BOOK OF ABSTRACTS

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Edited by:
Marcora, S., Narici, M., Paoli, A., De Vito, G., Tsolakidis, E.,
Thompson, J.L., Ferrauti, A., Piacentini, M.F.

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was conducted to compare CMJ performance between sessions and across recovery intervals. OPT distribution was tested using the Smirnov-Kolmogorov test.

RESULTS: CMJ performance declined two minutes after seated rest (34.7±6.2 vs 33.6±6.6 cm) but returned to baseline levels for the remainder of the control session, indicating that the assessment protocol did not induce significant potentiation. In the experimental session, CMJ performance was significantly higher than baseline (33.3±7.0 cm) at all time points post-CA (2 min: 35.6±6.9 cm; 4 min: 36.1±7.0 cm; 6 min: 35.9±6.7 cm; 8 min: 35.5±6.5 cm; 10 min: 35.1±6.3 cm). The mean, median and mode OPT were 4.8, 4.0, and 4.0, respectively. OPT distribution was non-gaussian (D[46] = 0.236, $p < 0.01$,).

CONCLUSION: Our findings support the data reported by Xu et al. [1] demonstrating that the mean OPT is approximately 5.5 minutes post-CA. Our hypothesis that OPT distribution would not be normal was confirmed by the obtained data, suggesting that individualized post-CA recovery intervals should be adopted when designing protocols aimed at inducing PAPE.

[1] Xu, K. et al. (2025). Optimizing post-activation performance enhancement in athletic tasks: a systematic review with meta-analysis for prescription variables and research methods. Sports Med, Online ahead of print.

DOES ACUTE SLEEP RESTRICTION NEGATIVELY AFFECT MAXIMAL STRENGTH, MUSCLE POWER, STRENGTH ENDURANCE, AND PSYCHOLOGICAL READINESS IN RESISTANCE-TRAINED WOMEN? PRELIMINARY RESULTS OF RANDOMIZED CONTROLL

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INTRODUCTION: Sleep is essential for optimal physical and cognitive performance, yet its effects on resistance exercise performance remain unclear in women. This study aimed to investigate the effects of acute sleep restriction on maximal strength, muscle power, and strength endurance in resistance-trained women.

METHODS: Eight resistance-trained women (age:25±4 years; BMI:23.0±2.8 kg/m2) participated in a randomized, counterbalanced, crossover study, completing two identical experimental sessions under different sleep conditions: a) night of habitual sleep (HS) and b) acute sleep restriction (SR) at the beginning of the night (i.e. 3 hours less than habitual sleep with a delayed bedtime). Sleep was monitored using wristwatch actigraphy (MotionWatch8, CamNtech, Neurotechnology Ltd., Cambridge, UK) to ensure compliance. Each session took place at the same time (~09:00am) and included: a) one repetition maximum test (1RM) in bench press exercise; b) three sets of three repetitions of explosive bench press exercise at 50%1RM; c) countermovement jump (CMJ) and d) strength endurance test in the bench press exercise at 50% 1RM. Before testing, participants completed: a) the Readiness-to-Train Questionnaire (RTT-Q) and b) the Self-Assessment Manikin questionnaire (SAM) to assess arousal and valence. Immediately after testing, ratings of perceived exertion (RPE; 6-20) and pain levels on visual analogue scale (VAS; 0-10) were obtained. Difference between conditions was determined by paired T-tests or Wilcoxons tests according to data distribution, except explosive bench press exercise, where a two-way ANOVA was applied. Effect sizes (ES) were calculated using Hedge's.

RESULTS: No significant differences between HS and SR conditions were observed in: a) 1RM (45.9±5.1 kg vs 44.4±5.6 kg; p=0.14; ES=0.26; Δ=-3.3%); b) peak (1.52±0.15 m/s vs. 1.42±0.23 m/s; p=0.13; ES=0.49; Δ=-6.6%), and mean (1.12±0.11 m/s vs. 1.00±0.15 m/s; p=0.05; ES=0.86; Δ=-10.7%) bar velocity during explosive bench press exercise; c) CMJ (28.6±4.8 cm vs 29.0±6.3 cm; p=0.22; ES=-0.07; Δ=1.4%) and d) number of repetitions during strength endurance test (37±9 vs 34±6; p=0.22; ES=0.37; Δ=-8.1%). Significant differences between HS and SR conditions were noted on SAM scores for arousal (62±19 arbitrary unit a.u.) vs 36±12 a.u. ; p=0.01; ES=1.55), dominance (71±21 a.u. vs 43±19 a.u.; p=0.02; ES=1.32) and valence (77±22 a.u. vs 45±27 a.u. ; p=0.01; ES=1.23), without changes in RTT-Q, RPE and VAS.

