



## Letters to the Editor

### The effectiveness of scoliosis treatment is not a matter of the type of brace



To the Editor,

We congratulate the authors of the paper “Providence night-time brace is as effective as fulltime Boston brace for female patients with adolescent idiopathic scoliosis: A retrospective analysis of a randomized cohort” [1]. However, there are some important considerations about this paper and, more broadly, about how research is performed in this specific field. In synthesis: results do not depend on the type of brace but on the treating team and how compliance issues are managed.

The demonstrated factors which influence the effectiveness of brace treatment include: its design, the correction ability, the applied dosage, and the aggressiveness of scoliosis. In research, we can control the latter element with study design and well-balanced groups, the other 3 elements depend on the treating team.

The correction of a brace is judged through in-brace radiography. While the lack of radiographic in-brace correction is a strong negative predictive factor for treatment success [2], experts suggest focusing more on the 3-dimensional action of the brace [3]. Nevertheless, the optimal level of correction is still to be determined. Unfortunately, in this case, the 2 studied braces will provide not comparable radiographic in-brace information because of their overall action: overcorrective bending versus 3-point. According to the internationally accepted brace classification, the overall action of the Providence brace is “bending” to achieve overcorrection on the “frontal” plane, possible because the brace is not meant to be worn standing. Contrarily, the Boston brace is done during activities of daily life and the action is “3-point” on the “frontal and transverse” planes [4].

The decision about brace dosage is the other key and even more complicated decisional factor [2]. It depends on risk assessment, goals and the beliefs of the treating physician, the family’s commitment and acceptance of the prescription by the adolescent. Recent evidence suggests the role of numerous baseline psychosocial factors associated with future compliance [5] It’s clear that compliance goes beyond factors related to the “brace tool” [6]. Other members of the treating team can make a difference in helping compliance. The orthotist, in addition to being skilled and well trained, should have the ability to properly interact with the patient in the delicate moments of brace building, fitting, and check [7]. Another fundamental element too often underestimated is the physiotherapist who isn’t just the “exercise expert,” but also someone whose evaluation of the brace can move the balance from increasing to reducing the compliance [8]. Full-time brace wear showed to be more effective than part time and dosage of brace wear showed to be the

principal factor leading to better end of growth results. All these factors involved in compliance can explain different results [9].

Sometimes it’s hard for parents to accept such demanding treatment, and they must be well-informed about the risks of scoliosis and the potential benefits of treatment [10]. All the team at large (therapeutic and family) should support the adolescent along this journey to make it successful, applying the principles of psychologically informed clinical practice [11]. When necessary, the team should include a psychologist for further help.

Implementing all these elements cannot guarantee a 100% success rate. Still, the association of well-designed and built braces, together with the commitment of the treating team, can raise compliance up to 95% even with full-time braces [12]. These are the keys to the success of conservative scoliosis treatment.

### Declarations of competing interest

One or more of the authors declare financial or professional relationships on ICMJE-NASSJ disclosure forms.

