A Mixed-Methods Examination of Limitations to Physical Activity as Reported by Individuals with Lower Extremity Amputations

Elizabeth Bell, Callie Moran, Shannon Jette, Ross Miller and Jae Kun Shim
Department of Kinesiology, University of Maryland, College Park, MD

kinesiology university of maryland
Neuromechanics Research Core

Introduction

Lower-extremity amputations are associated with a reduction in mobility and physical activity levels [1]. Reduced mobility in this population has been reported to be detrimental to many aspects of health.

Prosthesis design largely affects amputees' ability and willingness to participate in physical activities [2].

Other limitations such as perceived self-efficacy may also affect mobility and physical activities, independent of the type of prosthetic technology [3].

Barriers to physical activity have been previously reported for a military population [2]. However, no examination between barriers to physical activity among specific aspects of physical activity exist.

Purpose: To gain a better understanding of what aspects are limiting the physical activity and mobility of individuals with lower-extremity amputations (ILEA) by analyzing short text responses from two questions about the key terms related to physical activity and mobility.

This research uses mixed methods analysis [4] to assess an account of prosthetic, physical, mental, and health care limitations to physical activity as reported by ILEA. Descriptive analysis will display quantitative population trends.

Methods

Eighty-four ILEA respondents completed a novel online questionnaire which was approved by the University of Maryland Internal Review Board.

- Gender 45 male, 39 female
- Level 8 bilateral, 19 transfemoral or knee disarticulation, and 57 with transtibial level amputation
- Cause 41 disease, 36 trauma, 12 limb salvage failure

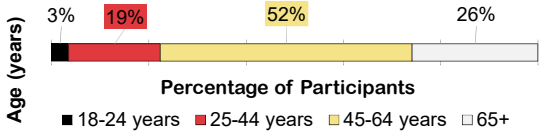

Figure 1. Participant age distribution.

Key terms related to physical activity which were previously identified through a review of literature, were explained in lay terms within the survey.

Participants were asked to select up to four choices for the most important of 10 key terms related to physical activity and answer two questions about each selected key term.

Short text responses were analyzed qualitatively. Limitations to physical activity were identified and categorized:

Table 1. Limitation categories and examples

Prosthetic	Issue with socket fit, prosthetic weight, liner issue, limited range of motion because of device
Physical	Pain in body segment, excessive sweat, limited range of motion at a body segment, comorbidities
Mental	Avoidance of an activity, fear of falling
Healthcare	Limited financial resources, clinical knowledge deficits, inadequate communication

References

1. Bussmann JB et al. Arch Phys Med Rehabil 2004;85:240–4.
2. Littman AJ et al. J Rehabil Res Dev 2014;51:895–906.
3. Möller S et al. Disabil Rehabil Assist Technol 2017;3107:1–6.
4. Giacobbi, PR et al. Sport Psych 2005; 19:18-31.

Recipient of the Edwin and Kathryn Arbogast Award

Results

Comfort was selected as an important key term by 74% of ILEA respondents. More than half of the comfort responses mentioned limitations to physical activity. Discomfort was commonly categorized as caused by prostheses (Figure 2 & 3).

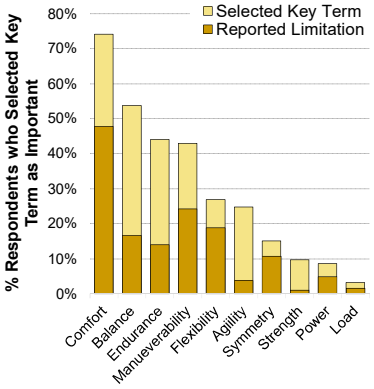

Figure 2. The percentage of respondents who identified each key term as important in relation to functional capabilities of their current or ideal prosthesis (light yellow) and the percentage that identified limitations in their short text responses (dark yellow).

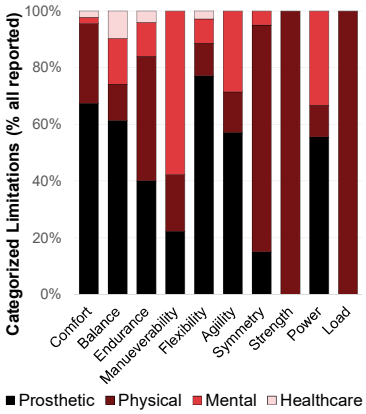

Figure 3. Distribution of limitations tagged in qualitative analysis by Prosthetic, Physical, and Mental categories.

The limitations reported under the comfort questions are presented by participant demographics in Figure 4a-c.

Comfort: the absence of physically unpleasant feelings (i.e. The comfort of your residual limb when either stationary or moving about / The overall fit and weight of the prosthesis)

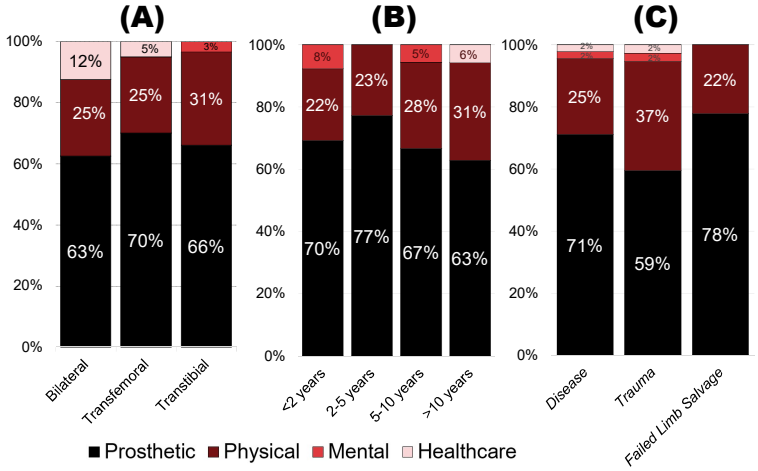

Figure 4. Categories of reported limitations organized by (a) amputation level (b) time since amputation, (c) cause of amputation. Limitations are displayed with respect to total limitations reported (see Figure 1).

Conclusions

This work provides an examination of barriers to mobility among specific aspects of physical activity such as comfort.

We found that comfort was the most commonly selected important key term related to physical activity. This finding is in line with other studies who have reported pain as the most common barrier to activity [2].

Physical causes greatly contributed to of discomfort. Prosthetic and physical causes of discomfort were prevalent when responses were arranged by amputation level, time since amputation, or cause of amputation.

This information should be taken into account when designing prosthetics and when creating physical activity programs for amputees. Further research is needed to investigate suitable solutions to this reported barrier to physical activity and mobility.