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Updated Poster Presentation Abstract (n = 58) From 2020 Combined Sections Meeting Of The American Physical Therapy Association: How Well Do Clinical Walking Measures Predict Natural Walking Behavior In Parkinson Disease?

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TITLE: How Well Do Clinical Walking Measures Predict Natural Walking Behavior in Parkinson Disease?

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ABSTRACT BODY:

Purpose Hypothesis: Declines in the amount and intensity of natural walking behavior in people with Parkinson disease (PD) may precede declines in motor behavior, gait, and balance.[1,2] Physical interventions targeting walking behavior in PD may have the greatest impact on slowing the progression of disability.[3-5] Despite a lack of supporting evidence, however, clinicians may be more likely to rely on quick performance measures of walking speed, capacity, and balance to make inferences about a patient's walking health, rather than direct measures of natural walking behavior. Our primary purpose, therefore, was to examine the extent to which clinical walking measures might predict natural walking behavior in early to mid-stage PD. Secondarily we sought to explore differences in the predictive capability of clinical measures between relatively less active and more active participants.

Number of Subjects: 58

Materials/Methods: Data were collected from 34 males and 24 females (age 67.7 ± 8.0 years; Hoehn & Yahr Stages 2.0-3.0) as part of the baseline assessment for a larger prospective study of individuals with PD [6]. Clinical measurement of comfortable walking speed (10 Meter Walk Test, *10MWT*, m/s), walking distance (6 Minute Walk Test, *6MWT*, m), and dynamic balance (Mini-BESTest, *MBT*, total score) were collected from participants prior to wearing a Step Activity Monitor (Modus Health LLC, Edmonds, WA) for seven days. Walking behavior was defined as the (1) mean daily number of steps and (2) mean daily minutes of moderate-intensity walking (≥ 100 steps). Less active and more active subgroups were defined post-hoc as those who averaged $<$ or $> 7,500$ daily steps, respectively. Bivariate correlations were used to characterize relationships between clinical and walking behavior measures for the full sample and subgroups.

Results: Participants collectively displayed variable walking speed ($10MWT = 1.15 \pm 0.2$ m/s), distance ($6MWT = 447.6 \pm 98.5$ m), balance ($MBT = 19.0 \pm 3.6$), daily steps (7666 ± 3843), and daily minutes of moderate intensity walking (7.4 ± 9.6). The less active subgroup ($n = 32, 55.2\%$) included 15 "sedentary" ($< 5,000$ steps) and 17 "low active" (5,000-7,499 steps) participants [7]. The more active subgroup ($n = 26, 44.8\%$) included 16 "somewhat active" (7,500-9,999 steps), 4 "active" (10,000-12,499 steps), and 6 "highly active" ($> 12,500$ steps) individuals [7]. Only two participants accumulated ≥ 30 minutes of moderate intensity walking / day. Frequency distributions for daily steps and moderate intensity minutes were not normal, warranting the use of a non-parametric correlation coefficient. For the full sample ($n = 58$), correlations between each clinical and walking behavior measure were positive but relatively weak ($.13 < \rho < .49$). The *6MWT* produced statistically significant relationships with daily steps ($\rho = .38, p = .003$) and moderate intensity minutes ($\rho = .49, p < .01$). The *10MWT* produced a significant relationship with daily steps ($\rho = .27, p = .04$). The strength of the relationships between clinical and walking behavior measures generally weakened for each subgroup, with only the relationship between the *6MWT* and moderate intensity minutes remaining statistically significant ($\rho = .48, p = .006$) for less active participants.

Conclusions: The sample included a range of clinical walking performance and natural walking behavior representative of individuals with early- to mid-stage PD [2,5]. More than half the sample was relatively less active (classified as either “sedentary” or “low active”) [7], and nearly all participants appeared to be falling well short of public health recommendations for moderate-intensity physical activity [8], at least in terms of their walking behavior. Correlation analyses suggested that clinical walking measures may be relatively poor candidates as predictors of natural walking behavior, as only some participants with relatively robust walking speed, distance, and/or balance were more active and only some participants with relatively diminished speed, distance, and/or balance were less active. Of the clinical measures, the 6MWT appeared to show potential as a modest potential predictor of walking behavior – especially of the walking intensity of relatively sedentary individuals.

Clinical Relevance: For their patients with PD, clinicians should exercise caution in making inferences about natural walking behavior based on clinical walking measures.

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