### References

- [1] Capek V, Westin O, Brisby H, Wessberg P. Providence nighttime brace is as effective as fulltime Boston brace for female patients with adolescent idiopathic scoliosis: a retrospective analysis of a randomized cohort. *N Am Spine Soc J* 2022;12:100178. doi:10.1016/j.xnsj.2022.100178.
- [2] van den Bogaart M, van Royen BJ, Haanstra TM, et al. Predictive factors for brace treatment outcome in adolescent idiopathic scoliosis: a best-evidence synthesis. *Eur Spine J* 2019;28(3):511–25. doi:10.1007/s00586-018-05870-6.
- [3] Guy A, Labelle H, Barchi S, Aubin CÉ. The impact of immediate in-brace 3D corrections on curve evolution after two years of treatment: preliminary results. *Stud Health Technol Inform* 2021;280:163–7. doi:10.3233/SHTI210459.
- [4] Negrini S, Aulisa AG, Cerny P, et al. The classification of scoliosis braces developed by SOSORT with SRS, ISPO, and POSNA and approved by ESPRM. *Eur Spine J* 2022;31(4):980–9. doi:10.1007/s00586-022-07131-z.
- [5] Gornitzky AL, England P, Kiani SN, et al. Why don’t adolescents wear their brace? a prospective study investigating psychosocial characteristics that predict scoliosis brace wear. *J Pediatr Orthop* 2023;43:51–60. doi:10.1097/BPO.0000000000002272.
- [6] Shaughnessy WJ. Advances in scoliosis brace treatment for adolescent idiopathic scoliosis. *Orthop Clin North Am* 2007;38:469–75 v. doi:10.1016/j.ocl.2007.07.002.
- [7] Negrini S, Grivas TB, Kotwicki T, et al. Guidelines on “Standards of management of idiopathic scoliosis with corrective braces in everyday clinics and in clinical research”: SOSORT consensus 2008. *Scoliosis* 2009;4:2. doi:10.1186/1748-7161-4-2.
- [8] Tavernaro M, Pellegrini A, Tessadri F, et al. Team care to cure adolescents with braces (avoiding low quality of life, pain and bad compliance): a case-control retrospective study. 2011 SOSORT award winner. *Scoliosis* 2012;7:17. doi:10.1186/1748-7161-7-17.
- [9] Dolan LA, Donzelli S, Zaina F, et al. AIS bracing success is influenced by time in brace: comparative effectiveness analysis of BRAIST and ISICO cohorts. *Spine* 2020;45(17):1193–9. doi:10.1097/BRS.0000000000003506.
- [10] Motyer G, Dooley B, Kiely P, Fitzgerald A. Parents’ information needs, treatment concerns, and psychological well-being when their child is diagnosed with adolescent idiopathic scoliosis: a systematic review. *Patient Educ Couns* 2020;104(6):1347–55. doi:10.1016/j.pec.2020.11.023.

FDA device/drug status: Not applicable.

Author disclosures: **FZ**: Nothing to disclose. **SD**: Nothing to disclose. **SN**: Stock Ownership: ISICO (28% ownership), (C).

<https://doi.org/10.1016/j.xnsj.2023.100218>

Received 21 February 2023; Received in revised form 28 March 2023; Accepted 7 April 2023

Available online 14 April 2023

2666-5484/© 2023 The Author(s). Published by Elsevier Ltd on behalf of North American Spine Society. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

- [11] Provost M, Beauséjour M, Ishimo M-C, et al. Development of a model of inter-professional support interventions to enhance brace adherence in adolescents with idiopathic scoliosis: a qualitative study. *BMC Musculoskelet Disord* 2022;23:406. doi:[10.1186/s12891-022-05359-w](https://doi.org/10.1186/s12891-022-05359-w).
- [12] Donzelli S, Zaina F, Negrini S. In defense of adolescents: they really do use braces for the hours prescribed, if good help is provided. Results from a prospective everyday clinic cohort using thermobrace. *Scoliosis* 2012;7:12. doi:[10.1186/1748-7161-7-12](https://doi.org/10.1186/1748-7161-7-12).

\*Corresponding author at: ISICO (Italian Scientific Spine Institute),  
Via Roberto Bellarmino 13/1, 20141, Milan, Italy.  
E-mail address: [fabio.zaina@isico.it](mailto:fabio.zaina@isico.it) (F. Zaina)

Received 21 February 2023  
Revised 28 March 2023  
Accepted 7 April 2023

Fabio Zaina, MD\*, Sabrina Donzelli, MD  
*ISICO (Italian Scientific Spine Institute), Milan, Italy*

Stefano Negrini, MD, PhD  
*Department of Biomedical, Surgical and Dental Sciences, University "La  
Statale", Milan, Italy*  
*IRCCS Istituto Ortopedico Galeazzi, Milan, Italy*