

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

Date: 3/21/2024

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 reviewed the invention disclosure and IRB submission. ARROW document clarifications are being made.

The functional prototype testing was planned within our team in order to finalize a design and begin the next prototyping phase with 80/20.

BME Outreach podcast was recorded and editing is in progress.

## 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
  - Finish editing outreach
- Delani Wille
  - Have meeting with WARF
  - Research 80/20 fabrication
- Gracie Kreissler
  - Get dimensions for 80/20 and then figure out how much 80/20 we need
- Margo Amatuzio
  - Evaluate testing protocol and establish quantifiable data for results section
- Cam Owens
  - Finish or help with any remaining work on the prototype
  - Help with revising IRB.

## 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										
Prelim presentation			x													
Final Poster																
<b>Meetings</b>																
Client	x															
Advisor	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
  - Review Arrow submission
  - Completed Outreach

- Edited Outreach Podcast
- Delani Wille
  - Review Invention disclosure
  - Completed outreach
  - Plan next prototype phase
- Gracie Kreissler
  - Discuss next steps for prototype
  - Completed outreach
  - Worked on figures for experimental setup
- Margo Amatuzio
  - Completed outreach
  - Fabricate and attach base to adjustable column for prototype
  - Worked on Results and Methods sections of manuscript draft and researched similar papers to continue to build upon testing protocol
- Cameron Owens
  - Completed Outreach activity with the team
  - Designed Podcast cover art

## Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Riley Toth	3/18/2024 3/19/2024 3/20/2024	Outreach Arrow review Outreach editing	2 0.5 1	3.5	24
Delani Wille	3/18/2024 3/18/2024 3/18/2024 3/20/2024	Invention Disclosure Outreach Plan prototype IRB required online training	0.5 2 0.5 1	4	26
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	3/8/2024 3/14/2024	Fabrication to attach adjustable column to base in TEAM Lab Work on manuscript	2 3	5	17.5
Cameron Owens	3/5/2024 3/4/2024	Outreach Cover Art for outreach	1 1	2	21