

Amputee Advanced Donning Device

Client: Mr. Daniel Kutschera

Advisor: John Pucinelli

Team: Carly Villa cpvilla@wisc.edu (Co-Team Leader/ BWIG)

Eleanor Hollander erhollander@wisc.edu (Co-Team Leader/ BWIG)

Ava Hopper aghopper@wisc.edu (BPAG)

Anna van Riessen avanriessen@wisc.edu (Communicator)

Sam Kamin sjkamin@wisc.edu (BSAC)

Date: October 10th 2025 - October 16th 2025

Problem Statement:

During rehabilitation, it is critical for amputee patients to wear a specialized compression garment known as a shrinker. A shrinker aims to shape the residual limb in preparation for prosthetic fitting and prevent post-operative complications like swelling and excessive fluid retention. For application of the shrinker, patients currently rely on basic donning tubes, in which the shrinker is stretched over a plastic tube and pulled over the residual limb. Because shrinkers are designed to apply strong, consistent compression, they can be very difficult to stretch over donning tubes. This challenge is especially significant for elderly patients, who may have limited strength, dexterity, or mobility. This project aims to create an advanced donning device that stretches the garment to the desired diameter using electronics, simplifying shrinker application and eliminating the need for the user to manually stretch the garment.

Brief Status Update

This week, the team prepared to order materials and begin the fabrication process. On Tuesday (10/14), the team met with ECB Design Innovation Lab staff to receive feedback and advice on our design and fabrication process. Additionally, the team continued to do final research on materials in an attempt to finalize our materials list. Finally, the team 3D printed a prototype of the expanding pulley mechanism, which will be used to gain an understanding of how the expansion mechanism operates.

Summary of Weekly Team Member Design Accomplishments in

- Team:
 - Design consultation meeting 10/14
 - 3D printed prototype of expanding pulley mechanism
- Carly:
 - Attended design consultation meeting
 - Conducted solid works testing on nylon cylinder

- Consulted with design hub on OnShape file
- Eleanor
 - Attended design consultation meeting
 - Researched crank mechanism to be implemented
- Ava:
 - Attend design consultation meeting
 - Discuss materials to be purchased in the future
 - Research crank and slider mechanism
- Anna:
 - Attended design consultation meeting
 - Collected 3D-printed prototype
 - Did individual research
 - Completed $\frac{2}{3}$ required trainings
- Sam:
 - Attended design consultation meeting
 - Researched parts needed for the expanding mechanism
 - Researched gear train or crank to be used in place of electronic motor

Difficulties / advice requests

N/A

Upcoming Team and Individual Goals

- Team:
 - Begin testing on 3D printed prototype to evaluate design
 - Print additional 3D printed prototype with needed modifications
 - Order materials
- Carly:
 - Conduct shrinker testing
 - Make modifications to OnShape file as needed
 - Research gear trains
- Eleanor
 - Place order for materials
 - Begin fabrication upon arrival of materials
 - Conduct shrinker strength test using MTS machine
- Ava:
 - Order materials and communicate purchases with client
 - Begin fabrication of device
 - Continue individual research
- Anna:
 - Begin fabrication

-

Expenses

[illegible]

Project Timeline

[illegible]

Dates & Deadlines:

- Product Design Specifications: Friday, September 19th
- Design Matrix Criteria: Friday, September 26th
- Preliminary Presentations: Friday, October 3rd
- Preliminary Report: Wednesday, October 9th
- Show and Tell: Friday, October 31st
- Final Poster Presentations: Friday, December 5th
- Final Deliverables Due: Wednesday, December 10th