

# Rise and Stride

January 24th - January 31st, 2025

Client: Debbie Eggleston

Advisor: Prof. John Puccinelli

## Team Members:

Madison Michels (mmichels2@wisc.edu), Communicator

Lucy Hockerman (lhockerman@wisc.edu), Team Leader

Presley Hansen (pmhansen3@wisc.edu), BSAC

Sadie Rowe (skrowe2@wisc.edu), BWIG

Kate Hiller (khiller@wisc.edu), BPAG

## **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 inadequate dorsiflexion, maintaining a slim, discreet design, and ensuring sufficient flexibility to minimize movement restriction.

## **Brief Status Update:**

Our group held our first official team meeting, where we welcomed our new members (Maddie, Sadie, and Kate) and brought them up to speed. We reviewed the successes and challenges of last semester's design and brainstormed new ideas for moving forward.

## **Team Goals:**

- To research the project description and its components.
- Meet with clients to discuss needs & adjust PDS accordingly.
- Determine a way to break the ankle mold open and cut the mold in half.
- Start considering materials and fabrication methods for the rigid support piece.

## **Individual Accomplishments:**

- Lucy:
  - Researched about the global impact of the project including environmental and social aspects
  - Met with client to introduce the team and discuss updates with the patient

- Edited assigned PDS sections
- Met with team to discuss research progress and cut the foot mold with a dremel
- Attended first advisor meeting
- Presley:
  - Researched hybrid, jointed, and powered AFOs
  - Researched the effects of AFOs on individuals and the economy
  - Met with the team to cut the foot mold in half
  - Edited PDS
  - Attended first BSAC meeting
- Maddie:
  - Researched the FSHD condition
  - Attended the first client meeting
  - Researched socioeconomic implications of muscular dystrophy
  - Researched materials for the rigid support
  - Cut the foot mold in half with the team
  - Edited assigned PDS sections and references
  - Attended the first advisor meeting
- Sadie:
  - Researched background on FSHD and current AFO brace design considerations/limitations
  - Researched the environmental & economic impact of current designs
  - Met with team to cut foot mold in half
  - Edited the PDS
- Kate:
  - Researched different AFO braces on the market and economic bourdon of FSHD
  - Researched epigenetic therapies and environmental factors affecting the onset of FSHD
  - Met with team to cut foot cast in half
  - Edited the PDS
  - Attended first client meeting

### **Individual Goals:**

- Lucy:
  - Start brainstorming with team about new designs/ideas and complete the design matrix
  - Continue researching and create rough sketches of current ideas
- Presley:
  - Work on designs for design matrix
  - Continue researching AFO designs, impacts, and materials
  - Attend next BSAC meeting

- Maddie:
  - Attend the next advisor meeting
  - Continue to research materials and fabrication methods
  - Draw initial designs for the rigid support
  - Scan the model of the foot using 3D scanning technology and upload it into SolidWorks
- Sadie:
  - Make initial design sketches
  - Continue researching existing AFO designs and limitations
  - Work on design matrix
- Kate:
  - Brainstorm design ideas based on research and client feedback
  - Complete research on Boa laces and their mechanics for potential design considerations

**Design Accomplishments:**

The team is organizing a meeting with the client to discuss project requirements.

**Weekly/Ongoing Difficulties:**

No difficulties have been identified at this early stage of the project.

**Project Timeline:**

Week	Description	Status
1/24 - 1/31 Week 1	Weekly Team Meeting 1	Complete
	Advisor Meeting 1	Complete
1/31 - 2/6 Week 2	Weekly Team Meeting 2	Complete
	Progress Report 1	Complete
	Have 1st Client Meeting	Complete
	Product Design Specification (PDS) Draft	Complete
	Advisor Meeting 2	Scheduled for 2/5
2/7 - 2/14 Week 3	Weekly Team Meeting 3	Scheduled for 2/14
	Progress Report 2	Due 2/10
	<b>Tong Lecture (2/7)</b>	Scheduled 2/7

	Advisor Meeting 3	Scheduled for 2/12
2/14 - 2/21 Week 4	Weekly Team Meeting 4	Scheduled 2/21
	<b>Preliminary Deliverables Due (2/21)</b>	
	Progress Report 3	
	Design Matrix	
	Advisor Meeting 4	
2/21 - 2/28 Week 5	Weekly Team Meeting 5	
	<b>Show and Tell (4/21)</b>	
	Preliminary Presentation Practice	
	Progress Report 4	
	Preliminary Presentation Slides Upload	
	Preliminary Presentation Day	
	Advisor Meeting 5	
2/28 - 3/7 Week 6	Weekly Team Meeting 6	
	Preliminary Report Draft	
	Preliminary Report Final	
	Preliminary Notebook Draft	
	Preliminary Notebook Upload	
	Progress Report 5	
	Advisor Meeting 6	
3/7 - 3/14 Week 7	Weekly Team Meeting 7	
	Progress Report 6	
	Advisor Meeting 7	
	Weekly Team Meeting 8	

