lack of awareness and facilities) at every stage of accessing and using primary care services (e.g, booking appointments, adhering to care plans). They can struggle to obtain hearing healthcare, including referrals to audiology services, sudden hearing loss treatment, and information about hearing loss. This can impact safety, privacy, trust, and physical, mental, and social functioning. Recommendations for overcoming these challenges included staff and student training, hearing loss champions, standardised communication protocols, technology (e.g, speech-to-text applications), and psychosocial interventions (e.g, counselling, support groups). Perceived impediments to implementing these recommendations included time and financial constraints and prioritisation of other health conditions.

Conclusion: This study provides novel insights on the experiences of adults living with hearing loss in UK primary care services and has key implications for health professionals and policymakers. The findings suggest that, despite legal requirements (e.g, Accessible Information Standard) and efforts to improve Deaf awareness, many people living with hearing loss remain under-served in primary care.

Keywords: Primary Care, Hearing Loss, Co-design

Posters

Others
PD 333

The advantages of a clinical nurse specialist as part of the audiology and hearing implant team

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ENT is often based in close proximity to audiology and hearing implant departments. There may be occasional access for patient care and advice but this tends to be dependant on clinic wait times and if there is someone available to help.
Guy's and St.Thomas' is amongst the first NHS Trusts to employ a nurse dedicated to patients under the care of the audiology and hearing implant department.
This poster will highlight the role of the clinical nurse specialist (CNS) and show the benefits it brings to the audiology department.
Microsuction can be carried out when ear care is required increasing the success of a fulfilled audiology appointment and improving patient access to treatment.
Skin integrity is a crucial consideration in the management and care of individuals with hearing implants. Maintaining optimal skin integrity around the implant site is essential to prevent complications like infections, pressure ulcers or device related irritation. Promoting the long term success and functionality of the hearing implants while minimizing discomfort or adverse outcomes for the patient is a vital part of the nurses role.
50% of adults with hearing implants under our care are elderly and/ or have medical co-morbidities which could create a barrier to accessing clinic based services. Increasingly, they are vulnerable adults with hearing health and communication impacted by cognitive decline including dementia. Domiciliary visits to these patients can be booked with microsuction carried out at home.
All medical queries are now managed by the CNS which has resulted in timely patient/ clinician advice and treatment options.
The CNS is teaching and supervising all the audiologists to remove wax which is very beneficial in outreach and domiciliary appointments.
Research is such a large part of audiology and nursing research in skin integrity, medical concerns and the improved audiology pathways offers a different perspective.

Keywords: Clinical nurse specialist, Ear care, Skin integrity

Posters

Others
PD 334

Persian version of the Swedish Metaphor Questionnaire: Translation and psychometrics evaluation

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Background and Objectives: Metaphors are a reflection of abstract thinking and outlook on life. In hearing-impaired individuals, metaphor processing may be distinct due to limitations in linguistic input. The aim of this study is to translate, culturally localize, and psychometrically validate the Swedish Metaphor Comprehension Questionnaire (developed by Dalby Skoog et al.) for use in the Persian-speaking hearing-impaired community.

Methods: This descriptive-analytical study was conducted with an instrument validation approach. The questionnaire consists of 23 target words that are presented in pairs in both metaphorical and literal forms and are assessed randomly. After obtaining content validity, the instrument was administered to 200 hearing-impaired individuals (18 to 45 years old). Construct validity was assessed with exploratory and confirmatory factor analysis, and reliability was assessed with Cronbach's alpha and test-retest.

Findings: Exploratory factor analysis showed satisfactory results and confirmed the expected four-factor structure, which explained a total of 67% of the total variance. The model also had a good fit in confirmatory factor analysis (CFI=0.94, RMSEA=0.05). The internal reliability coefficient (Cronbach's alpha) was 0.88 and the test-retest correlation was 0.82, indicating the desired stability of the instrument.

Conclusion: The Persian version of the Metaphor Comprehension Questionnaire, which was developed based on a valid Swedish instrument and conforms to its specific paired structure, has appropriate validity and reliability. This instrument can be used as a valid tool to assess the cognitive capacity of hearing-impaired individuals in interpreting metaphors, which is a reflection of their understanding of abstract concepts and their attitude to the world.

