

WII FIT TRAINING TO IMPROVE BALANCE IN OLDER ADULTS: A FEASIBILITY STUDY

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INTRODUCTION

Training using Nintendo's Wii Fit may be a novel way to improve balance in older adults. The Wii Fit is a game for Nintendo's Wii that uses an additional accessory, the Wii Balance Board. The Balance Board is similar to a force platform as it can monitor the center of pressure of a person but is less expensive and requires minimal training [1]. Using the Wii Fit would allow participants to complete training in their own living room with no supervision. This may make it more likely that participants would continue with the training after a study has ended.

The purpose of this study is to investigate the feasibility of training using the Wii Fit and Balance Board to improve clinical measures of balance in older adults. It is hypothesized that older adults who train with the Wii Fit will increase their Berg Balance Scale (BBS) score and Functional Reach (FR), and decrease their Timed Up & Go (TUG) time.

METHODS

Eleven healthy older adults recruited from a local senior living community ranging in age from 70-92 years old completed the study. The study was approved by Bucknell University's Institutional Review Board and written consent was obtained from all participants prior to participation.

Participants were randomly assigned to either an experimental group (n=5) or control group (n=6). The experimental group completed training on the Wii Fit three times a week for three weeks (Fig. 1). Each training session consisted of a series of strength exercises, yoga poses, and balance games and lasted approximately 30 minutes. The control group continued with their normal daily routine.

Three clinical measures of balance were collected one week before training, one week after training, and one month after training: BBS, FR, and TUG.



Figure 1: Older adult completing the half moon yoga pose during training with the Wii Fit.

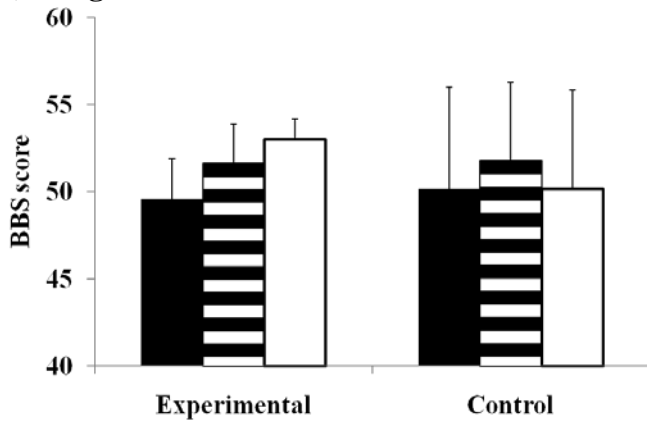
Clinical measures of balance before training were compared to one week and one month after training. An increase in BBS and FR would be considered an improvement in balance as would a decrease in TUG. Paired t-tests were conducted on the control and experimental group to determine if training using the Wii Fit influenced measures of balance. All statistical analysis was completed in JMP with significance set at $p < 0.05$.

RESULTS AND DISCUSSION

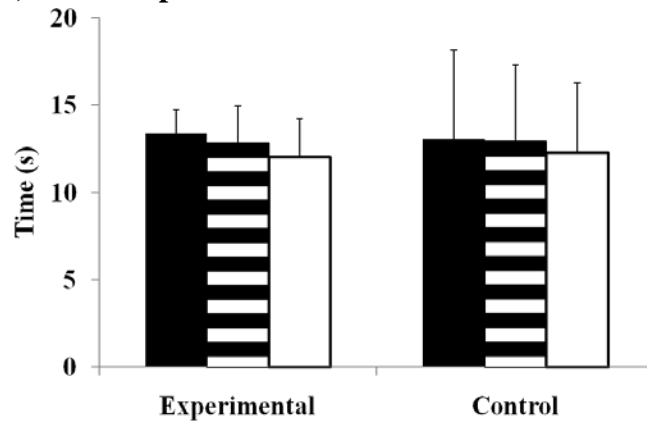
BBS scores significantly increased one week and one month after training when compared to before training for the experimental group ($p < 0.05$) (Fig. 2). There was no significant change in BBS for the control group.

TUG and FR were not significantly different from before training for either the control group or experimental group ($p > 0.05$).

a.) Berg Balance Scale



b.) Timed Up & Go



c.) Functional Reach

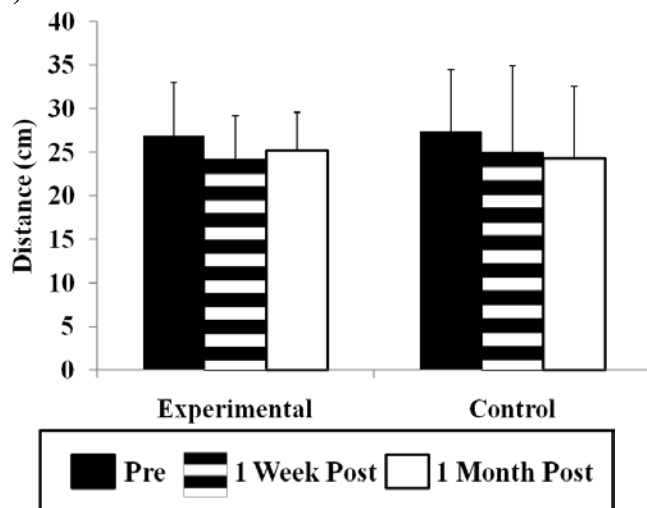


Figure 2: BBS (a), TUG (b), and FR (c) results from before training, one week after, and one month after for both the experimental and control group. Error bars represent standard deviation.

Few studies have examined the efficacy of training using the Wii Balance Board to improve measures of balance in older adults. One study examined the effect of four training sessions on a single stroke patient [2]. Although this was only one subject and

not an extended training period, this subject was able to decrease their TUG by 10 seconds and also increase their FR and BBS. These changes may not be directly attributed to the Wii Fit training, but do show promise. Another study involving stroke patients used the Wii Balance Board for training with a custom designed program [3]. Although no quantitative results were given, qualitatively the participants enjoyed the physical therapy and thought it to be more challenging compared to regular therapy. The prior studies examine the effect of training on stroke patients while this is the first to examine the effect on healthy older adults but the results for all studies are promising.

The possibility of using the Wii Fit with Balance Board for balance training is appealing for many reasons. First, participants tend to enjoy what they are doing [3]. Another benefit is the low cost for the entire system. The Wii along with the Wii Balance Board and Wii Fit game can be purchased for under \$300. This low cost would allow people to continue the training at home. With these reasons, the potential for long term adherence to the training program outside of the study is large.

CONCLUSIONS

In conclusion, this pilot study provides some evidence that training using the Wii Fit and Balance Board can lead to some improvements in clinical measures of balance in older adults. A larger study is needed to confirm the efficacy of training as a method to improve balance.

REFERENCES

1. Clark RA, et al. *Gait & Posture* **31**, 307-310, 2010.
2. Sugarman H, et al. *Virtual Rehabilitation International Conference* 111-116, 2009.
3. Lange B, et al. *Top Stroke Rehabil* **17**, 345-352, 2010.

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