

Progress Report # 10

UW Adapted Fitness: Grip Strength Improvement Mechanism

Client: Dr. Kecia Doyle

Advisor: Prof. William Murphy

Team:

Simon Nam (Team Co-Leader and BSAC)

Sarah Kendall (Team Co-Leader)

Nicolas Maldonado (Communicator)

Owen Noel (BWIG)

Joey Dringoli (BPAG)

Date: 11/14/24

Problem Statement

A longtime Adapted Fitness client and mechanical engineer has worked consistently on stimulating his hand with lesser grip strength. The client would like a custom mechanism that would help an adapted fitness client improve his grip function and enable him to better grip on daily objects and workout equipment.

Brief Status Update

This week our team met together to further carry out the fabrication and the designs' specific components for motor-thread synthetic system and electronics. We tested different strengths and thresholds of the motor's initial activation for the threads to be pulled without too much or too less torques.

Summary of Weekly Team Member Design Accomplishments

- TEAM
 - Continued working on fabrication of motor-thread and electronics
- Simon
 - Updated codes and began testing different threshold values and supply power for the motor
 - Continued working figuring out adequate torque required for each finger
 - Looked further into training requirement (HIPAA, human subject testing, etc)
- Sarah

- Drafted a detailed testing protocol on measuring the extension angles the glove pulls the fingers into.
- Created a blue-print of the layout of the electronics and thread/motor system on the exterior of the glove.
- Nicolas
 - Printed the rod for the pulley and rope system
 - Printed different sized finger braces for fitting on the client
- Owen
 - Created a design in solidworks for the axel which will go between the motors
 - Modified the sizes for the safety mechanisms
- Joey
 - 3D printed the axel with Owen and Nicolas
 - Cut tubing for the finger/line structure of the motor system
 - Received reimbursement

Weekly/Ongoing Difficulties

We are still trying to figure out how much torque is actually required for the clients' fingers to be pulled at appropriate level to the desired angle without any further issues. A more sophisticated thread motor system is required to resolve this matter. We also hope to continuously interact with our personal client to further test our prototype with different levels of strength/torque applied adhering to safety cautions.

Upcoming Team and Individual Goals

- TEAM
 - Continue working on fabrication and create a working prototype that is able to extend the finger(s)
- Simon
 - Complete HIPAA training when it is available to enroll
 - Figure out on how to assemble the electronic components via soldering and plan the deadline to do finalize it
 - Start the rough draft of final deliverables
 - Figure out how to obtain and print the poster board for final presentation
- Sarah
 - Begin editing our preliminary report, as some sections will be used for our final report.
 - Sew all of the elements into the exterior of the glove
- Nicolas
 - Finish motor pulley system
 - Meet with client to determine sizing for figer braces
- Owen
 - Add the thread and motor system to the glove
 - Continue testing plans work
- Joey

- Attach the motors to the axel and file down to fit
- Attach tubing and threads to the glove

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Background Reading and Prep for First Client Meeting	9/12/2024	All	Complete	Yes
PDS Draft 1	9/19/2024	All	Complete	Yes
Design Matrix w/ at least 3 ideas	9/26/2024	All	Complete	Yes
Preliminary Presentations	10/4/2024	All	Complete	Yes
Preliminary Deliverables (Report, Notebook, Peer Eval)	10/9/2024	All	Complete	Yes
Final Poster Presentation	12/6/2024	All	Not yet started	No
Final Deliverables	12/11/2024	All	Not yet started	No

Materials & Expenses

Link to [spreadsheet](#)