Keywords: Metaphor Comprehension, Hearing loss, Metaphor Questionnaire

Posters

Others
PD 335

A Longitudinal Comparison of Language Production in Broca's Aphasia With and Without Hearing Loss

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Hearing impairment affects language processing. During stroke recovery, it can significantly influence language outcomes, yet its impact is often overlooked in clinical practice. Aphasia, most commonly caused by stroke, disrupts language comprehension and production. When hearing loss co-occurs, access to auditory input is reduced, which limits opportunities for linguistic exposure and neural reorganization. Developmental research shows that hearing impairment affects the production of grammatical forms such as tense markers and possessive morphemes. However, very few studies have examined how hearing impairment affects language recovery in adults with aphasia.

This study examined the trajectory of language production across four time points in two individuals with chronic Broca's aphasia: one with typical hearing and one with hearing loss. Both participants were classified as having Broca's aphasia based on Western Aphasia Battery–Revised scores, and their stroke lesions were located in the middle cerebral artery territory, which primarily supports the brain's language network.

Both participants completed multiple spoken language tasks, including open-ended interviews and picture description tasks. Language samples were analyzed at the micro-linguistic level, examining morpheme errors and missing referents, and at the macro-linguistic level, evaluating overall message clarity and completeness.

Findings showed distinct patterns of change in language production across the two participants. The individual with hearing loss demonstrated reduced grammatical production compared to the participant with typical hearing across four time points. Patterns also varied across language tasks, suggesting that task demands place different cognitive loads during clinical assessment. Although the findings are limited by the small sample size and chronic stage of aphasia, they underscore the need for further research on the impact of hearing impairment in aphasia. Longitudinal studies from the acute to chronic stage are needed to clarify how hearing loss shapes recovery and emphasize the importance of integrating hearing assessment into rehabilitation planning.

Keywords: Hearing impairment, Aphasia, Language Production

Posters

Others
PD 336

Analysis of Cochlear Duct Length Based on Computed Tomography Images of Temporal Bones in Patients of the Institute of Physiology and Pathology of Hearing

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Objective: To analyse cochlear length in the Polish population and establish normative reference values, including sex-specific differences, USING computed tomography (CT) imaging of the temporal bone.

Material and method: A total of 1056 cochleae were examined, derived from 528 individuals. Of these, 517 (49%) belonged to females and 539 (51%) to males. Inclusion criteria were normal cochlear morphology and high-quality imaging data.

High-resolution temporal bone CT images were analysed using OTOPLAN software. An experienced radiologist performed all measurements of the cochlear duct.

Mean cochlear duct length and its distribution within the Polish population, with analysis of sex-related differences and categorisation into terciles for both sexes.

Results: The mean cochlear length in the total population was 35.51 mm (SD = 1.75; range 27.1–41.2 mm). Although the distribution was approximately normal, statistical testing revealed significant deviations ($p < 0.001$). Female cochleae were significantly shorter than male cochleae (M = 34.96 mm; SD = 1.61 vs. M = 36.00 mm; SD = 1.73; $p < 0.001$). The sex-specific tercile boundaries were as follows: for females, ≤34.4 mm (short), 34.5–35.4 mm (average) and ≥35.5 mm (long); and for males, ≤35.4 mm, 35.5–36.7 mm and ≥36.8 mm.

Conclusions: This study provides the first normative data on cochlear length in the Polish population. These results can serve as a reference for comparative international comparisons and support clinical decision-making in cochlear implant electrode selection and surgical planning.

Keywords: Temporal bone, CT, Cochlear duct

Posters

Others

PD 337

Chemical Sympathectomy with 6-OHDA Attenuates Noise-Induced Hearing Loss and Cochlear Inflammation

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Background: Noise-induced hearing loss (NIHL) is a major global cause of preventable sensorineural hearing loss. Emerging evidence suggests that sympathetic nervous system activation contributes to cochlear inflammatory responses following acoustic trauma. This study investigated whether chemical sympathectomy with 6-hydroxydopamine (6-OHDA) mitigates noise-induced cochlear damage.

