

Step by Step: A Comprehensive Approach to Stair Climbing Assistance

Date: 2/1/2024

Client: Dan Kutshera

Advisor: Dr. Russ Johnson

Team:

Margo Amatuzio

Gracie Kreissler

Delani Wille

Cameron Owens

Riley Toth

Problem statement

In the field of neuro-rehabilitation, physical therapists encounter a significant obstacle when assisting patients with weight-bearing restrictions to transition back to their homes. The primary challenge revolves around negotiating steps, which often proves to be an arduous task due to various constraints. Ramps, typically considered a solution, are frequently deemed impractical due to cost implications and compliance with rise-to-run criteria. As an alternative, patients are advised to use garden benches from hardware stores, which lack adjustability and medical design. This makeshift solution is frustrating for healthcare providers, as it is not purpose-built and poses issues with bench availability.

To address this gap in the next three months, there is a clear need for a specialized, medically designed bench tailored for step use, offering safety and adjustability to improve the mobility and independence of patients in neuro-rehabilitation.

Brief status update

This week, the team met with our client, Dan, to discuss his goals and expectations for the project this semester. Based on our meeting, we reached out to Dr. Puccinelli to speak about the intellectual property of our project. We need to continue patent research, and the required steps that go into such a process. From there, we can reconnect with Dan to inform him of our research so he can make an entrepreneurial decision. We also discussed testing the device through Dan's current company. We are expecting communication from him when he speaks to manager positions. Next week, we will work on the preliminary presentation and continue research to modify the design and determine testing protocols.

Difficulties / advice requests

Current design

Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
									\$0.00	
									\$0.00	
Category 2										
									\$0.00	
									\$0.00	
								TOTAL:	\$0.00	

Major team goals for the next week

1. Find out next steps to apply for a patent
2. Develop a plan for testing
3. Research and design device adjustability

Next week's individual goals

- Riley Toth
 - Further question IRB and see if that is a truly plausible route for testing
- Delani Wille
 - Continue researching Intellectual property and patent pathway
 - Mockup design for adjustability of base
- Gracie Kreissler
 - Draw out finalized hand sketch of idealized CAD bench model
 - Start CAD for bench
- Margo Amatuzio
 - Continue researching base adjustability and propose a design
- Cam Owens
 - Complete research related to safety requirements and produce a design for a mechanism to deflect the catching on stair lip.

Timeline

Task	Jan	Feb				March					April				May	
	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
Project R&D																
Empathize	x															
Background...																
Prototyping																
Testings																
Deliverables																
Progress Reports	x															
Prelim presentation																
Final Poster																
Meetings																
Client	x															
Advisor	x															
Website																
Update																

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Riley Toth
 - Drew a design for the adjustable portion of the device leg
 - Researched ways to test the device while going back through what I have done before
- Delani Wille
 - Communicated with advisor and client to set up meeting
 - Discussed patent pathway with Dr. P and Kip
 - Patent research, FDA classification
- Gracie Kreissler
 - Discussed the possibility of patenting the bench design with our client
 - Drew sketches of CAD design of bench
- Margo Amatuzio
 - Researched adjustability options and work on the design for the bench
- Cameron Owens
 - Researched related biomechanics of single leg squat only using the knee and up.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)

Riley Toth	1/29/2024 1/30/2024 2/1/2024	Meeting with client Designing adjustable leg Research safety protocols	2	2	2
Delani Wille	1/29/2024 1/31/2024 2/1/2024	Communicating with client Discussion with Dr. P Discussion with Kip and Patent Research	2	2	2
Gracie Kreissler	1/29/2024 1/31/2024	Meeting with Client Sketch Drawing	2	2	2
Margo Amatuzio	01/29/2024 01/31/2024	Meeting with client Research adjustable bench designs	2	2	2
Cameron Owens	1/29/2024 2/1/2023	Meeting with client Research biomechanics.	2	2	2