

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

Date: 4/4/2024

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 worked on the executive summary draft and planned the design's final prototyping. The functional prototype testing is planned within our team in order to finalize a design and begin the next prototyping phase with 80/20 and begin testing in the coming weeks.

## Difficulties / advice requests

## Current design

## Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Date	Total
CORNER BRACE	BRACE, CORNER_2"_GAL V_4PK	Everbilt	030699152674	Home Depot	02/04/24	\$6.97
BRACE, CORNER_5"_ZIN C	BRACE, CORNER_5"_ZINC	Everbilt	030699152124	Home Depot	02/04/24	\$5.94
CLEVIS PIN	TOWSMART 3/8" CLEVIS PIN	TowSmart	849278012038	Home Depot	02/04/24	\$5.38
SQ TB1.25	PUNCHED SQ TUBE ZP 1-1/4X36	Everbilt	887480030471	Home Depot	02/04/24	\$22.93
SQUARE TUBE	TUBE SQUARE ALUM 48X1X1/16	Everbilt	887480013078	Home Depot	02/04/24	\$28.47
8 IN SHIMS	8" COMPOSITE SHIM (12 PC BDL)	Timberwolf	852981002098	Home Depot	02/04/24	\$2.28
						<b>\$71.970</b>

## Major team goals for the next week

1. Review IRB submission
2. Test the prototype

## Next week's individual goals

- Riley Toth
  - Review Arrow submission and resubmit
- Delani Wille

- Begin 80/20 fabrication
- Decide on bench fixation method
- Test current prototype
- Gracie Kreissler
  - Get dimensions for 80/20 and then figure out how much 80/20 we need
- Margo Amatuzio
  - Current prototype data collection
  - Complete writing testing protocol
- Cam Owens
  - Continue working on Outreach, finalizing the essay and activity outlines.
  - Help team members with their portion of the product.

## 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	x													
Background...																
Prototyping																
Testings																
<b>Deliverables</b>																
Progress Reports	x	x	x	x	x	x	x	x	x	x						
Prelim presentation			x													
Final Poster																
<b>Meetings</b>																
Client	x															
Advisor	x	x	x	x		x	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
  - Completed outreach editing
- Delani Wille
  - Worked on 80/20 measurements
  - Submitted Invention disclosure
- Gracie Kreissler
  - Discuss next steps for prototype
  - Completed outreach

- Worked on figures for experimental setup
- Margo Amatuzio
  - Wrote executive summary draft
- Cameron Owens
  - Started working on the report for outreach.
  - Started working on the essay explaining the impact of our outreach project.

## ***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	4/3/2024	Outreach editing	2	2	26
Delani Wille	4/4/2024 4/3/2024	Invention Disclosure 80/20 measurements	0.5 1	1.5	27.5
Gracie Kreissler	3/18/2024 3/18/2024 3/18/2024	Outreach Plan prototype Worked on figures for experimental setup	2 0.5 1	3.5	25.5
Margo Amatuzio	4/4/2024	Executive summary draft	2	2	22.5
Cameron Owens	4/3/2024	Outreach	2.5	2.5	23.5