Rise and Stride

March 19th - April 1st, 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 is contacting labs for IMU and force plate testing, both for practice and client testing. Recently received foam for the supports and next fabrication steps include attaching the foam.

Team Goals:

- Write testing methods for IMU testing and force plate testing
- Adhere foam to the rigid supports
- Look into foam adhesives and/or velcro systems

Individual Accomplishments:

- Lucy:
    - Prepared for meeting with Dr. Wille to discuss motion capture testing
- Presley:
    - Attended show and tell
    - Prepared for meeting with Dr. Wille
- Maddie:

    - Created a graph for the MTS testing data
    - Communicated with the client to determine visiting timelines
    - Attended show and tell
    - Sewed the compression sleeve together again
    - Attended a testing meeting with Wille
- Sadie:
    - Reviewed notes from Show and Tell
    - Updated call to action for missed show and tell
- Kate:
    - Attended show and tell
    - Prepped for meeting with Dr. Wille
    - Attended meeting with Dr. Wille

Individual Goals:

- Lucy:
    - Meet with Dr. Wille to discuss testing
    - Finish brace fabrication
    - Finalize testing protocol and pilot testing
- Presley:
    - Meet with Dr. Willie to discuss testing
    - Finalize brace fabrication and testing protocols
    - Attend next BSAC meeting
- Maddie:
    - Print one longer rigid support for the inside of the foot
    - Learn how to operate the IMU system in the lab
    - Adhere the foam to the rigid support
- Sadie:
    - Finalize testing protocol and run through testing prior to client visit
    - Attach foam to rigid support
    - Finalize fabrication of brace
    - Prepare for client visit
- Kate:
    - Split the group into teams to complete brace fabrication and testing protocol
    - Write new testing protocol for OpenCap markerless testing
    - Figure out questions to ask client about brace comfort
    - Finish fabrication of brace

Design Accomplishments:

The team 3D-printed multiple versions of the inversion support with CF-PLA and assembled the full prototype, excluding the foam.

Weekly/Ongoing Difficulties:
Uncertainty in motion capture system for weekend testing and determining the best testing protocol to assess inversion and dorsiflexion motion.

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 2/11
	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	Scheduled 2/20
	Progress Report 4	Due 2/25
	Preliminary Report Due (2/26)	Due 2/26
2/28 - 3/7 Week 6	Weekly Team Meeting 6	Scheduled 2/28
	Progress Report 5	Due 3/4
	Individual Advisor Meetings	Scheduled 4/5
3/7 - 3/14 Week 7	Weekly Team Meeting 7	Scheduled 3/7
	Progress Report 6	Due 3/11
	Advisor Meeting 7	Scheduled 3/12
3/14 - 3/21 Week 8	Weekly Team Meeting 8	Scheduled 3/14
	Progress Report 7	Due 3/18
	Show and Tell	Scheduled 3/21
	Advisor Meeting 8	Scheduled 3/19
Spring Break (3/21 - 3/28)		
3/31 - 4/4 Week 9	Weekly Team Meeting 9	Scheduled 4/4
	Advisor Meeting 9	Scheduled 4/2
	Progress Report 8	Due 4/1
4/4 - 4/11 Week 10	Weekly Team Meeting 10	Scheduled 4/11
	Progress Report 9	Due 4/8
	Advisor Meeting 9	Scheduled 4/9
4/11 - 4/18 Week 11	Weekly Team Meeting 11	Scheduled 4/18
	Progress Report 10	Due 4/15
	Advisor Meeting 10	Scheduled 4/16
	Final Poster Presentations	

4/18 - 4/25 Week 12	**(4/25)**	
	Progress Report 11	Due 4/22
	Advisor Meeting 11	Scheduled 4/23
4/25 - 5/30 Week 13	Weekly Team Meeting 13	Scheduled 4/28
	Progress Report 12	Due 4/28
	Final Deliverables Due	Due 4/30

Expenses - Spring 2025

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total		Total Budget Spent	Link
Category 1 - Rigid Support												
CF-PLA	Carbon Fiber PLA 3D Print	Shen Printer		MakerSpace		2/28/2025	1	$0.86	$0.86			
CF-PLA	Carbon Fiber PLA 3D Print	Shen Printer		MakerSpace		3/5/2025	1	$2.42	$2.42			
CF-PLA	Carbon Fiber PLA 3D Print	Shen Printer		MakerSpace		3/14/2025	1	$3.66	$3.66			
Category 2 - Straps and Padding												
Mesh Padding	3D Air Sponge Mesh Fabric	Tong Gu		Amazon		3/7/2025	1	$16.99	$16.99		$16.99	link
Velcro	Velcro pieces			MakerSpace		2/28/2025	1	$0.40	$0.40			
								TOTAL:	**$24.33**	**Budget Spent:**	16.99	

Expenses - Fall 2024

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 fiber	**KEMFORD**		Amazon		10/10/2024	1	$15.95	$15.95	Link
Plastic cord locks	End of the bungee	**Headous**		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	3D printing of back	**Bambu**		Makersp		11/12/	1	3.8	$3.80	***covere**

printing prototype - 3 variants	support	**printer**		ace		2024				**d by our given $50 per team**	
3D printing prototype	3D printing of back support	**Bambu printer**		Makersp ace		11/13/ 2024	1	1.71	$1.71	***covere d by our given $50 per team**	
Lock lace piece	3D printing the lock lace piece	**Bambu printer**		Makersp ace		11/18/ 2024	1	0.23	$0.23	***covere d by our given $50 per team**	**$8. 71**
3D Printing Final Prototype	3D printing of back support	**Shen Printer**		Makersp ace		12/3/2 024	1	1.57	$1.57	***covere d 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	**Mrealeaz y**		Amazon		11/14/ 2024	1	0	$0.00	***Used the provide d material s in ECB**	
								TOT AL:	**$189.0 2**		

EXPENSES - Spring 2025

Item	Description	Manufa cturer	Mft Pt#	Vend or	Vend or Cat#	Date	Q T Y	Cost Each	Total		Total Budg et Spent	Link
Category 1 - Rigid Support												

CF-PLA	Carbon Fiber PLA 3D Print	Shen Printer		MakerSpace		2/28/2025	1	$0.82	$0.82			
CF-PLA	Carbon Fiber PLA 3D Print	Shen Printer		MakerSpace		3/5/2025	1	$2.42	$2.42			
Category 2 - Straps												
Velcro	Velcro pieces	Shen Printer		MakerSpace		2/28/2025	1	$0.40	$0.40			
								TOTAL:	**$3.64**	**Budget Spent:**	0	