AMBLICATION-ACTIVITIES DIFFICULTY AND RESIDUAL LIMB PAIN, SOCKET-FIT, AND BALANCE-CONFIDENCE

Sions, J.M.1, Horne J.2, Sarlo, F.3 and Manal, T.J.1
University of Delaware, Department of Physical Therapy1, Independence Prosthetics-Orthotics, Inc.2, Christiana Spine Center3

INTRODUCTION
Lower limb amputation (LLA) incidence increases after 50 years of age (Dillingham, 2002). Restoration of ambulation ability following an amputation may promote independence and improve social function (Fortington, 2013). Identifying factors that may contribute to ambulation-activity difficulty may ultimately guide interventions. **Purpose:** The primary objective of this analysis was to explore relationships among suspected factors, i.e. residual limb pain, socket-fit comfort, and balance-confidence, and difficulty with self-reported ambulation-activities, among individuals with LLAs. We hypothesized that these factors would be independently associated with ambulation-activity difficulties, with the strongest associations for residual limb pain. Secondary objectives included determining if there were any associations among residual limb pain, socket-fit comfort, and balance-confidence and which ambulation-activities were perceived as most difficult.

METHOD
**Subjects:** Data was collected from 19 patients with unilateral transfemoral or transtibial amputations who were currently using a prosthetic device.

**Procedures:** Patients rated the following activities on a 0-10 scale, where 0=no difficulty and 10=extreme difficulty: walking short/long distances, negotiating close spaces, walking up/down stairs, walking up/down a hill, walking on sidewalks/ slippery surfaces/backwards, turning, and stepping over objects. The standardized evaluation also included residual limb pain rating (0=no pain, 10=worst possible pain), height and weight for calculation of body mass index (BMI), Socket Fit Comfort Score (SFCS), and the Activities-Specific Balance Confidence Scale (ABC). SFCS is a reliable and valid measure where prosthetic users are asked to rate their socket comfort on a 0-10 point scale, where 0=most uncomfortable and 10=most comfortable socket imaginable (Hanspal, 2003). The ABC is a 16-item questionnaire where patients rate how confident they are that they will not lose their balance or become unsteady with various activities; scores of 0%=no confidence, while scores of 100%=complete confidence (Powell, 1995).

**Data Analysis:** SPSS Statistics 22 was used to perform correlation analyses while controlling for the following covariates: age, sex, amputation level, and BMI (p<.05).

RESULTS
Mean age was 58.7±10.5 year and mean BMI was 29.0±4.8kg/m². Ambulation-activities rated most difficult included walking on slippery surfaces (6.8±3.7), walking long distances (6.5±3.2), and walking backwards (5.1±3.4). There were no correlations among residual limb pain (3.6±3.9), SFCS, or the ABC (p>.05). Residual limb pain was not correlated to difficulty with any of the ambulation-activities. SFCS was correlated to walking long distances (r=-.645, p=.009), turning (r=-.687, p=.005), and stepping over objects (r=.597, p=.019). ABC was correlated to walking up stairs (r=-.820, p=.000), walking up a hill (r=-.689, p=.005), walking down a hill (r=-.624, p=.013), and walking backwards (r=-.517, p=.048).

DISCUSSION
Lack of correlation among residual limb pain rating, SFCS, and the ABC suggest these measures assess distinct constructs among older adults with LLAs. SFSC and the ABC appear to be more important factors related to self-reported ambulation-activity difficulty than residual limb pain. While exploration of SFCS is relatively novel, findings related to the ABC contribute to prior findings. Miller and Deathe found that balance-confidence, which is a strong predictor of social engagement, is a persistent problem among individuals with LLAs (2011). Perhaps interventions geared at improving socket-fit and/or balance-confidence may be effective for decreasing perceived difficulty with ambulation-activities and improving social function.

CONCLUSION
Ambulation-activity difficulties are associated with socket fit comfort and balance-confidence but not residual limb pain.

CLINICAL APPLICATIONS
Clinicians may consider inclusion of SFCS and ABC when evaluating older individuals with unilateral LLAs who express difficulty with ambulation tasks. Each of these measures may help to predict different and specific ambulation-activity difficulties, but further, longitudinal research is needed to establish causation.

REFERENCES