

## The 2014 Wingate Congress of Exercise and Sport Sciences

### Improving Balance of Individuals with Intellectual and Developmental Disability through a Virtual Reality Intervention Program

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**Background:** Individuals with intellectual and developmental disabilities (IDD) are in need of effective physical fitness training programs. Virtual Reality (VR) technology was investigated as a technique for providing a motivating physical fitness program for individuals with IDD.

**Aim:** To test the effectiveness of a VR-based exercise program in improving the balance of adults with IDD.

**Methods:** Participants were randomly assigned to the control and research groups from a total of 18 individuals with IDD and balance problems. A research group (N=9; age range = 30-58 years, mean  $\pm$  standard deviation (SD) age =  $42.9 \pm 10.6$  years; IDD level = moderate) matched the control group for age, gender, IDD level and balance abilities (N=9, age range = 24-55 years, mean  $\pm$  SD age =  $42.9 \pm 10$  years; IDD level = moderate). An 8-week program consisting of two 30-minute sessions per week was implemented. It consisted of game-like exercises (enhancing kicking, quick body movement and leaning to both sides) provided by the SeeMe video capture VR system (<http://www.virtual-reality-rehabilitation.com/products/seeme/what-is-seeme>). Post-intervention changes in balance were monitored by the Timed Up and Go (TUG) and Berg Balance Test (BBT) tests, relative to pre-intervention values.

**Results:** Significant ( $P < 0.05$ ) improvements in balance were demonstrated for the research group in comparison to the control group for the TUG test (using the two tailed student T-test). A similar trend (not statistically significant) was found with the BBT.

**Discussion:** The TUG test, but not the BBT, was found suitable and feasible to evaluate balance under clinical conditions. The difficulty in understanding and following directions for the BBT demonstrated by both groups of study participants suggests that it is not an appropriate test to evaluate balance in individuals with IDD; this finding is consistent with previous study results. VR game-based intervention was feasible and suitable for adults with IDD and, when delivered over a period of eight weeks, resulted in significant improvements in the balance of the research participants only. Not all games were appropriate for the research population due to cognitive limitations, three individuals originally participating within the research group were removed due to lack of cooperation-understanding.

**Conclusions:** VR technology is suitable as a means to improve balance in most adults with moderate level of IDD. The TUG balance test is suitable to assess balance of individuals with IDD. The BBT should be adapted for this population before it can be considered as a suitable/reliable test for individuals with IDD.