

Can Objective Measures of Gait, Posture, and Balance More Accurately Discriminate Between Older Fallers Versus Non-Fallers than Clinical Measures of Gait and Posture?

Author(s): ¹Antinett A. Ampiah, ¹Charlotte A. Downs, ¹Elizabeth O. Nelson-Twakor, ¹Albert K. Okrah, ²Katherine L. Hsieh, ¹Sadanand Fulzele, and ¹Deborah A. Jehu

Faculty Sponsor(s): ¹Deborah A. Jehu, ²Katherine L. Hsieh, and ¹Sadanand Fulzele

Affiliation(s): ¹Department of Community & Behavioral Health Sciences, Augusta University
²Department of Physical Therapy, Georgia State University

ABSTRACT

Poor physical function predicts falls among older adults. The Short Physical Performance Battery (SPPB) is a subjective clinical assessment of physical function that may lack sensitivity. Wearable inertial sensors provide objective measures of posture, balance, and gait and may be more sensitive than clinical assessments, but further research is needed. This study aimed to determine if objective or clinical assessments of gait and posture can distinguish older fallers from non-fallers. $n = 17$ community-dwelling and residential care older adults (≥ 65 years) were grouped into fallers ($n = 10$; Age: 81.8 years, Montreal Cognitive Assessment (MOCA) = 23.1 points, 50% Female) and non-fallers ($n = 7$; Age: 78.9 years, MOCA = 22.9, 14.3% Female) based on their fall history in the past year. During the 2-hour baseline visit, participants underwent clinical assessments with the SPPB and objective assessments using inertial sensors for postural assessments, usual-paced walking, and timed-up-and-go (TUG), which involved standing up, walking 3 meters, turning, and sitting down. Separate repeated measures analyses of variance were conducted for all clinical measures, posture, gait, and TUG. There was no significant interaction effect of group for clinical measures ($F_{(1.25,16.27)} = 0.191$, $p = 0.723$, $\eta_p^2 = 0.015$), posture ($F_{(1.03,14.39)} = 0.058$, $p = 0.82$, $\eta_p^2 = 0.04$), gait ($F_{(1.2,17.95)} = 0.23$, $p = 0.68$, $\eta_p^2 = 0.015$), and TUG ($F_{(1.30,18.24)} = 0.10$, $p = 0.817$, $\eta_p^2 = 0.07$). There was no significant main effect of group for clinical measures ($F_{(3,11)} = 0.725$, $p = 0.56$, $\eta_p^2 = 0.165$); posture ($F_{(7,8)} = 3.77$, $p = 0.4$, $\eta_p^2 = 0.768$), gait ($F_{(4,12)} = 0.22$, $p = 0.63$, $\eta_p^2 = 0.18$), and TUG ($F_{(4,11)} = 0.429$, $p = 0.79$, $\eta_p^2 = 0.135$). Our findings suggest clinical and objective measures of posture, gait, and balance did not differentiate between fallers and non-fallers. Caution is advised due to small sample size and ongoing data collection.

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Correspondence: Antinett Ampiah, Augusta University, 1120 15th St. Augusta, GA 30912, aampiah@augusta.edu