

Introduction

- Whole body vibration training (WBV) involves performing an exercise on a vibrating platform.
 - WBV is as efficient as a resistance strength training program.
 - WBV does not cause a high level of muscle loading, so it is safe for older individuals to use.
- Few studies have analyzed the effects of WBV on balance.
 - There are no current studies that have addressed the effects of WBV on balance.
 - The studies that have investigated the use of WBV have found an increase in leg strength, power, and cross sectional area.
- No current literature has reported on differences in balance and lower extremity strength gains comparing WBV and fixed surface exercise.

Objective & Hypothesis

Objective

- To determine if WBV affects lower extremity strength and balance in older individuals to a greater degree than fixed surface exercise.

Hypothesis:

- Community dwelling older individuals will see a larger improvement in their balance and lower extremity strength after an eight week training program consisting of WBV when compared to a fixed surface exercise program.

Methods

- Randomized Clinical Trial conducted at Highland Woods Country Club in Bonita Springs, FL.

Participants

- 22 participants: 12 males, 10 females (mean \pm SD age, 71.36 \pm 4.84 yrs.)
- Participants could not currently be involved in a training program, diagnosed with a vestibular condition, had a joint replacement in the past year, diagnosed with acute Rheumatoid Arthritis, or had undergone a surgical procedure within the past 6 months.

Interventions

- Double leg high squat (to 30° of knee flexion) held for 10 seconds, 2 sets of 10 repetitions using a WBV platform and a fixed surface

Outcome Measures

- Lower extremity strength as measured by 10RM using the Cybex® leg press machine.
- Balance as measured by Star Excursion Balance Test (SEBT) score in eight separate directions.

Data Analysis

- Data was analyzed by performing a MANOVA and descriptive statistics using IBM SPSS version 20.
- Variables: Change in 10RM strength scores and change in SEBT distance reached in eight directions.

Results

- Results were analyzed by using the change score between baseline and final leg press 10RM, and the baseline and final distances reached in the eight directions of the SEBT.
- Mean 10RM strength scores improved for both groups and most of the balance scores improved for both groups, but there was no statistical significance. (TABLE 1)
- There was no statistically significant difference between the groups for the strength and the eight components of the SEBT (TABLE 2)
- There was no statistically significant differences in outcomes for the co-variables of age and gender. (TABLE 2)
- While no statistically significant differences were found between the groups, the control group showed greater improvement in lower extremity strength and balance mean scores of 10RM strength scores and SEBT differences.
- Anecdotally, members of the vibrating group noted they felt more safe riding their bike, climbing stairs, and performing daily tasks

Table 1: Descriptive Statistics

	Group	Mean	Std. Deviation	N
10RM Change	1	26.67	16.77	9
	2	36.25	17.34	12
ANT change	1	-1.63	6.55	9
	2	3.63	9.71	12
AL change	1	.84	11.83	9
	2	2.62	8.26	12
LAT change	1	-.70	10.73	9
	2	1.93	8.35	12
PL change	1	2.66	8.74	9
	2	5.60	8.43	12
POST change	1	5.35	8.08	9
	2	7.39	11.55	12
PM change	1	1.53	8.76	9
	2	7.55	5.13	12
MED change	1	-2.83	4.78	9
	2	2.64	5.52	12
AM change	1	2.26	7.02	9
	2	6.79	4.96	12

Table 2: Multivariate Tests

Effect	Value	F	Hypothesis	Error	Sig.
Age	.522	.522 ^b	9.00	9.00	.827
Gender	.114	.114 ^b	9.00	9.00	.998
Group	.905	.905 ^b	9.00	9.00	.558



