

EFFECTS OF WHOLE BODY VIBRATION ON NEUROMUSCULAR PERFORMANCE OF
COMMUNITY DWELLING OLDER ADULTS

Submitted by

Trentham Phillip Furness BHLthSci, BExSci(Hons)

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School of Exercise Science

Faculty of Health Sciences

Australian Catholic University

Research Services

Locked Bag 4115

Fitzroy, Victoria 3065

Australia

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STATEMENT OF SOURCES

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Signed: _____ Date: _____

Name: Trentham Phillip Furness

ABSTRACT

Whole body vibration (WBV) is a mode of exercise by which an individual stands on a vibration platform that may be oscillating and therefore creating vertical displacement which affects gravitational forces acting upon the whole body. Manipulations of platform amplitude or frequency can affect the rate of change of the WBV (i.e. acceleration) acting upon an individual. The specific influences of frequency or amplitude, however, are unknown. The aim of the study, therefore, was two fold; (1) to identify chronic WBV effects of neuromuscular performance within a community dwelling older adult sample, and; (2) to identify WBV methods that would elicit chronic neuromuscular performance changes within such a sample. The study incorporated a randomised controlled experimental design to examine the aim. Seventy-three community dwelling older adults freely consented to the requirements of the study (mean age = 72.0 years). Neuromuscular performance was quantified with the 5-Chair Stands test, the Timed Up and Go (TUG) test and the Tinetti test. Health Related Quality of Life (HRQOL) was qualified with the SF-36 Health Survey. A six week WBV intervention significantly changed the quantifiers of neuromuscular performance in a community dwelling older adult sample. The WBV intervention significantly reduced time taken to complete the 5-Chair Stands test ($p < .05$) and the TUG test ($p < .05$). The six week WBV intervention significantly improved Tinetti test scores ($p < .05$). The six week WBV intervention significantly improved all components of HRQOL. For the 5-Chair Stands test, a three WBV sessions per week intervention elicited significantly larger ($p < .05$) neuromuscular performance gains than a two WBV sessions per week intervention in the target sample. For the TUG test, a three WBV sessions per week intervention elicited significantly larger ($p < .05$) neuromuscular performance gains than a zero and one WBV session per week intervention in the target sample. A significant difference ($p < .05$) was found between pre-test and post-test Tinetti test scores for all WBV intervention groups. There was an insignificant difference ($p > .05$) found within the control group of community dwelling older adults for the Tinetti test. Detraining effects were observed three weeks after the cessation of the six week WBV intervention for the three WBV sessions per week group. Neuromuscular performance reduced after the detraining period. Vibration platform dynamics (manipulated frequency and controlled amplitude) showed that gravitational forces created by the WBV were safe since no injuries were associated with the intervention and since participant compliance was 100% during the six week WBV intervention. The methods of this study showed a chronic WBV intervention to be a safe and easily administered exercise to improve neuromuscular performance and HRQOL of a community dwelling older adult sample. Specifically, WBV could be used as a safe and effective tool to improve aspects of normal daily function such as body balance and gait speed.