Inconspicuous Ankle Foot Orthosis (AFO) for teen

October 10th - October 16th, 2025

Client: Debbie Eggleston

Advisor: Dr. Justin Williams

Team Members:
Alex Conover (Team Leader)
Avery Lyons (Communicator)
Claire Matthai (BSAC)
Aditi Singhdeo (Co-BPAG)
Celia Oslakovic (Co-BPAG)
Sean Carey (BWIG)

Problem Statement:

Ankle-foot orthoses (AFOs) are designed to support dorsiflexion during the swing phase of walking. They are commonly used in managing muscular dystrophies, and for this project, our focus is specifically on adolescents with Facioscapulohumeral Dystrophy (FSHD), the most prevalent form of muscular dystrophy. Our goal is to create a brace that helps teens achieve safer walking by assisting ankle dorsiflexion, while remaining discreet, lightweight, and flexible enough to allow natural ankle motion. The main design priorities are to position the ankle in proper dorsiflexion, keep the brace slim and unobtrusive, and provide enough flexibility to reduce movement restrictions.

Status Update:

The team is beginning preliminary fabrication and design work, including meeting with the UW Grainger lab to get assistance with the actual design of the AFO. The old design will be updated via this method and we will reprint many versions to use in testing. The team is also working to create a method of testing to test the repeated usage of the dorsiflexion strap. MTS testing will be done on the straps, and maybe the inversion prevention device.

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

<u>Alex:</u>

- Scheduled and attended the Grainger Lab design consultation (1 hour)
- Uploaded all testing protocols for testing in the future with the client (30 minutes)
- Organized the meeting with the client (15 minutes)

<u>Avery:</u>

- Created 2 strips (8inchx1inx0.125inch and 8inchx1inchx0.0625inch) in SolidWorks to have 3D printed in the Makerspace (45 mins)
- Emailed with the client and finalized Madison travel plans for November 8-10 (40 mins)
- Took notes on Advisor Meeting 4 (10/10) and the weekly Team Meeting (10/12) for the team in LabArchives (1 hour)

Claire:

- Completed biosafety training module (2 hours)
- Attended BSAC meeting and took notes (1 hour)
- 3D printed TPU test strips (30 mins)

Aditi:

- Completed biosafety training (2 hours)
- Completed the online portion of intro to shop tools training (1 hour)
- Started researching and brainstorming stress test apparatus design (2 hours)

Celia:

- Attended Grainger Lab design consultation (1.5 hours)
- Ordered and obtained polyester straps for testing and updated expenses (45 minutes)
- Looked into patenting process (45 minutes)

Sean:

- Grainger design consultation (1 hour)
- Researched TPU (30 minutes)
- Brainstormed/modeled testing devices (4 hours)

Weekly/Ongoing Difficulties

The team will meet with the client November 8th-10th. Details to come!

Upcoming Team and Individual Goals

Team:

- Create the initial prototype in the makerspace and print multiple copies for testing purposes.
- Learn the process for testing and ensure the team knows how to work all machines for both types of testing, MTS and Force Plate.

Individual:

Alex:

- Finalize testing schedule for testing with the client and the patient.
- Update MTS testing protocols for materials testing.
- Continue fabrication of this initial prototype.

Avery:

- Research AFOs with the most similarity to our design to see if submitting to WARF for a patent is feasible

- Take notes on Advisor Meeting 5 and weekly Team Meeting on Sunday
- Upload any MTS notes from BME 201 for reference to LabArchives

Claire:

- Finalize materials for inside padding of inversion supports and begin fabrication
- Complete online portion of design innovation lab training and schedule in-person training
- Look into patent application process

Aditi:

- Complete ITS hands-on training
- Complete the mill and lathe training
- Continue researching test apparatus ideas for materials testing

Celia:

- Complete design innovation lab training both in person and online
- Find and purchase padding material
- Work to define fabrication process/steps
- Potentially work on CAD of lateral side of mediolateral support

Sean:

- Continue working on the testing device
- Work on inversion plate modeling (maybe)

Project Timeline

Project Goal	**Deadline**	**Team Member Assigned**	**Progress**	**Completed**
Meet with Client	9/10/2025		100%	
→ email client with dates	9/14/25	Avery	100%	
→ create question list		All	100%	
→ write summary and put in notebook		All	100%	
PDS Draft	9/18/2025		100%	
→ submit draft		Alex		
Design Ideas and Matrix	9/26/2023		100%	
→ create design 1		All		
→ create design 2		All		
→ create design 3		All		
→ compare designs in matrix		All		
Preliminary Design Presentation	10/03/2023		100%	
→ upload to website		Sean		

Preliminary Deliverables	10/08/2023		100%	
→ email report and notebook		Avery		
→ upload report to website		Sean		
→ peer/self evaluations		All		
Decide on Final Design	10/10/2023		100%	
→ get feedback from client on design		All		
Show and Tell	10/31/2023		25%	
→ create an initial prototype		All		
Final Poster Presentation	12/05/2023		0%	
→ invite client		Avery		
→ post on website		Sean		
Final Deliverables	12/10/2023		0%	
→ submit final notebook and report		Avery		
→ submit peer/self and client evaluations		All		

Expenses

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
Component 1								
Polyester blend elastic	**1 inch wide Polyester and Rubber blend. 10 yd in length**	**Cisone**	**n/a**	**10/10**	**1**	**$7.99**	**$7.99**	**link**
Component 2								
Component 3								
TOTAL:								**$7.99**