

Inconspicuous Ankle Foot Orthosis (AFO) for teen

October 24th - October 30th, 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 performed initial testing this week with the MTS tensile test. The goal was to determine which material was more resistant to stretch (which was stronger); however, the testing did not work as we encountered difficulties securing the slippery material in the clamps of the machine.

Avery, Alex, and Claire worked with Dr. Christa Willie to perform the tensile test, and received feedback that the team could potentially perform a 3 point bending test on the weak part of the AFO, to see what the force would be via testing, and not just FEA analysis. Dr. Willie also advised that to perform a compressive strength test, we print a flat disk to test, therefore eliminating issues.

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

Alex:

- Set up and Performed MTS testing (1 hour)

- Weekly meeting Sunday (30 minutes)
- Worked to finish the prototype in wendt for show and tell (1 hour)

Avery:

- Helped set up and perform first round of MTS testing (1 hour)
- Emailed with client about Madison travel itinerary (30 mins)
- Took notes on advisor meeting on 10/24 (30 mins)
- Took notes on weekly team meeting on 10/26 (30 mins)
- Attended BME 300 lecture (50 mins)
- Attended force plate testing training (40 mins)

Claire:

- Completed machine training (4 hours)
- Helped perform MTS testing and took notes on testing protocols (1 hour)
- Weekly team meeting (30 mins)
- Helped fabricate part of prototype (1.5 hours)
- Attended and took notes on BSAC meeting (1 hour)

Aditi:

- Completed online portion of intro to machine training (2 hours)
- Completed intro to machine practical training (6 hours)

Celia:

- Completed Intro to Machining Mill and Lathe in-person training (6 hours)
- Updated cost spreadsheet (30 min)

Sean:

- Made the medial side of the brace (1.5 hours)
- Made cages to the lateral side of the brace (45 mins)
- Made changes and added tolerances to the testing device and altered it for polyester material (45 mins)
- 3D printed 2 of the lateral sides of the brace (30 mins)

Weekly/Ongoing Difficulties

Because of the failure to grip the materials in MTS testing, we will have to repeat the test. We will ask about adherence methods in show and tell and ask our advisor.

Upcoming Team and Individual Goals

Team:

- Receive Feedback from show and tell to update the prototype.
- Complete itinerary for testing weekend by 11/05 at the latest.

Individual:

Alex:

- Conduct second round of MTS testing, specifically for a 3 point break test and possibly a compression test.
- Receive feedback from show and tell, update our design as needed.
- Complete the itinerary by 11/05 and make sure everything is set up for testing, then actually do testing.

Avery:

- Help with second round of MTS testing this week
- Attend Show-and-Tell and get helpful feedback from other groups on improving our design
- Help with itinerary for client visit

Claire:

- Attend show-and-tell and receive feedback
- Assist with testing and fabrication

Aditi:

- Attend show and tell and receive feedback
- Familiarize with testing protocols for force plate testing

Celia:

- Ask questions and receive feedback from Show and Tell
- Prepare for/Assist in testing

Sean:

- Receive feedback from Show-and-Tell
- Prepare for client testing

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 si							
Component 3								

TOTAL:		\$7.99
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