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Letter to the Editor

Gait Speed Assessment in Older Adults: A Comparison Among Walk Tests, a Portable Gait Analysis Device and Self-Report

Gait speed is a strong predictor of health outcomes, mobility, and survival in older adults.[1] Assessments of usual gait speed are usually performed in clinical settings using physical performance tests.[1] Self-report has recently emerged as a practical method to assess usual gait speed when physical performance tests are not feasible (eg, epidemiologic studies in large populations).[2] New technologies such as portable gait analysis systems can obtain a long and varied amount of information about gait speed from 24-hour monitoring. To date, information on the relationships between gait speed assessments with different methods is very limited. Hence, we aimed to compare usual gait speed assessed by walk tests, a portable gait analysis device, and self-report in older adults.

The study included 200 high-functioning community-dwelling older adults (114 women), aged 71.7 ± 4.9 years. They were recruitment from wellness and senior centers through phone calls, printed advertisement placed in the notice boards, and newspapers. Usual gait speed was assessed in all participants across 3 different methods: (1) the widely used 2.44-m and 6-m walk tests, (2) the Intelligent Device for Energy and Expenditure and Activity (IDEEA) portable gait analysis device, and (3) self-report. A digital stopwatch was used in both 2.44- and 6-m walk tests following standardized protocols.[3] The IDEEA device is a portable gait and posture analysis system able to record more than 40 types of daily activities and postures, including walking speed prediction. It has shown an error of prediction of 0.0036 ± 0.3708 mph and a correlation between predicted speed and actual speed of 0.987.[4,5] The device was worn during 2 consecutive days (48 hours) while continuing with their daily routines.

Finally, gait speed by self-report was ascertained in an interview, asking participants: “Which of the following best describes your walking speed?” Participants selected one of the following response options: “unable to walk,” “very slow,” “stroll at an easy pace,” “normal speed,” “fairly brisk,” or “fast.”[2] These responses were converted to meters per second according to previous sex-specific cut points for each category.[2] Statistical analyses were performed with Pearson correlation coefficients and 1-way analyses of variance with Bonferroni adjustment for multiple comparisons. All analyses were performed using SPSS Statistics 22 for Windows (IBM, Armonk, NY), with the level of significance set at $P < .05$.

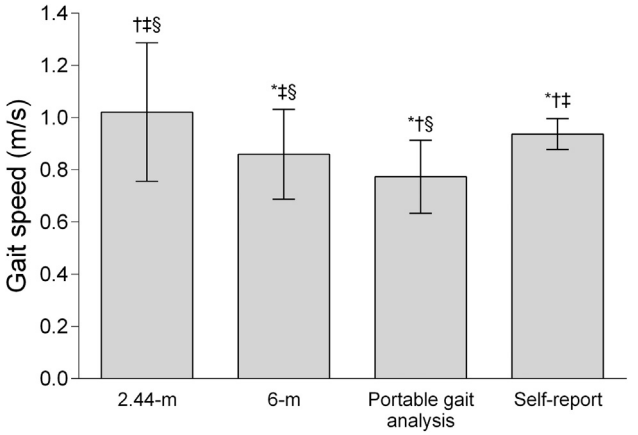

Figure 1. Habitual gait speed (means) assessed by different methods in older adults (n = 174). Bars represent standard deviation of the mean. *Significantly different from the 2.44-m walk test results. †Significantly different from the 6-m walk test results. ‡Significantly different from portable gait analysis device. §Significantly different from self-report.

Of the 200 participants, 174 had valid data on all gait speed variables. Our results showed large differences among the mean gait speed estimates from each method. The highest mean gait speed was for the 2.44-m walk test (1.02 ± 0.27 m/s), followed by self-report (0.94 ± 0.06 m/s) and the 6-m walk test (0.86 ± 0.17 m/s). The lowest speed was observed in the gait speed assessed by the IDEEA device (0.77 ± 0.14 m/s). Analyses of variance showed statistically significant differences among all pairwise comparisons (Figure 1). In addition, our results showed moderate correlations among methods. The highest correlations were observed between the self-report and the 6-m walk test and between the self-report and 2.44-m walk test ($r = -0.433$, $P < .001$, and $r = -0.487$, $P < .001$, respectively). Although lower, the correlations were also moderate between the portable gait analysis device and both walk tests ($r = -0.313$, $P < .001$, for the 6-m walk test; and $r = -0.301$, $P < .001$, for the 2.44-m). Likewise, the correlation between the self-report and the portable gait analysis IDEEA device was moderate ($r = 0.318$, $P = .001$).

According to these results, we highlight several interesting findings, which have implications for practice and research. First, gait speed by self-report was moderately correlated with a portable gait analysis device and 2 common tests used in clinical settings. Therefore, our results support that self-report gait speed may be a useful tool to rank older adults when other measurements are not possible. Second, the results show large differences across the average gait speed estimates from each method. This finding is

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important when descriptive information or effect size data related to gait speed are presented in meters per second. For example, older adults who have a usual gait speed of ≥1 m/s are classified as "normal walkers,"[6] but the method to assess gait speed when using this cut point could result in a misclassification. This issue may be also especially relevant for clinicians or researchers who use gait speed as a measure of well-being and prognosis in older adults, because these differences indicate that (1) methods to assess gait speed cannot be directly compared and (2) it will be needed to maintain the same method to assess gait speed in their research or practice.[7] Finally, a portable gait analysis device and both walk test and self-report differ greatly when assessing gait speed; further research is needed to understand these large disagreements or to confirm if they are actually assessing the same construct.

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