

**Brewer JF, Harris RW, Hamilton JW, Vause JS, Villarreal AL. *The Effects on Balance and Gait on the Advanced Elderly following Aerobic Training on the Alter-G Treadmill* (poster). Combined Sections Meeting of the American Physical Therapy Association. New Orleans, LA, 2018.**

**Abstract ID # 2771008**

**Purpose:** (1) To assess the effects of aging on balance and gait velocity in the advanced elderly (90-99 years of age) or nonagenarians, and (2) to determine whether an Alter-G anti-gravity treadmill provides an appropriate aerobic training option for the advanced elderly. **Number of Subjects:** Long term care facility participants (n=2): a 92 year-old male (92 y/o), and a 90 year-old (90 y/o) female.

**Materials/Methods:** Participants passed a cognition assessment and were medically cleared by their physician before consenting. Self-assessments were collected for each participant on the Modified Gait Efficacy Scale (MGES), Duke Activity Status Index, and the Par-Q. Baseline measurements included systolic blood pressure, heart rate (HR), and oxygen saturation levels (SaO<sub>2</sub>), the Two-Minute Walk Test, a 10 Meter Walk Test (both at a self-selected pace and fast pace), and postural stability measurements via the Biodex® Biosway platform. Training sessions were twice a week for 10 weeks (92 y/o) and 12 weeks (90 y/o) for a 10-minute supervised walking session on the Alter-G antigravity treadmill, using 60% of their body weight at the participant's self-selected pace. HR, SaO<sub>2</sub>, and rate of perceived exertion (RPE) were recorded every 2 minutes. Participants increased their speed if their RPE and vitals did not contradict doing so. Distance and speed were recorded at the end of each training session. Subsequent training sessions began at the last recorded speed, or as comfortable to the participant. **Results:** The two standard deviation band method of analysis was used to determine statistically significant changes from the baseline phase through the carryover phase. Neither participant's postural stability changed significantly (Sway Indexes from 1.5 to 0.9), the 92 y/o showed significant change in the 10 meter walk test at a self-selected speed (from 10.5 to 8.25 seconds), and both participants showed significant change in the 10 meter walk test fast pace (92 y/o from 4.5 to 3.3 and 90 y/o from 8 to 6.5 sec.) and as well as two minute walk distance (92 y/o from 70 to 145 meters, and the 90 y/o from 59 to 88). These positive changes were maintained when re-measured after the two-week carryover. In addition, both participant's MGES scores decreased after completing the training period, although not significantly. **Conclusions:** The findings suggest that Alter-G treadmill ambulation is a safe and practical method of exercise for the advanced elderly that can be successfully used to increase gait speed, endurance, and distance. Further research is needed to generalize our findings to a larger population and explore the long-term impact training in this type of environment has on the body. **Clinical Relevance:** Falls in the advanced elderly correlate with increased disability, costs, and mortality. Gait speed and balance have been shown to correlate with fall risk in the advanced elderly population. The pilot study demonstrates promise in benefits that may reduce the risk for falls. Further research is needed to establish normative training protocol data for this population.

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