

Conference Report

Strength and Conditioning Society (SCS) 7th Annual Meeting, Murcia, Spain, 2024

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Abstract: On behalf of the Strength and Conditioning Society (SCS), we are pleased to present the abstracts submitted for the SCS 7th Annual Meeting. The event was held at the Universidad Católica de Murcia (UCAM) headquarters in Murcia, Spain, on 9–11 October 2024, and comprised several invited sessions by international and national speakers on a variety of topics related to biochemistry and exercise physiology, strength and conditioning practices and their application to health, injury prevention, and sports performance. These included strength training in high-performance sports, sport science and training–competition load management in elite environments, biochemistry and exercise physiology and prescription, nutrition and biomechanics, among others. The conference also included practical workshops by renowned academics and practitioners on eccentric training, change of direction ability, and strength and power training in professional team sports, combat sports, and ergospirometry and exercise prescription in specific populations. Finally, the event disseminated up-to-date strength and conditioning research by providing practitioners and researchers with the opportunity to present their most recent findings. All abstracts presented at the SCS 7th Annual Meeting can be found in this Conference Report.

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Keywords: congress; performance; exercise; health; training; injury

1. Introduction

The Strength and Conditioning Society (SCS) is pleased to introduce the abstracts presented at the SCS 7th Annual Meeting. In accordance with the SCS's vision and mission of disseminating high-quality evidence of the performance and health benefits of strength and conditioning practices worldwide, the 2024 Conference took place in Murcia, Spain, on 9–11 October. The SCS 7th Annual Meeting, held at the Universidad Católica de Murcia (UCAM) headquarters, brought together more than 400 attendees with different expertise (e.g., sports science, sports physiotherapy, sports nutrition, exercise physiology and biochemistry, and sports medicine, among others), which provided ample opportunities to exchange and discuss the latest evidence on strength and conditioning practices

from multiple perspectives. In a stimulating social and professional environment, practitioners and academics from different countries had the opportunity to attend several thought-provoking sessions provided by international and national speakers on a variety of applied topics related to strength training in high-performance sports and children and the elderly, sport science and load management in elite environments or injury prevention and optimizing the rehabilitation process in different injuries. As in previous years, the conference also offered multiple practical workshops by renowned academics and practitioners on strength and conditioning and nutrition in Ultimate Fighting Championship (UFC), cancer and strength training, strength and power training in team sports, or recovery strategies in high-performance sports. The event also fostered the dissemination of up-to-date strength and conditioning research by providing practitioners and researchers with the opportunity to present and discuss their latest findings, which can be found in the abstracts that compose this Conference Report. Finally, the SCS recognized professional and academic excellence in the field of strength and conditioning and presented the “Female Strength and Conditioning Coach of the Year Award”, the “Male Strength and Conditioning Coach of the Year Award”, the “Emerging Strength and Conditioning Coach of the Year Award” and the “Strength and Conditioning Coach Career Achievement Award” to outstanding coaches, and the “Young Investigator Award” (YIA) and the “Applied Science Award” (ASA) to remarkable researchers. It should be noted that the selection process for our award winners was entirely blended, with a committee for both professional and academic awards. All the abstracts were reviewed by the Scientific Committee. For example, for both academic awards (YIA and ASA), we selected 18 semifinalists for each award, who presented their oral presentations under the supervision of a panel of three experts from the Scientific Committee. From among the 18 semifinalists, three finalists were chosen in each area, and they presented their work again on the final day of the event. The YIA finalists were the authors of the abstracts titled “Concurrent training in older people after valve replacement surgery. A randomized controlled study”, “Effects of a multicomponent training and a detraining period on cognitive and functional performance of older adults at risk of frailty”, and “Effects of different velocity loss thresholds with and without blood flow restriction during squat exercise on strength gains and jump performance.” The ASA finalists were the authors of the abstracts titled “Stair-climbing versus machine-based resistance exercise to improve muscle power among older adults”; “Effects of core centering training on balance, trunk control, and athletic performance in adolescent female volleyball players”; and “Eccentric phase velocity determines the load-velocity relationship in the squat jump and bench press throw exercise: a preliminary study”. The aforementioned committee selected the winners of the awards, which went to Anna Moradell Fernández from Spain for the YIA and to Evelien Van Roie from Belgium for the ASA.

2. Conference Abstracts

2.1. *Comparison of Vastus Lateralis Hypertrophy in Normobaric Hypoxia: Effect of Environmental Conditions in Rooms vs. Tents*

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Pearson's $r = 0.66$ to 0.96 (all $p < 0.001$). Intraclass correlation coefficient values were 0.96 for $F0$, 0.77 for $V0$, 0.98 for P_{max} , and 0.84 for FV_{slope} (all $p < 0.001$), and the coefficient of variation ranged from 5.5% to 14.9% . Lastly, there was no association between the test–retest differences for all F–V variables and physical and cognitive functions (all $p > 0.05$). In conclusion, the use of the F–V relationship was reliable in institutionalized older adults, independent of physical or cognitive performance.

