Knee Crutch

Progress Report #7

BME Design 200/300

Date: 10/16-10/23

Client: Daniel Kutschera
Advisor: Duc-Huy Nguyen
Team:

Carmen Tanem Team Leader	ctanem@wisc.edu
Katie Matheus Team Leader	kmatheus@wisc.edu
Meghan Hayes Communicator	hayes27@wisc.edu
Madeline Kramer BSAC	mkkramer3@wisc.edu
Victoria Kind BWIG	vkind@wisc.edu
Zach Haussler BPAG	haussler@wisc.edu

Problem statement

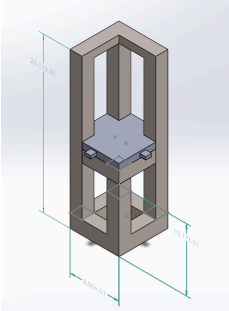
Patients who are non-weightbearing on a lower limb often have difficulty safely navigating stairs when returning home, particularly when weakness or other physical limitations prevent them from using crutches. Current solutions are either improvised, uncomfortable, difficult to adjust, or designed for walking rather than stair navigation. Therefore, there is a need for a stable, adjustable, comfortable, and easily sanitized device that allows non-weightbearing patients to safely ascend and descend stairs without placing weight on the injured lower limb.

Brief status update

This week, we did a lot of work individually. We each completed training, or set dates to complete training, which are necessary to begin the fabrication process. We also ordered a sterilizable cushion cover, and began looking into possible cushions, handles, and straps.

Difficulties / advice requests

Current design



Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
Al H-Beams	3ft long aluminum h beams; thickness: 0.05in; height: 1.074in; width: 1.040in	Unknown	Unknown	McMaster	4558t51	10/15/2026	6	$10.60	$79.33	https://www.mcmaster.com/4558T51/
									$0.00	
Category 2										
Knee cushion	knee cushion	etsy	-	etsy	-	10/21	2	14.76	$14.76	
									$0.00	
								TOTAL:	**$0.00**	

Goals

Major team goals for the next week

1. Begin fabrication of the frame.
2. Complete all necessary training required for fabrication.

Next week's individual goals

- Carmen Tanem
    - Obtain the cushion cover
    - Figure out how we can attach straps to the cover
    - Help with the manufacturing of the base
- Katie Matheus
    - Start fabricating base
    - Order handle and straps
- Meghan Hayes
    - Finalize material for base, order material
    - Set up a fabrication plan with dates
    - Order handles
- Madeline
    - Continue training
    - Determine how the strap will be attached to the platforms
    - Finalize design of riser platforms
- Zach
    - Continue training
    - Determine exactly how base will be manufactured
    - Order potential materials required to manufacture base
- Victoria
    - Continue trainings
    - Begin fabrication of Base
    - Determine how plate will be attached to base

Timeline

Task	N/A	Sept				Oct					Nov				Dec	
	N/A	3	10	17	24	1	8	15	22	29	5	12	19	26	10	17
Project R&D																
Empathize			X													
Background…			X	X	X											
Prototyping				X	X	X	X									

Testings																
Deliverables																
Progress Reports		X	X	X	X	X	X	X	X							
Prelim presentation						X										
Final Poster																
Meetings																
Client		X														
Advisor		X	X	X	X	X	X	X								
Website		X	X	X	X	X	X	X	X							
Update		X	X	X	X	X										

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

Detailed accomplishments

Previous week's goals and accomplishments

- Carmen Tanem
    - Nail down a cushion and velcro strapping system
    - continue on research
    - start build with materials that were just ordered
- Katie Matheus
    - Order cushion cover
    - Research more on fabricating
    - Finish training
- Meghan Hayes
    - Help create fabrication plan with dates
    - Run any additional CAD simulations
    - Begin trainings
- Madeline
    - Look into potential CAD revisions
    - Begin Trainings
- Zach
    - Run additional CAD simulations
    - Determine and order other needed materials
    - Begin training needed to weld and cut materials
- Victoria
    - Begin trainings
    - Identify sheet options at makers space

Summary of Team Accomplishments

1. Received aluminum alloy bars
2. Ordered cushion cover
3. Completed various individual trainings

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Carmen Tanem	10/17	training, ordered cushion cover	2	2	25
Katie Matheus	10/16 10/22	Update PDS and look at report comments Look for handles that can be ordered	2.5	2.5	22
Meghan	10/20/26	Researched possible metals, cushions and handles Completed training	2 1	3	22
Victoria	10/20/2026 10/22/2026	Trainings Identified Sheet options at makers space	1.5 1.0	2.5	22
Madeline	10/20 10/20	Training Looked into CAD designs	2 1	3	23
Zach	10/17/2026 10/22/2026	Training Researched metal joining methods	2 1	3	23