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Effect of a vibration exposure on muscular performance and body balance. Randomized cross-over study.

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Abstract

This randomized cross-over study was designed to investigate the effects of a 4-min vibration bout on muscle performance and body balance in young, healthy subjects. Sixteen volunteers (eight men, eight women, age 24-33 years) underwent both the 4-min vibration- and sham-interventions in a randomized order on different days. Six performance tests (stability platform, grip strength, isometric extension strength of lower extremities, tandem-walk, vertical jump and shuttle run) were performed 10 min before (baseline), and 2 and 60 min after the intervention. The effect of vibration on the surface electromyography (EMG) of soleus, gastrocnemius and vastus lateralis muscles was also investigated. The vibration-loading, based on a tilting platform, induced a transient (significant at the 2-min test) 2.5% net benefit in the jump height ($P = 0.019$), 3.2% benefit in the isometric extension strength of lower extremities ($P=0.020$) and 15.7% improvement in the body balance ($P = 0.049$). In the other 2-min or in the 60-min tests, there were no statistically significant differences between the vibration- and sham-interventions. Decreased mean power frequency in EMG of all muscles during the vibration indicated evolving muscle fatigue, while the root mean square voltage of EMG signal increased in calf muscles. We have shown in this study that a single bout of whole body vibration transiently improves muscle performance of lower extremities and body balance in young healthy adults.

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