



SELF-REPORT MEASURES HELP PREDICT DAILY STEP COUNTS AMONG INDIVIDUALS WITH A UNILATERAL TRANSTIBIAL AMPUTATION

Sions, J.M.¹, Arch, E.S.², Horne, J.³

University of Delaware, Department of Physical Therapy¹, University of Delaware, Department of Kinesiology and Applied Physiology², Independence Prosthetics and Orthotics, Inc.³

INTRODUCTION

One construct of interest in determining prosthetic componentry is the patient's physical activity level. Accelerometers, which provide daily step counts, have been used to assess physical activity level, in multiple populations. Since the cost of research-grade accelerometers precludes their use in routine clinical practice, practitioners rely on clinical measures to make inferences as to a patient's physical activity level in their home and community. However, research evaluating relationships between clinical measures and daily step counts among individuals with lower limb loss is limited. Thus, the purpose of this study was to determine if commonly used self-report measures are predictive of physical activity, as assessed via accelerometer data, i.e. daily step counts, among adults with a lower limb amputation.

METHODS

Participants: 50 prosthetic users, aged 18-85 years, with a unilateral transtibial amputation were included in this study that was funded by the Orthotics and Prosthetics Education and Research Foundation, Inc. Individuals with bilateral amputations or with weight-bearing restrictions of the residual limb were excluded. The project was approved by the University of Delaware Institutional Review Board for Human Subjects; all individuals signed an informed consent.

Procedures: Participants provided demographics information and completed the Prosthetic Evaluation Questionnaire-mobility section (PEQ-m; Franchignoni, 2007), the Activities Specific Balance-Confidence Scale (ABC; Miller, 2003), and the Houghton Scale of Prosthetic Use (HOU; Wong, 2016). Medical history and medications were reviewed with a licensed practitioner and the Cumulative Illness Rating Scale (CIRS; Hudon, 2005), which is a measure of comorbidity burden, was completed. Participants wore a StepWatch 3 activity monitor for 7 days following the examination; average daily step count was extracted from each monitor. Individuals with at least 5 days of activity monitor data were included (n=47).

Data Analysis: Linear regression modeling was used to explore relationships among self-reported outcome measures and average daily step count, while controlling for sex, age, time elapsed since the initial amputation, and comorbidities per the CIRS (p<.050). Assumptions for regression modeling were met.

RESULTS

Sixty-six percent of the sample was male (n=31). Mean age was 58.5±12 years, mean time elapsed

since the initial amputation was 12.7±14.5 years, and the mean CIRS was 11.0±6.7 points. Participants walked on average 5491±4043 steps/day. Covariates explained 31.4% (p=.004) of the variance in average daily step count, while PEQ-m explained an additional 13.0% of the variance (p=.004). Covariates explained 32.7% of the variance in the ABC and HOU (p=.002); the ABC and the HOU explained an additional 13.3% (p=.003) and 11.3% (p=.007) of the variance in average daily step count, respectively. For all self-report measures, higher scores helped predict greater average daily step counts in the days that followed.

DISCUSSION

Routine use of research-grade accelerometers to determine physical activity level is not feasible. Thus, it is important to identify clinical measures that provide insight into daily physical activity, which is a major consideration when determining a patient's prosthetic componentry. The PEQ-m, ABC, and HOU predict physical activity level among individuals with a unilateral transtibial amputation who are using a prosthetic device, regardless of age, sex, time elapsed since the individual's initial amputation, and comorbidities. Our work adds to the research of Lin et al. (2014) who found that mean daily step counts as assessed via pedometers were correlated to various physical performance measures. Our future work will seek to determine a cluster of clinical measures, i.e. self-report and performance-based, that predict physical activity level among patients with lower limb amputations over a longer time period.

CONCLUSION

The PEQ-m, the ABC, and the HOU may assist practitioners with predicting daily physical activity among individuals with a unilateral transtibial amputation.

CLINICAL APPLICATIONS

This work is the first step in determining a cluster of clinical measures that may serve as a surrogate for physical activity data obtained from accelerometers.

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