Methods: CBA/CaJ mice were exposed to 106-dB broadband noise for 2 hours and treated with systemic 6-OHDA or vehicle. Sympathetic activity was assessed using subcutaneous nerve activity (SCNA). Auditory thresholds were measured by auditory brainstem responses (ABR) and outer hair cell function by distortion product otoacoustic emissions (DPOAEs). Cochlear pathology was examined by quantification of outer hair cell loss, cochlear inflammatory gene expression (Il-1β, Tnf-α, Ccl2, Ccl4, Ccl12), and Iba1+ macrophage infiltration.

Results: 6-OHDA markedly reduced sympathetic bursts at rest and during cold-pressor challenge, confirming effective sympathectomy. Noise exposure induced a permanent threshold shift of ~25–35 dB, whereas 6-OHDA treatment significantly attenuated threshold elevations across frequencies. 6-OHDA preserved DPOAE amplitudes and reduced noise-induced outer hair cell loss. Genetic expression of inflammatory cytokines and chemokines was strongly upregulated after noise exposure but substantially suppressed by 6-OHDA. Additionally, 6-OHDA reduced Iba1+ macrophage infiltration in the cochlea.

Conclusion: Chemical sympathectomy with 6-OHDA protects against NIHL by suppressing sympathetic-driven cochlear inflammation and macrophage recruitment while preserving outer hair cell structure and function. These findings identify the sympathetic nervous system as a promising neuro-immune therapeutic target for preventing noise-induced cochlear injury.

Keywords: Noise-induced hearing loss, 6-OHDA, Sympathetic nervous system

Posters

Others

PD 338

The effect of cognitive cues on acoustic parameters of speech prosody in Children With and Without Hearing Impairment

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Background: Speech prosody is critical for effective communication, yet its acquisition can be challenging for children with hearing impairment (HI). While traditional therapeutic approaches often rely on direct imitation, the cognitive cueing approach offers an alternative by using semantic imagery to elicit intended vocal behaviors. This study aimed to investigate the efficacy of cognitive cues in modifying key acoustic parameters of speech prosody in children with hearing impairment and their typically developing peers.

Methods: A quasi-experimental, pre-test/post-test design was employed. The study included 60 children with hearing loss and a control group of 120 typically developing children. Participants were instructed to read a set of six specially designed sentences. These sentences were recorded, after which cognitive cues related to keywords within the sentences were provided. Participants then read the sentences a second time. Acoustic parameters of prosody including fundamental frequency (F0), intensity, and duration were extracted and analyzed using Praat software to measure changes between the pre- and post-cue readings.

Results: Post-intervention analysis revealed significant modulations in prosodic parameters. For both groups, mean F0 increased significantly across nearly all sentences ($p<0.05$). Mean intensity was significantly altered in alignment with the semantic intent of the cues, increasing for sentences with keywords like "aloud," "push," "up," and "happy," and decreasing for "slowly" and "sad" ($p<0.05$). Furthermore, significant changes in utterance duration were observed across all six sentences for all participants ($p<0.05$).

Conclusion: The findings demonstrate that cognitive cues can effectively modify the acoustic components of speech prosody in both typically developing children and those with hearing loss. This approach successfully alters vocal output without relying on an external auditory model, suggesting that leveraging internal mental representations is a viable therapeutic strategy. Future research should explore the broader application of this cognitive-based intervention for remediating prosodic deficits across diverse pediatric speech disorders.

Keywords: Cognitive cues, Acoustic parameters, Hearing Impairment

Posters

Others

PD 339

Improved efficiency in hearing care delivery via community-based care

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Background
Public hospitals in Singapore face challenges with increasing lead time for hearing aid evaluation appointments (HAE) due to surging demand for hearing aids from an ageing population and availability of government hearing aid subsidies. An internal survey showed that the lead time for HAE can reach up to nine months. Seniors with hearing impairment face a higher risk of cognitive decline due to sensory deprivation and social isolation. Therefore, early hearing intervention is crucial and one potential solution is by delivering hearing care in the community.

