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### Gait Quality Changes During an Instrumented Six Minute Walk Relate to Function but not Activity Level

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Walking performance is an indicator of overall mobility. Changes in walking speed and capacity can predict musculoskeletal, cardiorespiratory, and metabolic morbidities. Prolonged walking ability evaluated with the Six Minute Walk Test (6MWT) provides summary measures of gait performance over the assessment period. Instrumenting the 6MWT allows clinicians to evaluate stride-to-stride gait quality and changes in gait performance throughout the test. **PURPOSE:** To evaluate how measures of gait performance change during the 6MWT in aging Veterans, and how these changes relate to physical performance and health measures. **METHODS:** Twenty-one Veterans (age:  $62.2 \pm 6.4$  y/o, BMI:  $34.0 \pm 6.4$  kg/m<sup>2</sup>, 12 Male/9 Female) completed self-report (SF-36) and performance-based (four square step test (FSST), gait speed) measures of mobility and health. Veterans then completed the 6MWT with an accelerometer attached to their left ankle. Physical activity level was evaluated with 24 hours of at-home activity monitoring. **RESULTS:** Participants had an average gait speed of  $1.2 \pm 0.4$  m/s and walked  $430.6 \pm 111.6$  m on the 6MWT. There was no significant effect of time on gait performance measures across the minutes of the 6MWT (stance time:  $P=0.95$ , stance time coefficient of variation (COV):  $P=0.93$ , stance percent:  $P=0.89$ , stride time:  $P=0.96$ , stride time COV:  $P=0.91$ , swing time COV:  $P=0.99$ ). Having larger increases in stride time ( $\rho=-0.59$ ,  $P=0.005$ ) and stance time ( $\rho=-0.66$ ,  $P=0.001$ ) during the 6MWT were associated with lower self-reported function on the SF-36. Veterans with greater increases in stride time COV ( $\rho=0.61$ ,  $P=0.005$ ) and stance time COV ( $\rho=0.51$ ,  $P=0.03$ ) also took longer to complete the FSST. Larger changes in stride time COV during the 6MWT were related to having a slower gait speed ( $\rho=-0.59$ ,  $P=0.005$ ), and covering less distance on the 6MWT ( $\rho=-0.45$ ,  $P=0.04$ ). Neither sedentary time nor daily moderate-vigorous activity time were significantly related with gait measures during the 6MWT. **CONCLUSION:** Demonstrating greater changes in gait quality throughout the 6MWT is associated with having lower self-reported and objectively measured physical functioning. Summary measures of physical activity were not meaningfully related with gait performance during the 6MWT; future work should explore more granular measures of physical activity mode and timing. **SIGNIFICANCE/NOVELTY:** Adding a single accelerometer to the lower leg during the 6MWT provides insight into gait quality changes during the test. Changes in gait performance during this prolonged walking assessment related with poorer balance and mobility. This may indicate motor control endurance deficits; this mechanism for morbidity development should be explored in future work. The instrumented 6MWT can be used to sensitively track changes in mobility in clinical settings.

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