

Mowder-Tinney JJ, Camilleri G, Horan JP, King G, Lang B, Parton S, Partridge B, Newton A, Pullano K

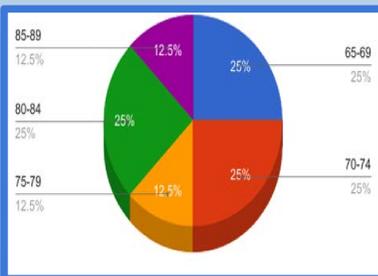
Introduction

Parkinson's Disease (PD) typically results in impaired functional mobility and increased risk for falls which affects ~8 million people worldwide. Although body weight supported harness systems^{1,2} and large amplitude movement training^{3,4} have separately shown improvement in function in those with PD, there is little research involving a combination of these therapies. In addition, few studies include an assessment of fear of falling although there is a correlation between increased fear of falling and poorer results on functional outcome measures.⁵ The purpose of this pilot study was to bridge this gap in the literature and assess the effects of progressive large amplitude movements with and without utilization of an unweighted harness system on functional outcome measures and fear of falling.

Subjects

Eight participants (six male, two female) diagnosed with PD with an average age of 75 years. Distribution of ages can be seen in Figure 1. Due to attrition data was collected on seven participants.

Figure 1: Age Distribution



Materials/Methods

Of the eight participants, four were randomly placed in the harness system and four were placed in a matched control group (no harness). Interventions took place twice a week for five weeks for 50 minutes each session. Each group performed the same exercises focusing on large amplitude movements with progressive challenges including but not limited to sit to stands, step ups, turns, and reactive balance. Participants in the harness group performed interventions starting at 20% unweighted. Pre and post-test measures included 10MWT, TUG, 6MWT, ABC scale, and cadence.

Results

Subjects in the harness group showed a mean improvement in the 10MWT (.0675 m/s), 6MWT (344.65 ft), and ABC scale (9.58%); while the control group showed a mean improvement in the 10MWT (.074 m/s), and 6MWT (69.1 ft) with a mean decrease in the ABC scale (1.67%), see Figures 2 and 3. A higher percentage of individual scores within the harness group showed improvement above the MDC in both the 6MWT and ABC scores, see Figures 4 and 5. Overall, improvement in the harness group was greater than those in the control group with no clinically significant changes in either group for the TUG or cadence.

Figure 4: Differences in 6MWT

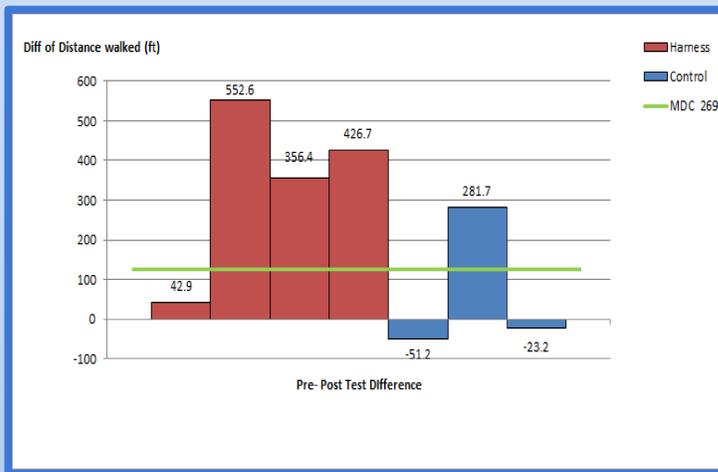
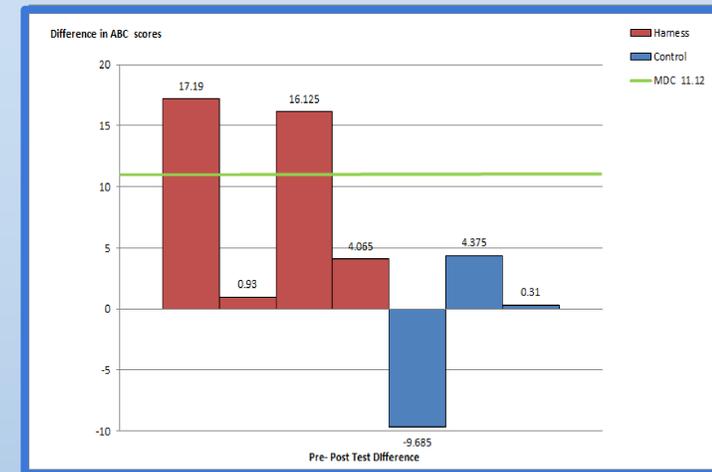