Aim
This study aims to evaluate the system efficiency of a community functional hearing screening programme (CFHSP) as compared to standard care for community-dwelling seniors aged 60 and above in Singapore who were recommended for hearing aid fitting.

Method
A retrospective cohort study was conducted using data from 2021-2023, comparing 656 patients in the usual care pathway with 229 patients in CFHSP who received hearing aid fitting. Across these two patient groups, two primary outcomes were compared, and they included time to HAE (TTHAE) and time to hearing aid fitting (TTHAF). Statistical analysis was performed using Mann-Whitney U tests, Chi-square tests and Quantile regression.

Results
Compared to usual care patients, CFHSP patients experienced 21.5% shorter TTHAF compared to usual care (172 vs 219 days, $p<0.001$). CFHSP patients without specialist referral showed the greatest benefit (150 vs 219 days, 31.5% reduction), whilst CFHSP patients requiring specialist consultation showed no significant difference in TTHAF compared to those undergoing usual care (230 vs 219 days, $p=0.466$).

Conclusion
CFHSP significantly improves system efficiency for simple hearing loss cases, reducing overall TTHAF by approximately one-third. However, complex cases requiring specialist intervention derive limited benefit from the screening pathway. The programme demonstrates value in redistributing healthcare resources and improving workflow for community-dwelling seniors with straightforward hearing impairments.

Keywords: Community-based care, Hearing, Hearing aid fitting

Posters

Others

PD 340

ECAP results in patients with long term deprivation without any auditory stimulation & rehabilitation & hearing Aid using

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Introduction: ECAP is represent a synchronous response from a population of individual auditory neurons that are stimulated electrically. e-CAP presence of an e-CAP provides evidence that the Cochlear Implant(CI) is providing stimulation & auditory nerve that is responding to electrical stimulation sufficiently. But we have a key word as *Auditory Deprivation* that as it rule , the response & reaction of nerve that is not activated & stimulated for long time decreased significantly:(Use It or Loss It) !! in this study we compare the response of VIII nerve with electrical stimulation at first time intraoperatively.

Method: We have 35 patients with severe to profound SNHL pre-lingually without any noticeable using time of hearing aid that implanted with CI prothesis & measuring the e-CAP&ESRT (Electrical Stapedius Reflex Threshold) as a tool for mearing of VIII nerve function & response & compare with control group with same situation in HL level , age & sex but difference in using hearing aid sufficiently before surgery time. The test performed intraoperatively in same situations & results compare with each other in special software.

Results: the results in e-CAP test show no significantly difference between 2 groups in morphology , thresholds but some difference between intensity function growth . But the ESRT showed difference without no advantage or superiority for special group. in some patient in first group the ESRT was disappeared & in some patient in second group is vice versa.

Conclusion: if we accepted the plasticity & deprivation rules about the auditory nerve we have expectation to see difference in function & response of VIII nerve at first time electrical stimulation in group with sufficient auditory stimulation before surgery compare to other group. the results shows that less time of hearing aid using had no significant effect on e-CAP results intraoperatively.

Keywords: Cochlear Implant - speech possessing- plasticity, EABR-, ECAP

Posters

Others

PD 341

ReSound Clear Focus outperforms Front Focus in Challenging Listening Situations

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Modern hearing aids are commonly fitted with both automatic and manually selectable listening programs. Automatic programs allow users to benefit from advanced sound processing without needing to analyze the listening environment or take explicit action beyond wearing the hearing aids. However, the settings chosen by the automatic classifier may not always align with the user's intent, and some sound processing features may be deliberately constrained to preserve a seamless, transparent listening experience. In contrast, manu-ally selectable programs can be optimized for situations where the user has a clear goal, such as maximiz-ing audibility of a talker in noisy environments.

ReSound hearing aids offer a manually selectable "Hear in Noise" program that applies strong noise man-agement to support such intent driven listening. In ReSound Vivia, an upgraded 4 microphone beamformer (Clear Focus) was introduced in this program, extending the low frequency bandwidth of directional pro-cessing relative to the legacy Front Focus solution. It was anticipated that this enhancement would increase directional benefit for users who actively select the Hear in Noise program.

