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Ignacio Gaunaurd (1,2) presenting Robert Gailey (2) Rana Salem (3) Brian Hafner (3)

Miami Veterans Affairs Healthcare System, Miami, FL, USA (1) University of Miami, Coral Gables, FL, USA (2) Universit of Washington, Seattle, WA, USA (3)

Construct Validity of the Prosthetic Limb Users Survey of Mobility (PLUS-M)

Background: Prosthetists in the United States and elsewhere around the world are required to provide supporting documentation for the provision of prosthetic services. Although functional outcome measures exist to measure people with lower limb amputation (LLA), self-report measures may exhibit psychometric or practical limitations that restrict their use in clinical practice and research. The Prosthetic Limb Users Survey of Mobility (PLUS-M) was developed to facilitate quick and easy measurement of patients with LLA. Although evidence of PLUS-M's content validity is available,[1] additional evidence of PLUS-M's ability to measure mobility in prosthetic limb users (i.e., construct validity) is needed to support its use for measuring people with LLA.

Aim: To assess the construct validity of PLUS-M as a measure of mobility for people with LLA.

Method: A cross-sectional study was conducted at prosthetic clinics across the United States. People with unilateral LLA who were receiving prosthetic care at these clinics were eligible to participate. Participants were assessed by their prosthetist in their current prosthesis. In addition to PLUS-M, participants were administered physical performance and self-report outcome measures intended to assess mobility-related constructs, such as physical function, mobility, and balance. Measures included the Amputee Mobility Predictor (AMP), Timed Up and Go (TUG), Prosthesis Evaluation Questionnaire Mobility Subscale (PEQ-MS), Activities Specific Balance Confidence Scale (ABC), and the Patient Reported Outcome Measurement Information System Phyiscal Function (PROMIS-PF). Correlations between PLUS-M T-Scores and other measure scores were used to assess convergent construct validity. Differences in PLUS-M T-Scores among groups of people known to be clinically distinct (i.e., prosthesis users classified as K-Level 2, 3, or 4) were used to evaluate known groups construct validity.

Results: Participants (n=65 prosthetists, n=199 people with LLA) from 37 clinics participated in the study. PLUS-M demonstrated a moderate positive relationship with the AMP ($r = 0.51$, $p < 0.001$) and a moderate negative relationship with the TUG ($r = -0.44$, $p < 0.001$). The PLUS-M also showed a strong positive relationship with the PEQ-MS ($r = 0.76$, $p < 0.001$), ABC ($r = 0.81$, $p < 0.001$), and PROMIS-PF ($r = 0.77$, $p < 0.001$). Significant differences in PLUS-M, ABC, AMP, and TUG scores were found across K-Levels ($p<0.05$).

Table 1: Comparison of performance-based and self-report measures by K-Level in people with lower limb amputation

Outcome Measures	Total Mean ± SD	K-2 Mean ± SD	K-3 Mean ± SD	K-4 Mean ± SD
PLUS-M†	50.3 ± 8.0	45.2 ± 9	50.5 ± 7.7	53.8 ± 6.6
PEQ-MS‡	2.4 ± 0.8	2.1 ± 0.9	2.4 ± 0.8	2.8 ± 0.6
ABC†	2.4 ± 0.8	2.0 ± 0.8	2.4 ± 0.8	2.8 ± 0.7
PROMIS-PF §	39.9 ± 7.3	35.4 ± 7.5	40.3 ± 7.2	42.0 ± 6.0
TUG†	15.3 ± 10.3	26.3 ± 15.6	14.5 ± 8.8	9.5 ± 3.4
AMP†	39.9 ± 5.4	32.1 ± 6.2	40.4 ± 4.3	44.6 ± 1.9

† = significant differences among all K-levels; ‡ = significant difference between K-2 and K-3 and between K-3 and K-4; § = significant difference between K-2 and K-3 and between K-2 and K-4. Threshold of significance was $p \leq 0.05$.

Discussion & Conclusion: Results of this study show PLUS-M has strong evidence of validity as a self-report measure of prosthetic mobility in people with unilateral LLA. Moreover, evidence of known groups construct validity may support use of PLUS-M to help corroborate clinician-assigned K-levels. These data suggest that prosthetists and other clinicians can use PLUS-M with confidence to document prosthetic mobility and functional level of patients with LLA.

References: 1. Morgan SJ. Qual Life Res, 23(6):1767-75.