

Inconspicuous Ankle Foot Orthosis (AFO) for teen

September 4th - September 11th, 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:

Much of the data needs to be reviewed from the previous semesters, which is currently being done, as well as more up to date research being completed on FSHD and ankle mobility. The PDS will begin drafting stages this Sunday (09/14), or updates will be made as necessary to previous PDS for this project.

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

Alex:

- Reviewed notes from previous semester (1 hour)
- Researched ankle/foot problems, FSHD research updates (1 hour)
- Created progress report 1, team drive, lab archives, scheduled meeting times (½ hour)
- Met with the client for an update on the patient's condition and other design specifications (½ hour)

Avery:

- Researched common ankle/foot problems, FSHD muscular dystrophy, and types of ankle braces on the market today (1.5 hours)
- Took notes on the client meeting on 9/10/25 (0.5 hours)

Claire:

- Researched and gained background knowledge on FSHD, types of AFOs and their applications, and common materials used in AFO construction, and added notes to LabArchives (2 hours)
- Attended client meeting alongside my group and organized/added to meeting notes afterwards (1 hour)

Aditi:

- Researched FSHD, its symptoms and the common treatment options currently available (1.5 hours)
- Researched different types of AFO, looked at solid, hinged, UD flex and carbon fiber AFOs (1.5 hours)

Celia:

- Researched the muscular functions affected by FSHD and found which muscles specifically affect our client and added these notes to LabArchives. (1.5 hours)

Sean:

- Researched dorsiflexion, eccentric contractions, and the different phases of your gait when walking, the muscles it uses, and the angles of the ankle and knee (2 hours)
- Updated website with team descriptions and photo, and will add progress report (30 min)

Weekly/Ongoing Difficulties

The team is working on finding dates that work with the client to meet in Madison to test a new version of the brace. Current suggested dates are 10/11 and 10/18.

Upcoming Team and Individual Goals

Team:

- Continue conducting research into relevant topics, patents, and standards.
- Start working on the Product Design Specifications.

Individual:

Alex:

- Come up with new brace design ideas
- Keep the team informed and up to date on assignments
- Brainstorm new ways to approach the project

Avery:

- Come up with 3 new ankle design ideas

- Continue researching FSHD muscular dystrophy and inconspicuous braces
- Send a reminder email to the client on Sunday about possible travel dates to Madison

Claire:

- Look into previous teams designs and combine this with my own research/ideas to come up with new design ideas
- Continue researching ankle braces, ankle movement, and potential materials

Aditi:

- Research athletic gear designs, shin guards and ankle braces, things look like sports gear.
- Look at the possibility and practicality of adding an elastic component to the AFO.

Celia:

- Research different AFOs and what past teams have done.
- Brainstorm ideas for new AFOs that will solve our client's problems with previous designs.

Sean:

- Research into types of AFO braces
- Research about what the previous teams did
- Begin brainstorming ideas

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	9/19/2025		10%	
→ submit draft		Alex		
Design Ideas and Matrix	9/26/2023		0%	
→ create design 1		All		
→ create design 2		All		
→ create design 3		All		
→ compare designs in matrix		All		
Preliminary Design Presentation	10/03/2023		0%	
→ upload to website		Sean		
Preliminary Deliverables	10/08/2023		0%	

