Rise and Stride

February 11st - February 18th, 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:

The team has completed the design matrix, outlining our design ideas and material considerations. We have also begun to explore fabrication options for the varying materials.

Team Goals:

- Complete and present our preliminary presentation
- Begin fabricating our 3D printed parts
- Order necessary materials

Individual Accomplishments:

- Lucy:
    - Met with team to discuss preliminary presentation and the possible routes of fabrication and testing including visiting the Makerspace to learn about 3D scanning
    - Research more in-depth about the fabrication and mechanical properties of fiberglass plaster and thermoplastics

    - Edited my assigned preliminary presentation slides
- Presley:
    - Met with team to discuss the preliminary presentation
    - Edited and practiced my presentation slides
    - Attended the BSAC meeting
    - Visited the makerspace to learn about 3D scanning opportunities
- Maddie:
    - Researched PLA and Fiberglass manufacturing methods.
    - Created an AFO simulation in OpenSim to attempt to discover the optimal strength of the brace under varying conditions.
    - Visited the makerspace to learn about 3D scanning opportunities
    - Contacted Jesse to schedule a design consultation
    - Updated LabArchives
    - Edited my presentation slides

- Sadie:
    - Met with team to discuss preliminary presentation slides and next steps
    - Visited the makerspace to learn more about 3D scanning opportunities
    - Created Preliminary Presentation Slides
    - Researched 3D Scanning & other modeling techniques
    - Researched potential testing methods to evaluate ankle inversion and dorsiflexion
    - Updated Lab Archives
- Kate:
    - Met with team to discuss preliminary presentation and scanning the cast
    - Researched gait and ankle support for inversion
    - Edited and prepared preliminary presentation
    - Got an ankle brace to show team/to use for reference

Individual Goals:

- Lucy:
    - Present preliminary presentation
    - Attend design consultation meeting with Jesse about 3D scanning
    - Begin prototyping by 3D scanning the cast
    - Begin writing testing protocols (at home testing)
- Presley:
    - Present the preliminary presentation
    - Attend the meeting with Jesse to discuss 3D scanning the foot brace
    - 3D scan the cast if the meeting with Jesse is successful
    - Begin prototyping
- Maddie:

    - Present preliminary presentation
    - Attend design consultation meeting with Jesse
    - Begin to prototype initial designs
    - Research motion capture systems for testing
    - 3D scan our cast
- Sadie:
    - Attend design consultation with Jesse to discuss 3D scanning cast
    - Present preliminary presentation
    - 3D scan cast & begin prototyping
    - Work on testing protocols
- Kate:
    - To present preliminary presentation
    - Attend meeting with Jesse to discuss 3D scanning our brace
    - Start initial prototyping

Design Accomplishments:
The team has completed the design matrices and thoroughly discussed benefits and drawbacks to each design and material. Collectively, we looked into fabricating a CF-PLA rigid support with a 3D scanner.

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
	Weekly Team Meeting 3	Scheduled for 2/14
	Progress Report 2	Due 2/11

2/7 - 2/14 Week 3	**Tong Lecture**	Scheduled 2/7
	Advisor Meeting 3	Scheduled 2/12
	Design Matrix	Due 2/13
2/14 - 2/21 Week 4	Weekly Team Meeting 4	Scheduled 2/21
	Preliminary Deliverables Due (2/21)	Due 2/21
	Progress Report 3	Due 2/18
	Advisor Meeting 4	Scheduled 2/19
	Preliminary Presentations	Scheduled 2/21
	Preliminary Presentation Draft	Due 2/19
	Design Consultation Meeting	Scheduled 2/19
2/21 - 2/28 Week 5	Weekly Team Meeting 5	
	Progress Report 4	
	Advisor Meeting 5	
2/28 - 3/7 Week 6	Weekly Team Meeting 6	
	Progress Report 5	
	Advisor Meeting 6	
3/7 - 3/14 Week 7	Weekly Team Meeting 7	
	Progress Report 6	
	Advisor Meeting 7	
	Tong Lecture	Scheduled 3/7
3/14 - 3/21 Week 8	Weekly Team Meeting 8	
	Progress Report 7	
	Show and Tell	Scheduled 3/21
	Advisor Meeting 8	

Spring Break (3/21 - 3/28)		
3/31 - 4/4 Week 9	Weekly Team Meeting 9	
	Advisor Meeting 9	
	Progress Report 8	
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	**Final Poster Presentations (4/25)**	
	Progress Report 11	
	Advisor Meeting 11	
4/25 - 5/30 Week 13	Weekly Team Meeting 13	
	Progress Report 12	

Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link	
Ankle Brace - Component 1											
Ankle Brace	Cloth brace	**Abiram**		Amazon		10/10/2024	1	$14.88	$14.88	Link	
Gel padding	medical grade padding	**Shechekin**		Amazon		10/10/2024	1	$15.81	$15.81	Link	
Gel sock	Compressive sock to support the carbon	**KEMFORD**		Amazon		10/10/2024	1	$15.95	$15.95	Link	

	fiber										
Plastic cord locks	End of the bungee	**Heado US**		Amazon		10/10/2024	1	$3.98	$4.20	Link	
Nylon Fabric	fabric/cloth to sew carbon fiber	**MYUREN**		Amazon		11/6/2024	1	$12.61	$12.61	Link	
Bungee pt 2	stronger bungee to support better dorsiflexion	**LuckyStraps**		Amazon		10/23/2024	1	18.99	$20.03	Link	
Bungee	thinner bungee	**Huouoo**		Amazon		10/25/2024	1	$6.32	$6.32	Link	
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	Link	
Fabric Glue	glue to attach the cord locks to the fabric	**E6000**		Amazon		11/08/2024	**1**	$8.14	$8.14	Link	
Needles and Thread	Stronger needles and thread to attatch various fabrics	**Basic Home**		Amazon		12/03/2024	**1**	$8.43	$8.43	Link	
Carbon Fiber piece - Component 2											
3D printing prototype	3D printing of back support	**Bambu printer**		Makerspace		11/8/2024	1	1.4	$1.40	***covered by our given $50 per team**	
3D printing prototype - 3 variants	3D printing of back support	**Bambu printer**		Makerspace		11/12/2024	1	3.8	$3.80	***covered by our given $50 per team**	
3D printing prototype	3D printing of back support	**Bambu printer**		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	**Bambu printer**		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	**Shen Printer**		Makerspace		12/3/2024	1	1.57	$1.57	***covered by our given $50 per team**	
Epoxy Mold - Component 3											
Epoxy	Take cast of the leg	**Easy Pour Epoxy**		Amazon		11/14/2024	1	$39.97	$39.97	Link	
Mold release Agent	PVA release agent - Prevent bonding to the cast	**Mrealeazy**		Amazon		11/14/2024	1	0	$0.00	***Used the provided materials in ECB**	
								TOTAL:	**$189.02**		