CONCLUSION: Acute sleep restriction (3-hour reduction) does not significantly impair maximal strength, muscle power, or strength endurance in resistance-trained women. However, reduced emotional state scores indicate a negative impact on mood and psychological readiness. While short-term sleep loss may not immediately affect physical performance, it could influence motivation and long-term outcomes. Further research is needed to explore the relationship between emotional state and resistance training performance after sleep restriction.

ACUTE EFFECTS OF DIFFERENT STRETCHING TECHNIQUES ON REGIONAL MUSCLE STIFFNESS OF THE GASTROCNEMIUS MEDIALIS ASSESSED WITH SHEAR-WAVE ELASTOGRAPHY

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INTRODUCTION: Stretching can acutely increase the maximum range of motion (ROMmax). However, its effects on muscle mechanical properties vary depending on the type, intensity, and duration of the stretching maneuver. Shear-wave elastography (SWE) was used to assess muscle stiffness by measuring ultrasound wave speed through the tissue. This speed can be converted into modulus (μ, kPa), providing an estimate of tissue elasticity. Recently, SWE has been applied to investigate stretch-induced changes in muscle stiffness. Since different muscle regions may exhibit different μ values, we examined whether three stretching protocols affected μ differently in two muscle regions.

METHODS: Twelve participants (8 men, 4 women; mean±SD: age = 23.9±2.4 years, body mass = 69.8±10.6 kg, height = 172.0±8.5 cm) completed three stretching sessions on separate days. ROMmax was assessed. GM stiffness (μ) was measured using SWE (V8, Samsung Healthcare, Seoul, Korea) at both a neutral ankle angle (90°) and at 80%ROMmax in the middle muscle portion (GMmid) and the muscular region of the GM myotendinous junction (MTJ). Measurements were taken PRE and immediately POST 5×30-s passive static stretching (PS30, 30-s inter-set rest), 5×45-s PS (PS45, 15-s inter-set rest), and 5×30-rep dynamic stretching (DS, 30-s inter-set rest). The order was randomized. The same absolute angle at 80%ROMmax was used in POST evaluations. Within-day reliability was assessed before stretching using intraclass correlation coefficient (ICC) analysis. Data were analysed with repeated-measures ANOVA (within-factors: stretching type, region, ankle angle, time) at $p<0.05$, with Bonferroni correction for pairwise comparisons.

RESULTS: ICCs were >0.80 for all parameters. No significant differences were found at PRE across the three days ($p>0.05$). No main interactions were observed ($p>0.05$). PS30 increased ROMmax (8.4%, $p<0.01$) and decreased GMmid μ at 80%ROMmax (−17.6%, $p<0.01$). PS45 increased ROMmax (7.8%, $p<0.01$) and decreased GMmid μ at 80%ROMmax (−14.2%, $p<0.01$), as well as MTJ μ at both 90° (−13.4%, $p<0.01$) and 80%ROMmax (−8.6%, $p<0.01$). DS increased ROMmax (11.1%, $p<0.01$) and reduced GMmid μ at 80%ROMmax (−12.5%, $p<0.01$) and MTJ μ at 90° (−12.7%, $p<0.01$), while the decrease at 80%ROMmax was not significant (−8.3%, $p>0.05$).

CONCLUSION: This study highlights that stretching-induced changes in muscle stiffness can be region-specific and depend on the protocol used. Longer-duration static stretching was more effective in reducing stiffness across GM regions. Dynamic stretching improved ROMmax but had a more limited impact on muscle stiffness, particularly at the MTJ. However, the small sample size and variability in μ may have influenced these findings.

Hirata K et al. (2016). DOI: 10.1007/s00421-016-3349-3.

Hirata K et al. (2019). DOI: 10.1249/MSS.0000000000002186.

Maeda N et al. (2017). PMID: 29238251.

TRAINING LOAD AND RECOVERY IN ELITE VOLLEYBALL PLAYERS: NEUROMUSCULAR, PSYCHOLOGICAL, AND SOCIAL PERSPECTIVES

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INTRODUCTION: Optimizing recovery is important for sustaining performance and minimizing injury risk in elite team sports. Training load is commonly divided into internal (ITL) and external (ETL) components, both of which influence various aspects of recovery. However, the extent to which ITL and ETL impact neuromuscular, psychological, and social recovery in elite volleyball remains unclear. This study investigated the associations between training load metrics and recovery dimensions over a 105-day competitive period.

