Inconspicuous Ankle Foot Orthosis (AFO) for teen

November 7th - November 13th, 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:

Testing was mostly successful!
The team was able to complete testing for all different devices, the “old” red prototype, and the “new” black prototype. Both prototypes utilised the elastic polyester strap, as the TPU was not long enough to test in the actual brace. Testing for stability was done, as well as the gait test was performed. The collected data will be parsed and completed in the following weeks, and an analysis of the data will be performed following the processing of the data. The following tests were completed:

Stability of the ankle:

- No Brace
- No Brace, with Shoe
- AFO, no shoe
- AFO, with shoe

- Red brace, no shoe
- Red brace, with shoe
- Black brace, no shoe
- Black brace, shoe
- Black brace, taped, shoe

Gait Analysis (walking):

- No brace, no shoe
- No brace, with shoes
- AFO, no shoe
- AFO, with shoes
- Red Brace, no shoe
- Red brace, with shoe
- Black brace, no shoe
- Black brace, with shoe, taped

The team also measured the improvement of dorsiflexion from TPU and the elastic polyester strap. Analysis of the data will come soon, along with initial drafts of the final deliverables.

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

Alex:

- Team meeting Sunday to fabricate the black prototype and discuss results (1 hour 15 min)
- Performed Testing with the client and patient Monday morning (1 hour, 15 minutes)
- Began Analyzing the data from testing (2 hours)

Avery:

- Tested the red brace with client and took measurements of black brace (2 hours)

Claire:

- Attended testing with client and patient on Monday and took notes (1.5 hours)

Aditi:

- Assisted in client testing and took notes on testing (2 hours)
- Met with team on Sunday (11/09) to fabricate the prototype for Monday's (11/10) testing

Celia:

- Assisted in testing with client on Monday (1.5 hours)
- Met with team on Sunday to fabricate Monday testing prototype (1 hour)

Sean:

- Participated in Saturday testing with the client (2 hours)
- Met online with the team on Saturday and talked about improvements for the brace (1 hour)

Weekly/Ongoing Difficulties

No ongoing difficulties this week!

Upcoming Team and Individual Goals

Team:

- Complete the analysis of testing data
- Make final updates to this semester's prototype
- Refabricate the prototype, one for final deliverables, and one for the client.

Individual:

Alex:

- Analyze the data
- Fabricate the dorsiflexion strap, and the padding for the new prototype.
- Continue to update lab archives with testing data, fabrication data, and analysis of the data.
- Start the documents for the other final deliverables.

Avery:

- Help with fabrication of new strap
- Look into patent documents
- Start final deliverables

Claire:

- Help refabricate the prototype and consider possibility of adding additional strap around the back of the brace
- Contribute to initial drafts of final deliverables

Aditi:

- Help with fabrication of the prototype

Celia:

- Help make adjustments to prototype learned from testing
- Start drafts of final deliverables

Sean:

- Change the 3D-printed brace to fit the new data (make the lateral side longer, move holes, and get rid of gaps)
- Fabrication of a new device

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		100%	
→ 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 (email) and Sean (Canvas)		
→ 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								
CF-PLA	**3D printed for testing of mediolateral support**	**Design Innovation Lab**	**n/a**	**10/27**	**2**	**$2.25**	**$4.50**	
Component 3								
TPU	**3D printed TPU test strips for testing apparatus**	**Design Innovation Lab**	**n/a**	**10/22**			**$2.75**	
TOTAL:								**$15.24**