

Step by Step: A Comprehensive Approach to Stair Climbing Assistance

Date: 4/25/2024

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 performed testing on our final prototype and the iWalk and analyzed the data for the presentation. We completed the poster with our results for Friday, and we will continue to work on a formal report for submission next Wednesday.

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
BLACK SPRAY PAINT	MATTE BLACK SPRAY PAINT	Krylon	724504055464	Micheals	2/19/24	\$8.56
						\$71.970

Major team goals for the next week

1. Test the prototype
2. Draw conclusions from testing

Next week's individual goals

- Riley Toth
 - Edit final paper
 - Presentation
 - Meet with WARF
- Delani Wille
 - Edit final paper
 - Final presentation
 - Meet with WARF
- Gracie Kreissler
 - Present final poster
 - Meet with WARF
 - Work on final report and notebook
- Margo Amatuzio
 - Present final poster
 - Meet with WARF
 - Work on final report and notebook
- Cam Owens
 - Finish working on the final report for submission
 - Finalize notebook

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	x	x													
Background...																
Prototyping																
Testings																
Deliverables																
Progress Reports	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Prelim presentation			x													
Final Poster																
Meetings																
Client	x															
Advisor	x	x	x	x		x	x	x			x	x	x			
Website																
Update																

Filled boxes = projected timeline
 X = task was worked on or completed

Previous week's goals and accomplishments

- Riley Toth
 - Team Testing
 - Helped finish the poster
 - Arrow editing
- Delani Wille
 - Prototype testing
 - Final executive summary
 - Reviewed final poster
 - Finished prototype fabrication
- Gracie Kreissler
 - Performed testing of device
 - Finalized poster
 - Practiced for final presentation
- Margo Amatuzio
 - Performed testing with the team
 - Analyzed testing results in MATLAB
 - Completed final design, testing, and results section of final poster
- Cameron Owens
 - Finished poster for presentations
 - Finalized Testing

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Riley Toth	4/19/2024 4/22/2024 4/23/2024	Team testing Arrow editing Poster editing	2 1 0.5	3.5	34
Delani Wille	4/19/2024 4/19/2024 4/23/2024 4/23/2024	Prototype testing Executive summary Prototype fabrication Final poster	2 1 3 1	7	45
Gracie Kreissler	4/19/2024 4/23/2024	Testing Reviewed poster and finalized prototype CAD	2 2	4	36
Margo Amatuzio	4/19/2024 4/20/2024 4/21/2024 4/22/2024 4/23/2024	Testing MATLAB Testing Analysis MATLAB Testing Analysis Testing Analysis & Final Poster Testing Analysis & Final Poster	2 5 3 3 2	15	39.5
Cameron Owens	4/21/2024 4/23/2024	Poster Testing	1 2	3	32