3/14 - 3/21 Week 8	Progress Report 7	
	Advisor Meeting 8	
Spring Break (3/21 - 3/28)		
3/31 - 4/4 Week 9	Weekly Team Meeting 9	
	Prototype 1	
	Progress Report 8	
	Show & Tell	
4/4 - 4/11 Week 10	Weekly Team Meeting 10	
	Progress Report 9	
	Advisor Meeting 9	
4/11 - 4/18 Week 11	Weekly Team Meeting 11	
	Progress Report 10	
	Advisor Meeting 10	
4/18 - 4/25 Week 12	<b>Final Poster Presentations (4/25)</b>	
	Progress Report 11	
	Advisor Meeting 11	
4/25 - 5/30 Week 13	Weekly Team Meeting 13	
	Final Poster Presentation Draft	
	Final Poster Presentation Practice	
	Final Poster Presentation Print	
	Progress Report 12	
	Final Poster Presentation Day	

## Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link
<b>Ankle Brace - Component 1</b>										
Ankle Brace	Cloth brace	Abiram		Amazon		10/10/2024	1	\$14.88	\$14.88	<a href="#">Link</a>
Gel padding	medical grade padding	Shechekin		Amazon		10/10/2024	1	\$15.81	\$15.81	<a href="#">Link</a>
Gel sock	Compressive sock to support the carbon fiber	KEMFORD		Amazon		10/10/2024	1	\$15.95	\$15.95	<a href="#">Link</a>
Plastic cord locks	End of the bungee	Headous		Amazon		10/10/2024	1	\$3.98	\$4.20	<a href="#">Link</a>
Nylon Fabric	fabric/cloth to sew carbon fiber	MYUREN		Amazon		11/6/2024	1	\$12.61	\$12.61	<a href="#">Link</a>
Bungee pt 2	stronger bungee to support better dorsiflexion	LuckyStraps		Amazon		10/23/2024	1	18.99	\$20.03	<a href="#">Link</a>
Bungee	thinner bungee	Huouoo		Amazon		10/25/2024	1	\$6.32	\$6.32	<a href="#">Link</a>
Mini caribener	small sized caribener to hold bungee	REI		REI		11/4/2024	1	\$6.00	\$6.00	In-store
Shock cord	thinner and stronger bungee	REI		REI		11/4/2024	1	\$5.95	\$6.61	In-store
Lock laces	lock laces to fix the slipping problem of the plastic cord lock	Lock Laces		Amazon		11/4/2024	1	\$12.65	\$12.65	<a href="#">Link</a>
Fabric Glue	glue to attach the cord locks to the fabric	E6000		Amazon		11/08/2024	1	\$8.14	\$8.14	<a href="#">Link</a>
Needles and Thread	Stronger needles and thread to attach various fabrics	Basic Home		Amazon		12/03/2024	1	\$8.43	\$8.43	<a href="#">Link</a>
<b>Carbon Fiber piece - Component 2</b>										
3D printing prototype	3D printing of back support	Bambu printer		Makerspace		11/8/2024	1	\$1.40	\$1.40	*covered by our given

										\$50 per team	
3D printing prototype - 3 variants	3D printing of back support	<b>Bambu printer</b>		Makerspace		11/12/2024	1	3.8	\$3.80	*covered by our given \$50 per team	
3D printing prototype	3D printing of back support	<b>Bambu printer</b>		Makerspace		11/13/2024	1	1.71	\$1.71	*covered by our given \$50 per team	
Lock lace piece	3D printing the lock lace piece	<b>Bambu printer</b>		Makerspace		11/18/2024	1	0.23	\$0.23	*covered by our given \$50 per team	\$8.71
3D Printing Final Prototype	3D printing of back support	<b>Shen Printer</b>		Makerspace		12/3/2024	1	1.57	\$1.57	*covered by our given \$50 per team	
<b>Epoxy Mold - Component 3</b>											
Epoxy	Take cast of the leg	<b>Easy Pour Epoxy</b>		Amazon		11/14/2024	1	\$39.97	\$39.97	<a href="#">Link</a>	
Mold release Agent	PVA release agent - Prevent bonding to the cast	<b>Mrealez y</b>		Amazon		11/14/2024	1	0	\$0.00	*Used the provided materials in ECB	
								<b>TOTAL:</b>	<b>\$189.02</b>		