

# Step by Step: A Comprehensive Approach to Stair Climbing Assistance

Date: 2/8/2024

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 went to Home Depot to pick up supplies for the bench prototyping on Friday. We plan to create the adjustable portion of the bench and reinforce the current design handle. Next week, we would like to begin some physical testing with the bench and make any needed adjustments to the design.

Delani and Margo met with Dr. Puccinelli to speak about the patent process and intellectual property. We will meet to discuss with the team about how to move forward with submitting to WARF.

# Difficulties / advice requests

## Current design

## Materials and expenses

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

## Major team goals for the next week

1. Practice for the presentation
2. Fabricate a metal adjustable design
3. Discuss WARF submission

## Next week's individual goals

- Riley Toth
  - Continue to practice on the Preliminary Presentation
  - Call Arrow to work through the next steps in submission
- Delani Wille
  - Continue research on testing protocols
  - Practice Preliminary presentation
- Gracie Kreissler
  - Build the adjustable version of the bench
  - Finalize the CAD
  - Finalize the testing setup
- Margo Amatuzio
  - Prototype adjustable version of the bench
  - Preliminary presentation
  - Research ergonomic bench designs
- Cam Owens
  - Finish initial design for spring loaded base

- Help with fabrication of adjustable support
- Preliminary Presentation

## Timeline

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

Filled boxes = projected timeline

X = task was worked on or completed

## Previous week's goals and accomplishments

- Riley Toth
  - Research to properly fill out my slides and practice the preliminary presentation
  - Went to home depot as a group to get the right supplies
  - Researched Arrow to figure out next steps
- Delani Wille
  - Complete the Fall project recap portion of the preliminary presentation
  - Went to home depot as a group to get supplies for design changes
  - Met with Dr. Puccinelli to discuss patent pathway
  - Research competing patents and IRB testing protocols
- Gracie Kreissler
  - Worked on CAD for the bench
  - Went to Home Depot and bought materials to fabricate the adjustable version
- Margo Amatuzio
  - Complete timeline and objectives section of the preliminary presentation
  - Bought materials and researched column support of the bench
  - Met with Dr. Puccinelli to discuss intellectual property and patent
- Cameron Owens

- Went to Home Depot to buy components for the support leg
- Did some initial sketches and research on a spring loaded base design
- Completed slides for preliminary presentation

## **Activities**

<b>Name</b>	<b>Date</b>	<b>Activity</b>	<b>Time (h)</b>	<b>Week Total (h)</b>	<b>Sem. Total (h)</b>
Riley Toth	2/4/2024 2/7/2024 2/8/2024	Home Depot Arrow Research Presentation Practice/Work	1 0.5 1	2.5	4.5
Delani Wille	2/4/2024 2/6/2024 2/7/2024 2/8/2024	Home Depot Competitor Research Patent Meeting with Dr.P Presentation work	1 1 0.5 1	3.5	5.5
Gracie Kreissler	2/4/2024 2/7/2024 2/8/2024	Home Depot CAD Prelim Presentation	2	2	2
Margo Amatuzio	2/4/2024 2/7/2024 2/8/2024	Home Depot Patent Meeting with Dr.P Prelim Presentation	1 0.5 1.5	4	6
Cameron Owens	2/4/2024 2/7/2024 2/7/2024 2/8/2024	Home Depot Patent Meeting with Dr. P Preliminary Presentation Slides Sketching	1 0.5 0.5 0.5	2.5	4.5