Figure 5: Differences in ABC scores



Conclusions

The application of large amplitude movements within an unweighted harness system showed greater improvement than large amplitude movements alone for the 6 MWT and ABC scale. These results differ from a meta-analysis,⁶ which found no significant difference in ABC scale scores between an exercise and control group for people with PD despite exploring various interventions. Post-test ABC scale results suggest the use of an unweighted harness system may create an environment that allows greater confidence while performing large amplitude movements. Further research is needed to explore the benefit of a harness system for people with PD. Limitations of the current study are the small sample size, baseline differences between groups, and the fluctuation of symptoms.

Figure 2: 6MWT

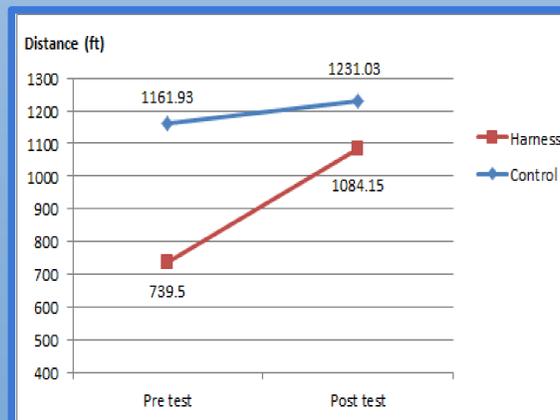
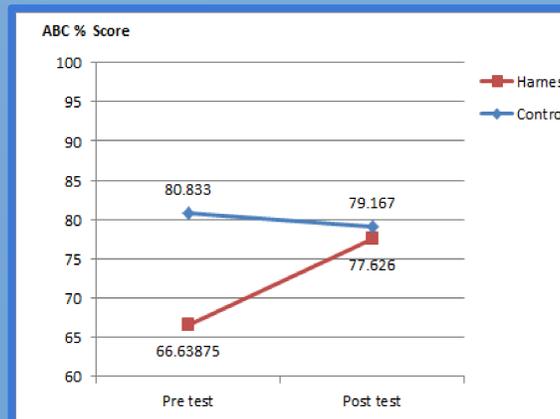


Figure 3: ABC Scores



Clinical Relevance

Using an unweighted harness system in conjunction with large amplitude movements may help to reduce fear of falling in individuals with Parkinson's Disease to allow for the utilization of more challenging activities. Along with reducing fear of falling, improvements were seen in gait speed and endurance.

References

- Miyai I, Fujimoto Y, Kang J, et al. Long-term effect of body weight-supported treadmill training in Parkinson's disease: a randomized controlled trial. *Archives Of Physical Medicine And Rehabilitation* [serial online]. October 2002;83(10):1370-1373. Available from: MEDLINE, Ipswich, MA. October 24, 2015.
- Boyne P, Israel S, Dunning K. Speed-dependent body weight supported sit-to-stand training in chronic stroke: a case series. *Journal Of Neurologic Physical Therapy: JNPT* [serial online]. December 2011;35(4):178-184. Available from: MEDLINE, Ipswich, MA. Accessed October 11, 2017.
- Farley B, Fox C, Ramig L, McFarland D. Intensive amplitude-specific therapeutic approaches for Parkinson's disease: toward a neuroplasticity-principled rehabilitation model. *Topics in Geriatric Rehabilitation*. 2008. Vol.24, no. 2, pp. 99-114. Accessed October 4, 2015.
- Hirsch M, Fairley B. Exercise and Neuroplasticity in persons living with Parkinson's disease. *European Journal of Physical and Rehabilitation Medicine*. 2009. 45(2), 215-229. Accessed October 20, 2015.
- Bryant M, Rintala D, Hou J, Protas E. Influence of fear of falling on gait and balance in Parkinson's disease. *Disability And Rehabilitation* [serial online]. 2014;36(9):744-748. Available from: MEDLINE, Ipswich, MA. Accessed October 4, 2015.
- Tomlinson C, Patel S, Ives N, et al. Physiotherapy intervention in Parkinson's disease: systematic review and meta-analysis. *BMJ (Clinical Research Ed.)* [serial online]. August 6, 2012;345:e5004. Available from: MEDLINE, Ipswich, MA. Accessed October 24, 2015.

