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Sensorimotor Training Elicits Comparable Strength Gains to Resistance-Endurance Training While Improving Balance-Related Factors Associated with Fall Prevention in Older Women

Aging is associated with declines in muscle strength, postural control, and functional performance, contributing to an increased risk of falls, mobility limitations, and loss of independence. While resistance training is considered an effective strategy for attenuating these age-related changes, alternative exercise modalities may be needed for older adults who are unable or unwilling to perform conventional resistance exercise. The study aimed to investigate the effects of sensorimotor training on muscle strength, postural control, and functional performance in older women and subsequently determine whether these adaptations differ from those induced by traditional resistance-endurance training. Thirty-three healthy women aged 65–80 years, with no previous experience in resistance or sensorimotor training, no participation in organized sports during the preceding five years, and no engagement in systematic physical activity, were randomly assigned to a resistance-endurance training group (RET, $n = 11$), a sensorimotor training group (SMT, $n = 11$), or a control group (CG, $n = 11$). Both intervention programs lasted 10 weeks. Strength, postural control, and functional performance were assessed before and after the intervention. Both RET and SMT resulted in significant improvements in maximal and relative lower-limb strength, with no significant differences between the intervention groups. However, only SMT produced significant improvements in postural control and stair-climbing performance, whereas maximal walking speed remained unchanged. No improvements were observed in the control group. These findings indicate that sensorimotor training elicits strength gains comparable to those achieved through resistance-endurance training in previously untrained older women while providing additional benefits for balance and functional mobility. Sensorimotor training may therefore represent an effective strategy for enhancing physical capacities associated with fall prevention and functional independence in older adults.

Keywords: aging, sensorimotor training, strength, balance, mobility, older adults

Biography

Mgr. Ľubica Žiška Böhmerová, PhD. is an Assistant Professor at the Faculty of Physical Education and Sport, Comenius University in Bratislava, Slovakia. Her research focuses on motor abilities, balance assessment, sensorimotor functions, strength diagnostics, and exercise interventions across the lifespan, with particular emphasis on older adults and children. She has extensive experience in the assessment of postural control and motor performance and has participated in several national research projects. Her scientific work includes publications in peer-reviewed journals indexed in Web of Science and Scopus. She is also actively involved in applied sport practice as a coach of artistic gymnastics.