THE PERRY & RUBY STEVENS
Parkinson's Disease
CENTER OF EXCELLENCE

"Exercise interventions for improving balance and neuroplasticity in Parkinson's disease"

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Abstract

Postural instability is a hallmark motor symptom in Parkinson's disease (PD) and a major contributor to falls. Non-motor symptoms such as cognitive impairment are associated with postural instability, and increased risk of fall. This talk will present an overview of two exercise studies that were conducted for improving balance in people with PD.

Aerobic exercise training is an intervention that can increase cardiovascular fitness and improve motor symptoms and cognition in individuals with PD. When aerobic exercise is combined with targeted cognitive-motor rehabilitation such as virtual reality (VR) based training, it could produce additive effects and potentially reduce the risk of fall. This pilot study investigated the effects of exercise training followed by VR games on balance and cognition in PD. In the first study, participants were randomized to high intensity interval training (HIIT) and VR games (HIIT-VR, n=8) or stretching and VR games (St-VR, n=7). The HIIT-VR group performed 30 minutes of exercise (intervals at >80% heart rate maximum) on a recumbent stepper before 30 minutes of VR games thrice per week for 8 weeks. The dose-matched St-VR group performed whole body stretches prior to VR games.

Outcomes were obtained at baseline, post-intervention, and 6 week follow up. The primary outcome was the mini-Balance Evaluation Systems Test (miniBESTest) and secondary outcomes included 6-minute walk distance (6MWD), postural sway, PD-cognition rating scale, spatiotemporal measures of gait during single and dual task conditions and quality of life. Fifteen individuals [mean ± SD age: 68.1 ± 10.5 years, Hoehn and Yahr stages 2-3] participated in the first study. Significant group by time interactions were observed for the miniBESTest and 6MWD, with the HIIT-VR group demonstrating greater improvements in the balance and endurance compared to the St-VR group at post assessment. There were no differences between groups in measures of postural sway, cognition, gait and quality of life.

In the second study, the researchers are interested to test whether a combination of blood flow restriction combined with instability resistance training is better than IRT alone for improving balance in people with PD. This study is ongoing and the speaker will present initial results from 12 participants who have completed the study.

Overall, preliminary findings suggest that both aerobic and resistance exercise could elicit meaningful gains in balance, suggesting that it may improve rehabilitative outcomes in PD. Larger controlled studies are needed to evaluate long term effects and identify the underlying neurobiological mechanisms.