Knee Crutch

Progress Report #10

BME Design 200/300

Date: 11/6-11/12

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

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Problem statement

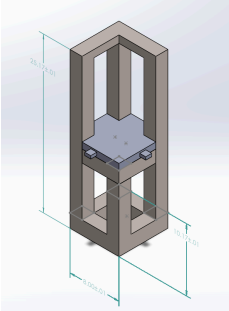
Patients who are non-weightbearing on a lower limb often have difficulty safely navigating stairs when returning home, particularly when weakness or other physical limitations prevent them from using crutches. Current solutions are either improvised, uncomfortable, difficult to adjust, or designed for 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 our team members began fabrication. We ran into a small problem with the cutting orientation, but we had enough extra material to correct our mistake! We finished cutting the H-bars for our frame, and will begin/finish welding with Mike Hughes before next Friday.

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	
Knee Cushion	Knee cushion upcharge	etsy	-	etsy	-	11/6		$6.00	$6.00	
								TOTAL:	**$0.00**	

Goals

Major team goals for the next week

1. Begin cutting and welding frame
2. Order handles, and cushion stuffing

Next week's individual goals

- Carmen Tanem
    - Finish fabricating the metal base
    - Obtain the cushion
    - Start on the final deliverables
- Katie Matheus
    - Place an order for the handles
    - Make a testing doc to put all of our testing ideas so we will be ready to test
- Meghan Hayes
    - Assist in the welding process
    - Start on final deliverables
- Madeline
    - Measure and begin making printed plates
    - Aid in early testing
- Zach
    - Begin CAD and fabrication of 3d printed plates
    - Determine where we can access certain tools required for later testing
    - Alter testing plans if certain tools are unavailable
- Victoria
    - Finish fabricating the base
    - Begin testing on the 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	X	X	X	X					
Testings																
Deliverables																
Progress Reports		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		X	X	X	X	X	X	X	X							
Update		X	X	X	X	X	X	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
    - Hopefully get the materials cut and down into weld
        - This would mean we would have the final base!
    - Talk with the etsy seller to confirm shipping date
    - Lay out remainder of semester plan
- Katie Matheus
    - Fabricate the base of the knee crutch
    - Research the best handle options
- Meghan Hayes
    - Weld materials
    - Meet with Mike
    - Look into additional materials and testing protocols
- Madeline
    - Start fabrication
    - Look into riser sizes as base is fabricated
- Zach
    - Look into alternative material shape
    - Determine what should be ordered for the handles, and how it will be added to the device
- Victoria
    - Cut materials
    - Complete base fabrication

Summary of Team Accomplishments

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Carmen Tanem	11/12	Welding consultation Cutting of h bars Deliverables work	4	4	30
Katie Matheus	11/6/26 11/10/26	Go over fabrication plans to be completed next week and get advise from advisor on testing Find handle options and narrowed it down to 3 materials/styles	1 1	1 1	27.5
Meghan	11/12/2026	Welding consultation Cutting H bars	4	4	30
Victoria	11/10/2026 11/11/2026	Cut Aluminum H Bars Cut Aluminum H Bars	2 2	4	32
Madeline	11/10/2026	Designed early riser models (to be shaped to final measurements)	2	2	29
Zach	11/10/2026	Looked at alt. Material shape (hollow rods and bars)	1	1	30