FIGURE 1: Demonstration of exercise performed on iShape 8500 vibrating platform

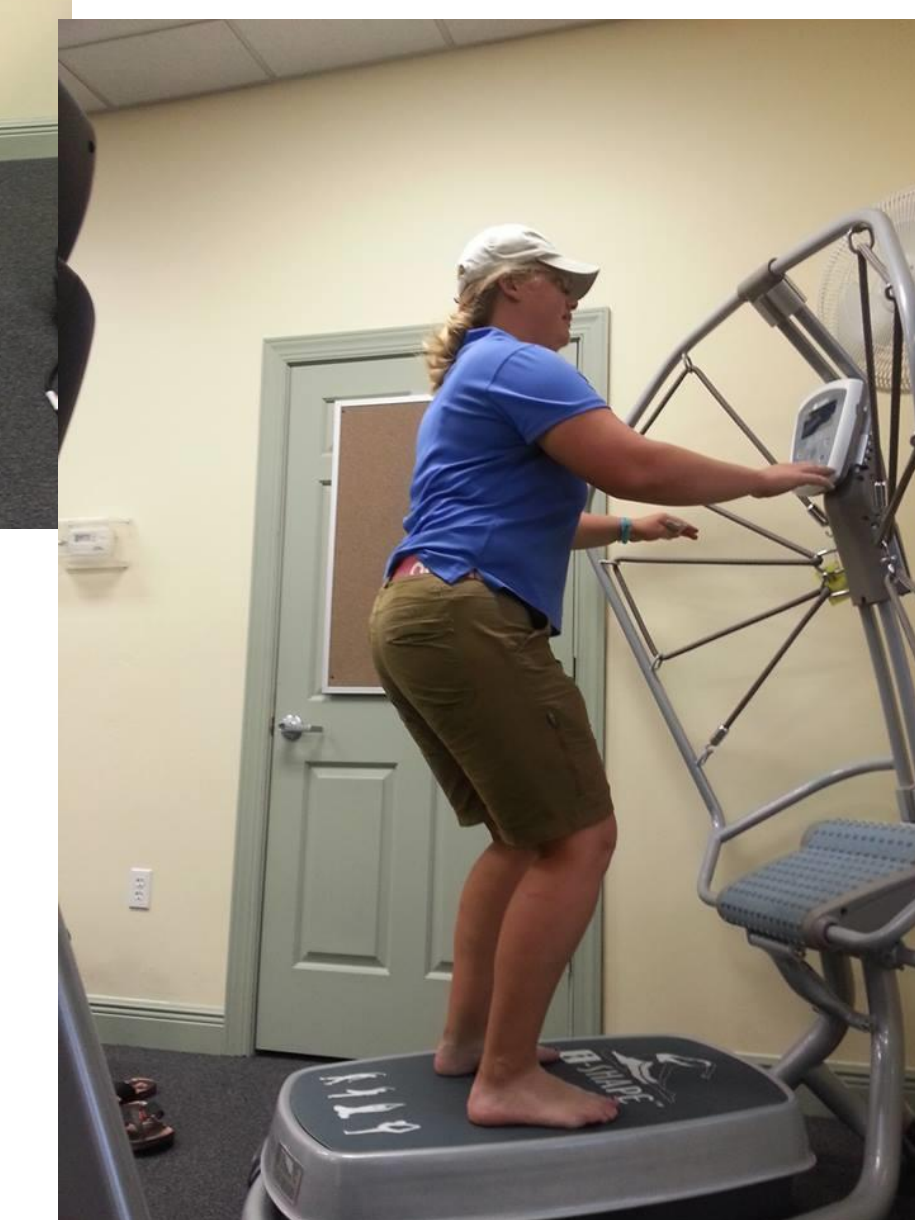


FIGURE 2: Demonstration of exercise performed on iShape 8500 vibrating platform

Discussion

- The results of this study did not support the hypothesis that WBV exercise increases leg strength and balance more than fixed surface exercise in community dwelling older individuals.
- Both interventions increased leg strength.

The Learning Effect

- Defined as the participant's ability to improve his or her results in short intervals after a thorough explanation or test run of the specific task at hand.
- In this study, the participant was given trial repetitions on the leg press machine to increase familiarity and decrease fear of the machine.
- The SEBT protocol was accurately followed using thorough instructions with trial repetitions given before the initial and final test.
- Despite trial runs for both tests, after analyzing the data it appeared that there was still a possibility of a learning effect. Most of the participants greatly increased the leg press weight and some of the SEBT directions showed a substantial increase in distance during the final test.

Limitations

- This study was completed on healthy, community dwelling older individuals and a complex balance measure was used.
- Small sample size: may have affected the statistical analysis as the sample size may have been insufficient to show differences between groups.
- Measurements of the SEBT may not have been accurate enough due to user error resulting in inconsistent measurements.

Future Research

- Future studies may want to revise the methods to have participants perform a different balance test to analyze improvement. Future studies may also want to include more than one exercise to see if any additional changes are noted, and use larger samples sizes.

Conclusions

- The results from this study indicate that WBV has an effect on lower extremity strength, but there was no significant difference between interventions.
- The control group had a greater increase in balance scores than the vibrating group, but there was no statistical significance.
- No sources of funding were provided for this study.