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Benefits of Whole-Body Vibration Training on Lower-Extremity Muscle Strength and Balance Control in Middle-Aged and Older Adults

Authors : Long-Shan Wu, Ming-Chen Ko, Chien-Chang Ho, Po-Fu Lee, Jenn-Woei Hsieh, Ching-Yu Tseng

Abstract : This study aimed to determine the effects of whole-body vibration (WBV) training on lower-extremity muscle strength and balance control performance among community-dwelling middle-aged and older adults in the United States. Twenty-nine participants without any contraindication of performing WBV exercise completed all the study procedures. Participants were randomly assigned to do body weight exercise with either an individualized vibration frequency and amplitude, a fixed vibration frequency and amplitude, or no vibration. Isokinetic knee extensor power, limits of stability, and sit-to-stand tests were performed at the baseline and after 8 weeks of training. Neither the individualized frequency-amplitude WBV training protocol nor the fixed frequency-amplitude WBV training protocol improved isokinetic knee extensor power. The limits of stability endpoint excursion score for the individualized frequency-amplitude group increased by 8.8 (12.9%; $p = 0.025$) after training. No significant differences were observed in fixed and control group. The maximum excursion score for the individualized frequency-amplitude group at baseline increased by 9.2 (11.5%; $p = 0.006$) after training. The average weight transfer time score significantly decreased by 0.21 s in the fixed group. The participants in the individualized group showed a significant increase (3.2%) in weight rising index score after 8 weeks of WBV training. These results suggest that 8 weeks of WBV training improved limit of stability and sit-to-stand performance. Future studies need to determine whether WBV training improves other factors that can influence posture control.

Keywords : whole-body vibration training, muscle strength, balance control, middle-aged and older adults
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