METHODS: Fourteen elite male volleyball players participated in 95 training sessions and 18 matches. ITL was assessed using session rating of perceived exertion, while ETL was quantified via inertial measurement units. Neuromuscular recovery was evaluated using countermovement jump (CMJ) metrics, while psychological and social recovery were assessed via the Recovery-Stress Questionnaire for Athletes (RESTQ-Sport). Linear mixed-effects models were used to analyse repeated measures across players and time points. Significance was set at $p < 0.05$.

RESULTS: Chronic ETL negatively affected neuromuscular recovery, with increased ETL associated with longer time to take-off ($\beta = -0.008$, $p = 0.03$) and reduced reactive strength index modified ($\beta = -0.008$, $p = 0.047$). ITL significantly influenced social and psychological recovery, with acute ITL increasing social stress ($\beta = -3.512$, $p = 0.034$) and chronic ITL contributing to higher emotional exhaustion ($\beta = -0.013$, $p = 0.029$). Additionally, an elevated acute:chronic ITL ratio was linked to greater psychological strain ($\beta = 0.021$, $p < 0.001$).

CONCLUSION: These findings highlight the multidimensional impact of training load on recovery. Neuromuscular recovery was primarily influenced by ETL, while ITL played a more significant role in psychological and social stress responses. Coaches and practitioners should integrate objective neuromuscular assessments with subjective monitoring tools to detect fatigue, optimize recovery strategies, and enhance athlete well-being throughout the competitive season.

IMPACT OF MENTAL FATIGUE ON TRAINING VOLUME AND INTENSITY IN RESISTANCE TRAINING: A SEX-BASED ANALYSIS

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UNIVERSITY OF ROME

INTRODUCTION: Mental fatigue (MF) is a psychobiological state that arises following prolonged and demanding cognitive activity (1). Although the effects of MF on endurance performance are well recognized (1), there is a lack of research on its effects on resistance training (RT) sessions. Velocity of the first repetition (V1Rep) and training volume (TV) have been shown to be affected by MF but only when sets are performed to failure (2). However, athletes rarely train to failure while they use the V1Rep to set training intensity and the percentage of velocity loss (VL) from the V1Rep to define TV, a practice known as velocity-based training (VBT). Its main benefit is real-time monitoring of daily readiness and fatigue. Therefore, the aim of the present study was to investigate the effect of MF on TV and V1Rep during back squat in males and females, using VL to determine TV. The hypothesis is that MF will decrease TV and V1Rep in both sexes with no difference between sexes.

Acute effects of different stretching techniques on regional muscle stiffness of the gastrocnemius medialis assessed with shear-wave elastography

Longo, S., Cè, E., Pau, S., Battioli, R., Coratella, G., Padovan, R., Toninelli, N., Sconfienza, L.M., Esposito, F.

Università degli Studi di Milano

INTRODUCTION:
Stretching can acutely increase the maximum range of motion (ROMmax). However, its effects on muscle mechanical properties vary depending on the type, intensity, and duration of the stretching maneuver. Shear-wave elastography (SWE) was used to assess muscle stiffness by measuring ultrasound wave speed through the tissue. This speed can be converted into modulus (μ, kPa), providing an estimate of tissue elasticity. Recently, SWE has been applied to investigate stretch-induced changes in muscle stiffness. Since different muscle regions may exhibit different μ values, we examined whether three stretching protocols affected μ differently in two muscle regions.
METHODS:
Twelve participants (8 men, 4 women; mean±SD: age = 23.9±2.4 years, body mass = 69.8±10.6 kg, height = 172.0±8.5 cm) completed three stretching sessions on separate days. ROMmax was assessed. GM stiffness (μ) was measured using SWE (V8, Samsung Healthcare, Seoul, Korea) at both a neutral ankle angle (90°) and at 80%ROMmax in the middle muscle portion (GMmid) and the muscular region of the GM myotendinous junction (MTJ). Measurements were taken PRE and immediately POST 5×30-s passive static stretching (PS30, 30-s inter-set rest), 5×45-s PS (PS45, 15-s inter-set rest), and 5×30-rep dynamic stretching (DS, 30-s inter-set rest). The order was randomized. The same absolute angle at 80%ROMmax was used in POST evaluations. Within-day reliability was assessed before stretching using intraclass correlation coefficient (ICC) analysis. Data were analysed with repeated-measures ANOVA (within-factors: stretching type, region, ankle angle, time) at $p<0.05$, with Bonferroni correction for pairwise comparisons.
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