

PERSPECTIVES OF INDIVIDUALS WITH C6-C7 SPINAL CORD INJURY ON THE DESIGN OF A NOVEL ROBOTIC HAND BRACE

Lauren Winterbottom, MS, OTR/L; Dawn Nilsen, EdD, OTR/L, FAOTA; Rochelle Mendonca, PhD, OTR/L;
Ava Chen, MS; Jingxi Xu, MS; Matei Ciocarlie, PhD; Joel Stein, MD

INTRODUCTION

Individuals with C6-C7 spinal cord injury (SCI) can form a grasp with their hands by extending the wrist (tenodesis) but have difficulty performing daily activities due to reduced strength and fine motor ability.

Wearable robotic hand orthoses have the potential to improve functional grasps for individuals with SCI but little is known about the needs and priorities of this population for such a device.

OBJECTIVES

OBJECTIVE 1:
Explore the perspectives of individuals with reduced hand function due to C6-C7 SCI on the design of a novel wearable robotic hand brace.

OBJECTIVE 2:
Learn about the perceived real-world usage of such a device during the daily life activities of this population.

METHODOLOGY

We held two 90-minute focus groups (3 participants per group, 6 total). Participants were adults with complete or incomplete C6-C7 SCI living in the community.

Recordings were transcribed by an online transcription service and verified by LW. Qualitative analysis using NVivo software was conducted by 3 occupational therapists using a deductive coding approach in which initial codes were collaboratively developed.

Transcriptions were independently coded by 2 raters according to the initial codes. The codes were then collaboratively revised, and a Code Book was created. Transcripts were then recoded by 2 independent raters according to the Code Book. Raters then met to discuss, revise, and finalize the Code Book.

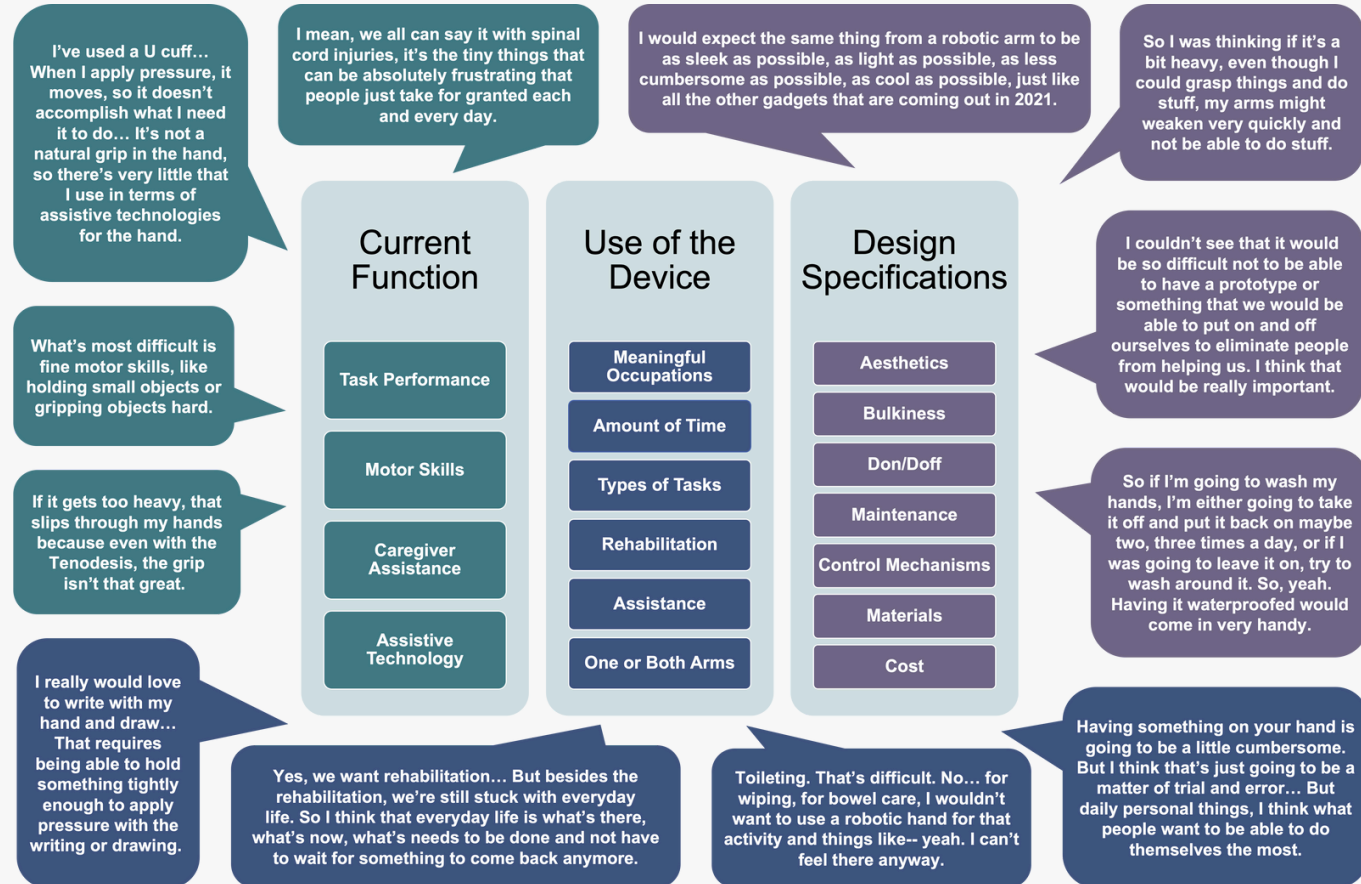
PRELIMINARY RESULTS

Qualitative analysis revealed 3 overarching themes and 17 sub-themes. While SCI survivors reported diverse levels of hand function and different goals for use of a robotic hand brace, some common themes emerged:

- Participants focused on the pragmatic aspects of everyday device use (e.g. donning and doffing the brace easily)
- Participants often noted a cost-benefit tradeoff with design aspects (e.g. tolerating inconvenience if the device enabled them to perform meaningful occupations)

- Participants prioritized grip strength and fine motor ability during meaningful activities

THEMATIC ANALYSIS



CONCLUSIONS

Stakeholder feedback on the use and design of robotic devices can challenge researcher assumptions and help direct the research process to focus more on the experience of potential end users. End user perspectives should be incorporated early in the design process in order to drive device development.

Future work will involve the creation of an advisory panel of stakeholders to provide feedback on the device design and the research process. This project highlights the importance of obtaining stakeholder feedback when developing rehabilitative technologies to ensure they are useful and relevant for the intended population.



Prototype Design

