

Effects Of A Golf Training Program On Dual-task Gait Speed In Older Military Veterans

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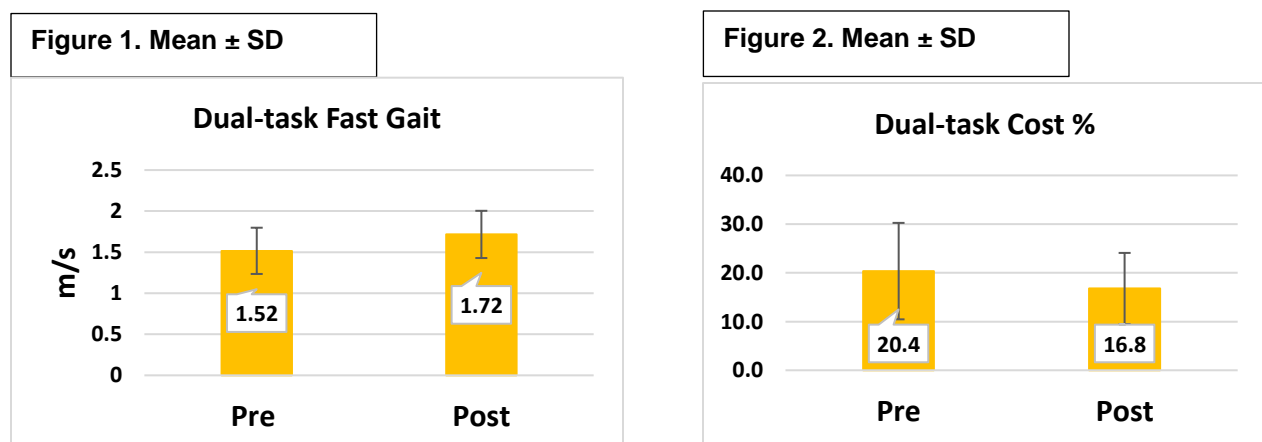
Biomechanics and Physiology

Purpose: Physical and cognitive function are important predictors of successful, independent aging. As part of the natural aging process, these functions progressively decline. Both gait and cognitive impairments are associated with fall risk, institutionalization, hospitalization and mortality in seniors. In the past, gait and cognition were thought to be independent paths of decline in aging adults. However, in the last decade, emerging evidence has demonstrated that gait and cognition are inter-related in older adults. Dual-task (DT) paradigms have been used to gain greater understanding of the relationship between gait, cognition, and aging. There is strong evidence that poor DT gait performance is a predictor of increased fall risk and impaired cognition. This poor DT performance is also known as a DT “cost”, this “cost” occurs when both a motor and cognitive task are being performed at the same time resulting in poorer performance when compared to either individual task done by itself. Exercise interventions have been utilized to improve both gait and cognitive performance in older adults. The purpose of this study was to examine the influence of a 12-week golf training program on DT gait performance in older military veterans.

Methods: Eight healthy, community dwelling older military veterans (70.8±3.3 yrs) were recruited. DT gait speed was measured before and after a 12- week golf intervention (2x weekly; 90 minutes per session). Participants completed 3 successful gait trials (correct contact with the force plate), walking as fast as possible while performing a subtraction by 3’s counting task. Gait speed was measured over a 6m distance (10m total, with 2m acceleration and 2m deceleration) using timing gates with a 10-camera Qualisys (Goteborg, SE) 3D motion capture system. Dual-task “cost” was measured using the following calculation:

$$\frac{\text{dual task} - \text{single task}}{\text{single task} \times 100}$$

Results: Post intervention, participants improved average DT fast gait speed by 0.20 m/s or 13.2% (p=0.03, ES: 1.54). Average DT fast gait speed increased from 1.52 (0.28) m/s to 1.72 (0.29) m/s. See figure 1. DT “cost” decreased from 20.4% to 16.8%. See figure 2. Results presented as mean (±SD).



Discussion: Participants improved average DT fast gait speed by 0.20 m/s. Previous reports have established that a change of 0.1 m/s in gait speed is considered to be a meaningful clinically important difference (MCID) in older adults. MCIDs are defined as the smallest difference in the score that is

considered worthwhile or important. Gait speed changes of at least the MDIC (showing decline or improvement) demonstrate that the participant or patient has experienced an important change to their functional ability. The current literature reports that a gait speed MDIC of 0.05 m/s is considered a small meaningful change and that 0.10 m/s is considered a substantial meaningful change. Improvements in DT performance (i.e. "Cost") are important findings in this study. Walking while simultaneously performing another cognitively demanding task, such as talking on the phone, texting, and navigating traffic in a parking lot, are typical activities of daily living that need to be maintained in order for older adults to stay independent in the community.

Practical Application/Clinical Relevance: In older adults, golf training has combined physical and cognitive demands. Physical demands include walking on uneven terrain, picking up a golf ball, pulling a cart with clubs, high-powered golf swings with controlled momentum, navigating obstacles (gopher holes, woody areas with branches and leaves, sand traps, and soggy/muddy grassy areas). Cognitive demands include determining the intensity of the swing (tee-off vs. putting), deciding which club to use for each shot, finding the ball after it has been hit, incorporating internal feedback from the last shot to improve the next shot, incorporating external feedback from the instructor on what changes are needed to accomplish the goal, "reading" the green, reward-based association with what a "good" shot feels/sounds like, focusing all attention on the ball and tuning out all other distractions (cars, helicopters, birds, fellow players talking), and paying attention to environmental conditions (wind, if the greens are "fast" or "slow", depending on the type of grass). These preliminary findings suggest that these physical and cognitive demands of golf may improve DT fast gait speed and DT performance in older veterans, leading to their improved quality of life through improved momentum of both cognitive and physical performance.

- Please consider for either a podium or poster presentation