

EFFECTS OF WHOLE BODY VIBRATION TRAINING ON CARDIORESPIRATORY FITNESS AND MUSCLE STRENGTH IN OLDER INDIVIDUALS, A ONE YEAR RANDOMIZED CONTROLLED TRIAL

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Introduction: Increased age is associated with a decline in cardiorespiratory fitness and a decline in muscular performance. Considering the need to maintain both components of fitness throughout life, whole body vibration (WBV) training might be an efficient method for older adults to achieve this. WBV training is a recent type of neuromuscular training where exercises are performed on a platform which generates vertical sinusoidal vibrations. Recently we have shown the positive effect of 6 months WBV training on muscle strength in an older female population (1). So far, no data are available about the effect on muscle strength in older men and about the loading of the cardiovascular system of older adults during vibration training. This randomized controlled trial investigated the effects of one year WBV training on cardiorespiratory fitness and muscle strength in community dwelling men and women over the age of 60. The results of the WBV group are compared with those of a regular fitness training group and a control group.

Methods: 220 older adults were randomly assigned to a WBV group (n=94), a fitness (FIT) group (n=60) or a control (CON) group (n=66). The WBV and FIT groups exercised three times weekly for one year. The WBV group performed exercises (squat, deep squat, lunge,) on a vibration platform, which provokes reflexive muscle activity. The FIT group performed cardiovascular, strength, balance and stretching exercises. The CON group did not participate in any training. Maximal oxygen uptake (VO₂max, ml.min⁻¹.kg⁻¹) and time to exhaustion (seconds) were measured during progressive bicycle ergometry at baseline and after 12 months. Muscle strength (Nm) was assessed isometrically by a dynamometer at the same time points.

Results: Considering cardiorespiratory fitness, VO₂max and time to exhaustion increased significantly in the WBV (+19.1%, +9.4 %, respectively) and FIT groups (+22.1 %, +15.9%, respectively). Only time to exhaustion showed a significant different effect between the WBV and FIT groups with the fitness program being more successful. Considering muscular fitness, the WBV and FIT groups improved significantly in muscle strength (+9.6%, +12.0%, respectively) with no significant differences in training effect between the two training groups. The changes over time in VO₂max, time to exhaustion and muscle strength in the WBV and FIT groups were significantly different from the changes in the CON group.

Conclusion: The results of the present study show that WBV might be seen as a training paradigm with an impact on both the cardiorespiratory and muscular system, without

increasing the risk of injury. Consequently, it may improve the ability of older subjects to live longer independently with a higher quality of life.

References:(1) Roelants M., Delecluse C., Verschueren S.M. (2004) Whole body vibration training increases knee-extension strength and speed of movement in older women. *J Am Geriatr Soc* 52(6):901-8.

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