Effects on strength of vibratory exercise compared to walking in postmenopausal women

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INTRODUCTION

A major problem associated with advanced adult age is the remarkable decline in functional capacity and the associated loss of independence (1). Muscle strength of the lower extremities is a major neuromuscular determinant of these losses and mobility (2). Vibration exercise is a new method of training with ameliorations on bone (3), balance (4), strength of lower extremities (5, 6) and neuromuscular performance (7), and it easily to apply on previously physically untrained and frail persons. We hypothesized that a low-frequency vibrating board for 8 months would be feasible and improve more the functional capacity and the muscle strength of lower limbs than a walking-based program in post-menopausal women.

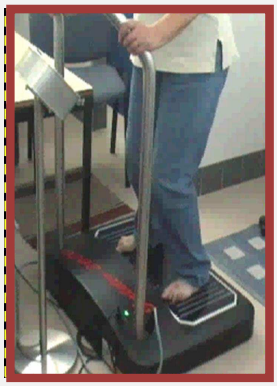
METHODS

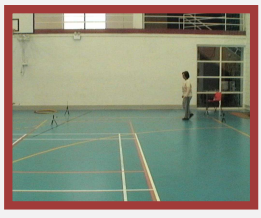
Participants:
Twenty-seven postmenopausal women were randomly assigned into 2 groups:
Whole Body Vibration (WBV) - N=14;
Walking Control Group WC) – N=13

Program:
WBV - 3 times a week; 6 sets of 1-minute with 1 minute of rest ; 12,6 Hz of frequency; amplitude of 3 mm;
WC - 3 times a week; 60 minute of walk activity;

Assessments:
Health Related Fitness Test Battery (HRF): Body Weight and Height; Vertical Jump Test; Chair Rise Test; Time to walk 4 meters as fast as subject could.
Maximal Isokinetic Strength: Concentric action 3 rep of 60˚ ·sec-1 and 30 rep of 300º·sec-l. Eccentric action 3 rep of 60˚ ·sec-l.

Statistics:
The effects between groups were tested by ANOVA for repeated measures adjusted by age and body weight





RESULTS AND DISCUSSION

Table 1. Comparative effects of whole-body vibration (N=14) and walk-based exercise (N=13) programs on a Health Related Fitness Test Battery. Outcomes at baseline and changes at the 8 months

		Baseline	Change to 8 months	Treatment effect	*p*†
Test	Group	Mean ± SD	Mean	Mean	
4-m walking (sec)	WBV	2.7 ± 0.4[a]	0.15	0.62	.011
	WC	3.1 ±	-0.47		
Chair Rise (sec)	WBV	6.5 ±	-0.27	0.96	.005
	WC	7.1 ±	-1.23		
Vertical Jump (ms)	WBV	308 ± 46	21.5	23.5	.041
	WC	318 ± 46	-2.00		

WBV, Whole-body Vibration group and WC, Walking as Control Group
Values expressed as mean ± standard deviation and 95% confidence interval *p* † values of analysis of variance for repeated measures adjusting by baseline data and age to compare differences between groups at 8 months [a] p < .050 on baseline outcome

Meanwhile the isokinetic strength of the WC group remained unchanged , the WBV group showed a tendency to decrease in all of the isokinetic strength variables measured. After 8 months, no significant changes nor comparative effects between exercise programs were found in the isokinetic dynamometric variables studied.

CONCLUSION

The present study shows that our WBV training program may have a muscular positive effect, improving explosive strength. Moreover, to our knowledge, the current study is the first had obtained these results using low-frequency vibration in postmenopausal women. WBV seems to require longer sessions to pursue relevant effects on isokinetic strength. Walking programs should be prescribed to achieve significant improvements in health status related with usual daily physical tasks.

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