A clinical study was conducted to compare speech recognition in noise for people fitted with hearing aids using Clear Focus versus Front Focus in the Hear in Noise program. Speech recognition in noise was as-sessed with frontal target speech and competing noise from other angles, and directional benefit was de-rived from speech reception thresholds. The upgraded Clear Focus beamformer yielded a statistically signif-icant improvement in directional benefit of 1 dB compared to the legacy Front Focus feature, confirming a measurable advantage of the enhanced directional processing in the Hear in Noise program.

Keywords: Speech in noise, Directional processing, Hearing aids

Posters

Others

PD 342

Large-Scale School-Based Hearing Screening Using a Web-Based Platform: Prevalence and Implementation Outcomes in West Java Students

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Background:
Hearing loss in school-aged children remains underrecognized, particularly in low- and middle-income settings where structured screening programs are limited. Digital screening tools may offer scalable solutions for early detection.

Purpose:
To evaluate the prevalence of hearing impairment and implementation outcomes of a large-scale web-based hearing screening program among school-aged children.

Methods:
A cross-sectional study was conducted involving 4,716 students from elementary to senior high schools in West Java, Indonesia. Hearing screening was performed using Screen-H, a web-based platform. Students with abnormal screening results were referred for confirmatory pure-tone audiometry. Descriptive analysis was used to assess prevalence, distribution of hearing loss, and follow-up rates.

Results:
Of 4,716 students screened, 384 (8.1%) were identified with suspected hearing impairment. Unilateral hearing loss predominated (76%), while bilateral cases accounted for 24%. Among those who screened positive, 234 students (61%) underwent confirmatory audiometry, all of whom were diagnosed with hearing impairment, consisting of 174 (74%) unilateral and 60 (26%) bilateral cases. The high confirmation rate among tested individuals suggests strong positive predictive performance of the screening tool, although this finding should be interpreted cautiously due to partial verification.

Conclusion:
This large-scale screening program reveals a substantial burden of hearing impairment among school-aged children, with unilateral hearing loss as the predominant presentation. The web-based Screen-H tool offers a practical and scalable approach for early detection; however, strengthening follow-up pathways is essential to optimize program effectiveness.

Keywords: Hearing loss, School-based screening, Web-based

Posters

Others

PD 343

Reliability of Bone-Conducted cervical Vestibular- Evoked Myogenic Potentials in newborns: A prospective study

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Background/Objectives: Vestibular function assessment in newborns and infants is demanding. To develop age-appropriate methods for vestibular investigation in infancy we studied whether Bone-Conducted cervical Vestibular-Evoked Myogenic Potentials (BCcVEMP) is reliable. We also outlined BCcVEMP wave values in newborns and compared them with values obtained at one year of age in the same cohort.

Materials and Methods: We enrolled 53 infants; median age 6.4 weeks (IQR 8.29). The infants were referred to the Hearing and Balance outpatient department of Karolinska University Hospital due to perinatal risk factors for inner ear impairment. The study was conducted between January 2021 and December 2022. We tested BCcVEMP in all participants within a few weeks after birth. The same group was tested again at approximately one year of age with the same protocol. We assessed each ear independently and recorded responses in the number of ears. We calculated and compared BCcVEMP wave latencies and amplitudes between the two test trials.

Results: We identified vestibular responses in 72.6% of the tested ears (n=77 ears) during the newborn testing and in 94% (n=92 ears) during the one-year follow up. There was a 75% chance of a response in the first test among the newborns with a positive predictive value of 94.5%. There was statistically significant difference in wave reproducibility (WR), P13, N23 and P13-N23 wave latencies; there was no statistically significant difference in the P13-N13 scaled amplitude ratio between the two test trials.

Conclusions: Our findings support the use of BCcVEMP as a reliable method to confirm vestibular function in newborns and it can be used as vestibular screening beside the hearing screening; the test should only be repeated in those cases with a failed outcome.

Keywords: Bone-Conducted cervical Vestibular-Evoked Myogenic Potentials, vestibular function tests, newborns, infants



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