Keywords: aging; F–V profile; strength training; reproducibility; velocity-based training

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References

1. Campos GE, Luecke TJ, Wendeln HK, Toma K, Hagerman FC, Murray TF, Ragg KE, Ratamess NA, Kraemer WJ, Staron RS. Muscular adaptations in response to three different resistance-training regimens: specificity of repetition maximum training zones. *Eur J Appl Physiol.* 2002 Nov;88(1–2):50–60. 55
2. Alcazar J, Rodriguez-Lopez C, Ara I, Alfaro-Acha A, Mañas-Bote A, Guadalupe-Grau A, García-García FJ, Alegre LM. The Force-Velocity Relationship in Older People: Reliability and Validity of a Systematic Procedure. *Int J Sports Med.* 2017 Dec;38(14):1097–1104.
3. Lindberg K, Solberg P, Bjørnsen T, Helland C, Rønnestad B, Thorsen Frank M, Haugen T, Østerås S, Kristoffersen M, Midttun M, Sæland F, Paulsen G. Force-velocity profiling in athletes: Reliability and agreement across methods. *PLoS One.* 2021 Feb 1;16(2):e0245791.

2.80. *Interrelationships of Strength, Muscle Mass, and Muscle Quality in Knee Extensors of an Active Young Population*

Santos-Pérez, J.¹, **González-Martín, D.**¹, **Sánchez-García N.**¹, **Reyes-Merino, F.**¹, **Hernández-Murua, J.A.**² and **Gallego-Selles, A.**³

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Abstract: Muscle quality, defined as the skeletal muscle's ability to generate force relative to its mass, plays a critical role in physical performance and overall health. This dynamic relationship is influenced by various factors, including age, gender, and individual characteristics. This study investigated the interplay between muscle mass, strength, and quality in the knee extensors of active young individuals, focusing on potential asymmetries between lower limbs. Forty-three active university students (26 males and 17 females) were evaluated. Knee extensor strength was measured using a strain gauge (Chronojump Boscossystems) connected to a leg extension machine (BH Fitness). Muscle mass was assessed using a GE Lunar Prodigy® densitometer, determining the thigh region

of interest, including the pelvic area, for analysis. Maximum voluntary isometric contraction (MVIC) was recorded both unilaterally and bilaterally (knee 90° flexion), and maximum repetition (1RM) was determined unilaterally in an incremental test with progressive loads. Data were analyzed using SPSS software, with significance set at $p < 0.05$, and the results were presented as mean $\pm$ SD. Significant strength and muscle mass differences were observed between genders ($p < 0.05$), although no significant differences were found after adjusting for muscle mass. Despite higher muscle mass in males (59.96 ± 6.93 kg vs. 41.17 ± 5.2 kg in females), muscle quality measured by bilateral MVIC was comparable between males (11.37 ± 2.15) and females (10.83 ± 1.7); similar results were obtained for muscle quality calculated unilaterally for 1RM. No differences were found in absolute and relative force asymmetry between genders; 25% of the sample showed bilateral deficits, a slightly lower percentage than described in the literature. Assessment of muscle quality is critical to understanding force-generating capacity in relation to muscle mass in active young people. Developing early intervention strategies could enhance athletic performance and promote long-term muscle health. Future research could use this protocol to explore muscle quality in populations at risk of sarcopenia or muscle weakness.

Keywords: muscle quality; physical performance; knee extensor strength

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References

1. Fragala, M. S.; Kenny, A. M.; Kuchel, G. A. Muscle quality in aging: a multi-dimensional approach to muscle functioning with applications for treatment. *Sports Med.* 2015, 45, 641–658. <https://doi.org/10.1007/s40279-015-0305-z>
2. Kuschel, L. B.; Sonnenburg, D.; Engel, T. Factors of Muscle Quality and Determinants of Muscle Strength: A Systematic Literature Review. *Healthcare* 2022, 10, 1937. <https://doi.org/10.3390/healthcare10101937>
3. Portilla-Cueto, K.; Medina-Pérez, C.; Romero-Pérez, E. M.; Núñez-Othón, G.; Horta-Gim, M. A.; de Paz, J. A. Muscle Quality of Knee Extensors Based on Several Types of Force in Multiple Sclerosis Patients with Varying Degrees of Disability. *Medicina* 2022, 58, 316. <https://doi.org/10.3390/medicina58020316>
4. Zhang, Y.; Chen, K.; Liu, K.; Wang, Q.; Ma, Y.; Pang, B.; Huang, L.; Ma, Y. New prediction equations for knee isokinetic strength in young and middle-aged non-athletes. *BMC Public Health* 2023, 23, 2558. <https://doi.org/10.1186/s12889-023-17478-7>

2.81. Incidence and Economic Impact of Injuries in the Main European Leagues

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Abstract: Player availability is key for professional football clubs as it directly impacts the team's performance. Additionally, not having a player available for selection in a match due to injury places an economic cost on the club. In this regard, [1] estimated that the