

THE EFFECT OF COUNTER-CLOCKWISE VIBRATION PLATFORM TRAINING IN THE GERIATRIC POPULATION ON POSTURAL SWAY

Ryan Hickey, SPT; Alex Wann, SPT; Eric Shamus, PhD, DPT; Arie van Duijn, EdD, PT, OCS

Purpose

To analyze the effects of treatment using a counterclockwise oscillating vibration platform on balance and postural sway in community dwelling older adults

Participants

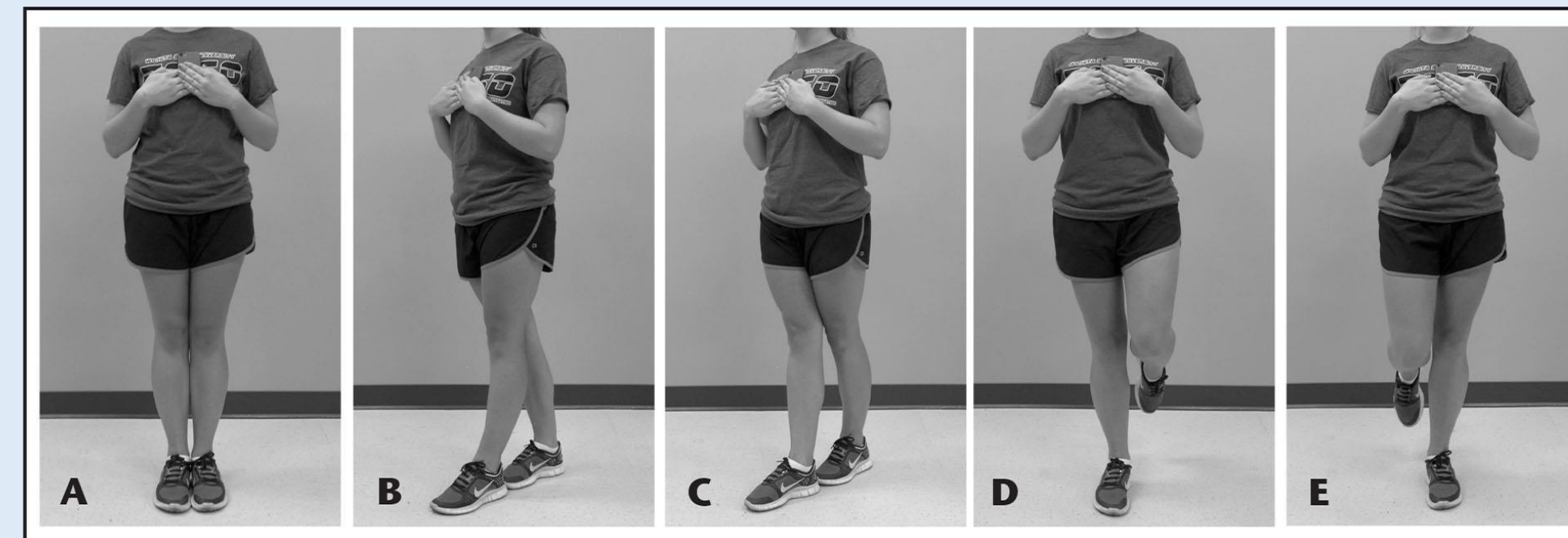
- 34 subjects ranging from age 66 to 96
- Average age of 80 years old \pm 7.57 years
- Independent living, moderately active seniors
- All participants met Activities-Specific Balance Confidence Scale and Folstein Mini-Mental Examination minimum cutoffs
- Exclusionary criteria were as follows: Have an acute thrombosis, any injury or existing inflammation, recent fracture, recent joint implant, recent surgery, rheumatic episode, tumor of any sort.

Instrumentation

- Osflow Oscillation Platform
- SWAY Medical Balance Phone Application
- Activities-Specific Balance Confidence Scale (ABC Scale)
- The Folstein Mini-Mental State Examination

Pre-Intervention Measurement

- Activities-Specific Balance Confidence Scale
- Participants underwent an initial balance evaluation using the SWAY Medical Balance Application



- A. Feet together
- B. Tandem with left foot leading
- C. Tandem with right foot leading
- D. Single leg stance on right leg
- E. Single leg stance on left leg
- F. Not pictured – feet together

Intervention

- Individuals trained 4 days per week for 5 weeks
- Participants wore a gait belt, removed their shoes, and stepped onto the vibration platform.
- The platform was turned on and the participant was instructed on how to appropriately position him or herself on the platform throughout the time period (feet shoulder width apart, chin up, and relaxed posture). The intervention lasted 5 minutes with stand by assist.

Post-Intervention Measurement

- Activities-Specific Balance Confidence Scale
- SWAY Medical Balance Application using CDC4 protocol with positions described above.
- SWAY application measures postural sway by using built in motion sensors of Apple iPhone as the device is held to participants chest.

Results

- A total of 34 participants completed the entire protocol
- The relative change in ABC is described as follows:
 - 20 participants increased in balance confidence
 - 9 decreased in confidence
 - 5 had scores reflecting no change
- Detailed statistics about the ABC scores pre and post-intervention can be found in Tables 1 and 2
- These results demonstrate a statistically significant change in balance confidence post-intervention protocol.
- The average scores for the SWAY test before and after the intervention are as follows:
 - Pre-Intervention: 81.6027 out of a possible 100 points
 - Post-Intervention: 83.2439 out of a possible 100 points
- Detailed statistics about the SWAY scores pre and post-intervention can be found in Tables 3 and 4
- These results demonstrate no statistically significant change in balance as measured by SWAY Balance test.

Data Analysis

- The statistics were analyzed by the IBM SPSS version 20 software
- A Paired T-Test was used to determine the significance of the change in balance confidence on ABC Scale as well as the actual balance measure calculated by SWAY

Table 1: ABC Paired Sample Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pre-Intervention	13.1906	34	2.86756	0.50692
Post-Intervention	13.8038	34	2.44764	0.43269

Table 2: ABC Paired Samples Test

	Mean	Std. Deviation	Std. Error	95% CI Lower	95% CI Upper	t	Sig. (2-tailed)
Pre-Post Paired	.61313	1.65297	.29221	0.01717	1.20908	2.098	.044

Table 3: SWAY Paired Sample Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pre-Intervention	81.6027	34	12.12175	2.11013
Post-Intervention	83.2439	34	11.66608	2.03080

Table 4: SWAY Paired Samples Test

	Mean	Std. Deviation	Std. Error	95% CI Lower	95% CI Upper	t	Sig. (2-tailed)
Pre-Post Paired	1.64121	8.42952	1.46739	-1.34776	4.63019	1.1118	.272

Discussion

• Average pre-test ABC score was 82. Fort-four percent (44%) which is significantly higher than the average for this age population.

• This may have created a ceiling effect

• After completion of the initial balance testing many participants verbalized that they had not been aware of their balance deficiencies.

• The protocol itself may not have appropriately challenged the balance systems enough to elicit any positive adaptations

Conclusion

• There was a statistically significant increase in balance confidence per ABC Scale, which demonstrates that the intervention was effective.

• Average scores on the SWAY Balance test improved, but not to a statistically significant level. Possibly due to brevity of protocol duration or high overall levels of those participating

