

The Effect of Balance Training on Stable and Unstable Surfaces under Cognitive Dual-Task Condition on the Two Directions of Body Sway, Functional Balance and Fear of Fall in Non-Fallers Older Adults

Authors : Elham Azimzadeh, Fahimeh Khorshidi, Alireza Farsi

Abstract : Balance impairment and fear of falling in older adults may reduce their quality of life. Reactive balance training could improve rapid postural responses and fall prevention in the elderly during daily tasks. Performing postural training and simultaneously cognitive dual tasks could be similar to the daily circumstances. Purpose: This study aimed to determine the effect of balance training on stable and unstable surfaces under dual cognitive task conditions on postural control and fear of falling in the elderly. Methods: Thirty non-fallers of older adults (65-75 years) were randomly assigned to two training groups: stable-surface (n=10), unstable-surface (n=10), or a control group (n=10). The intervention groups underwent six weeks of balance training either on a stable (balance board) or an unstable (wobble board) surface while performing a cognitive dual task. The control group received no balance intervention. COP displacements in the anteroposterior (AP) and mediolateral (ML) directions using a computerized balance board, functional balance using TUG, and fear of falling using FES-I were measured in all participants before and after the interventions. Summary of Results: Mixed ANOVA (3 groups * 2 times) with repeated measures and post hoc test showed a significant improvement in both intervention groups in AP index ($F= 11/652$, $P= 0/0002$) and functional balance ($F= 9/961$, $P= 0/0001$). However, the unstable surface training group had more improvement. However, the fear of falling significantly improved after training on an unstable surface ($p= 0/035$). All groups had no significant improvement in the ML index ($p= 0/817$). In the present study, there was an improvement in the AP index after balance training. Conclusion: Unstable surface training may reduce reaction time in posterior ankle muscle activity. Furthermore, focusing attention on cognitive tasks can lead to maintaining balance unconsciously. Most of the daily activities need attention distribution among several activities. So, balance training concurrent to a dual cognitive task is challenging and more similar to the real world. According to the specificity of the training principle, it may improve functional independence and fall prevention in the elderly.

Keywords : cognitive dual task, elderly, fear of falling, postural control, unstable surface

Conference Title : ICKESS 2024 : International Conference on Kinesiology, Exercise and Sport Sciences

Conference Location : San Francisco, United States

Conference Dates : September 26-27, 2024