

# **Inconspicuous Ankle Foot Orthosis (AFO) for teen**

October 4th-11th, 2024

Client: Debbie Eggleston

Advisor: Dr. Brandon Coventry

Team Members:

Anya Hadim (Team Leader)

Lucy Hockerman (BSAC)

Presley Hansen (Communicator)

Alex Conover (BPAG)

Grace Neuville (BWIG)

## **Problem Statement:**

Ankle foot orthoses (AFOs) are designed to provide dorsiflexion support during the swing phase of walking. These devices are primarily used to treat muscular dystrophies. For this project, we are focusing on young individuals diagnosed with Facioscapulohumeral Dystrophy (FSHD), the most common type of muscular dystrophy. The team aims to design a brace for teens that assists with ankle dorsiflexion, promoting safer walking while remaining easily concealable and flexible enough to allow for functional ankle movement. The brace will be tailored specifically for the client, Maggie Eggleston. Key objectives for the device include positioning the ankle in adequate dorsiflexion, maintaining a slim, discreet design, and ensuring sufficient flexibility to minimize movement restriction.

## **Status Update:**

The team has completed the preliminary design presentation, finalized the design, and made necessary revisions. We are now finalizing our materials list for the first prototype and preparing the preliminary report before moving into the fabrication phase.

## **Summary of Weekly Team Member Design Accomplishments (Include time spent):**

### Anya:

- Researched ankle braces, bungee cords, plastic cord locks, gel pads, and compressive socks for the initial prototype (1 hour)
- Met with the team to discuss buying materials for prototyping (45 mins)
- Met with the team to discuss sections for the preliminary report and complete the final design (30 mins)
- Worked on the preliminary report (2 hours)

### Lucy:

- Met with team to discuss and research buying materials (45 mins)
- Met with the team to discuss sections for the preliminary report and complete final design (30 mins)
- Worked on the preliminary report (1.5 hours)
- Added measurements and smaller details to our final design (1 hour)

Presley:

- Met with the team to discuss buying materials (45 minutes)
- Met with the team to discuss the preliminary report (30 minutes)
- Emailed client (10 minutes)
- Worked on preliminary report (1.5 hours)

Alex:

- Met with team to discuss and decide the materials for prototyping (45 min)
- Researched materials and prices (1 hour)
- Worked on the preliminary report (30 minutes)

Grace:

- Met with team to discuss buying materials for prototyping. (45 minutes)
- Worked on the preliminary report. (1.5 hours)
- Researched different materials we could use for our prototype. (30 minutes)

**Weekly/Ongoing Difficulties:**

We are struggling with how exactly the carbon fiber piece will be attached to the rest of the brace. We also are seeking help in Solidworks as we want to be able to construct our carbon fiber part all together so that we don't have to attach 2 different pieces of it together.

**Upcoming Team and Individual Goals:**

**Team:**

- Order the materials needed for the first prototype
- 3D print the first iteration of the carbon fiber part
- Conduct stress testing on the Solidworks design

**Individual:**

Anya:

- Begin fabrication of the initial prototype.
- Finish solidworks carbon fiber piece and 3D print.
- Research the material to be used to print the first iteration of the carbon fiber piece.
- Conduct bungee cord testing.

Lucy:

- Finish SolidWorks carbon fiber piece, run simulation testing, make edits, 3D print
- Conduct bungee cord testing

- Begin the process of fabricating our brace

Presley:

- Test the strength of different bungee cords
- Begin fabrication of initial prototype
- Continue communication with client

Alex:

- Continue the certification necessary for fabricating our parts
- Begin the process of fabrication for our initial prototype
- Continue meeting with both client and patient to make sure designs meet all specifications so it is as comfortable as possible.

Grace:

- Begin fabrication of the initial prototype.
- Begin testing the strength of different bungee cords.

**Project Timeline**

Project Goal	Deadline	Team Member Assigned	Progress	Completed
Meet with Client	9/17/2023		100%	
→ email client with dates		Presley	100%	
→ create question list		All	100%	
→ write summary and put in notebook		All	100%	
PDS Draft	9/22/2023		100%	
→ submit draft		Anya	100%	
Design Ideas and Matrix	9/29/2023		100%	
→ create design 1		All	100%	
→ create design 2		All	100%	
→ create design 3		All	100%	
→ compare designs in matrix		All	100%	
Preliminary Design Presentation	10/06/2023		100%	
→ upload to website		Grace	100%	
Preliminary Deliverables	10/13/2023		66%	
→ email report and notebook		Presley		
→ upload report to website		Grace		
→ peer/self evaluations		All	100%	

Decide on Final Design	10/13/2023		50%	
→ get feedback from client on design		All		
Show and Tell	10/27/2023		0%	
→ create an initial prototype		All		
Final Poster Presentation	12/08/2023		0%	
→ invite client		Presley		
→ post on website		Grace		
Final Deliverables	12/13/2023		0%	
→ submit final notebook and report		Presley		
→ submit peer/self and client evaluations		All		

**Expenses**

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
<b>Component 1</b>								
<b>Component 2</b>								
<b>Component 3</b>								
<b>TOTAL:</b>							<b>\$0.00</b>	