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 17th 2025 - October 23rd 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. A solidworks stress analysis was conducted on the nylon tube to assess its ability to withstand compressive strength. []. A team meeting was held on Sunday (10/19) to discuss material selections and design changes. It was finalized that the electronic circuit and motor component will be replaced with a gear train/crank mechanism, allowing the team to focus more on the expansion mechanism. Therefore, research was done in relation to cranks and gears.

Summary of Weekly Team Member Design Accomplishments

- Team:
    - Observed results of solidworks testing simulation
    - Decided upon elimination of circuit from design
    - Researched gear train mechanism
- Carly:

    - Worked on solid works for gears
    - Researched gear train
    - Attended team meeting
- Eleanor
    - Researched gear train and crank mechanisms
    - Searched for Nylon tube to purchase
    - Attended team meeting
- Ava:
    - Research crank and gear mechanism/important factors
    - Research grips and handles for low dexterity individuals
    - Discuss materials to be ordered
- Anna:
    - Finished all required trainings
    - Researched boat crank and different modified grips
- Sam:
    - Researched gears and gear mechanisms
    - Researched boat crank mechanism
    - Attended team meeting

Difficulties / advice requests

N/A

Upcoming Team and Individual Goals

- Team:
    - Place materials order
    - Begin producing expansion mechanism second prototype
    - Continue research as needed
- Carly:
    - Finalize gear connection
    - Plan connection of nylon and 3D printed base
    - Conduct any additional research
- Eleanor
    - Place order for materials
    - Begin fabrication upon arrival of materials
    - Continue individual research
- Ava:
    - Order materials and communicate purchases with client
    - Begin fabrication of device
    - Continue individual research
- Anna:

    - Continue research
    - Help with fabrication
    - Perform required testing
- Sam:
    - Continue individual research
    - Fabricate prototypes
    - Test prototypes

Expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
									$0.00	
									$0.00	
Category 2										
									$0.00	
									$0.00	
								TOTAL:	**$0.00**	

Project Timeline

Task	September			October				November					December			
Project R&D																
Empathize																
Background…																
Prototyping																
Testings																
Deliverables																
Progress Reports																
Prelim presentation						10/3										
Final Poster														12/5		
Meetings																
Client																
Advisor																
Website																

Update																

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