EFFECTS OF VIBRATION EXERCISE ON LOWER LIMB STRENGTH AND FUNCTIONAL PERFORMANCE IN AN OLDER POPULATION

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INTRODUCTION

The ageing process is synonymous with a decline in muscle strength and power. This decline can affect many aspects of physical function such as walking and rising from a chair. To date, exercise appears to be the best intervention to minimise or counteract reduced muscle function. Recently, whole-body-vibration (WBV) training has emerged as an intervention which may also improve strength in an older population (Roelants et al. 2004). However, research examining the effect of WBV on strength and functional performance in such a population is sparse. Therefore, this randomised controlled study was designed to investigate the effects of WBV on lower limb strength and performance of functional activities in a healthy, untrained, older population.

METHODS

Forty-three participants (23 men, 20 women, age 73.5 ± 4.5 yr) were randomly assigned to either a WBV group (VIB), an exercise without-vibration group (EX) or control group (CON). The VIB and EX interventions consisted of three sessions per week for eight-weeks. Outcome measures included a 5m fast walk, a sit-to-stand test (STS), stair mobility and isokinetic flexion and extension strength of the hip, knee and ankle. Data was examined to compare effects between groups using a 3x2 (group x time) ANCOVA, with pre-test values used as covariates. Significance was accepted at p<0.05.

RESULTS

The VIB group significantly improved ankle plantar flexion strength compared to the EX and CON groups (18.2%, 5.0%, 0.9%, respectively) (p<0.05). Both the VIB and EX groups significantly improved knee extension strength compared to the CON (8.1%, 7.2%, -2.0%, respectively) (p<0.05). Similarly, both the VIB and EX groups improved STS (12.4%, 10.2%) and 5m fast walk time (3.0%, 3.7%) compared to the CON (p<0.05). No significant changes were evident in hip flexion and extension strength or stair mobility for any group.

DISCUSSION

WBV training improved plantar flexion strength in a healthy, older population. This increase in plantar flexion strength can be considered clinically significant, with values approaching that previously reported in a healthy, younger population (Thelen et al. 1996). However, WBV did not facilitate knee extension strength to a greater degree than the exercise without-vibration group. The comparable gains in knee extension strength can be largely attributed to the unloaded squats. As comparable changes in 5m fast walk and STS performance also appear to be linked with the change in knee extension strength, future WBV programs should explore protocols to target the proximal musculature of the leg.

REFERENCES


Keywords: Physical Abilities, Exercise Training, Strength