Knee Crutch

Progress Report #6

BME Design 200/300

Date: 10/9-10/15

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

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Problem statement

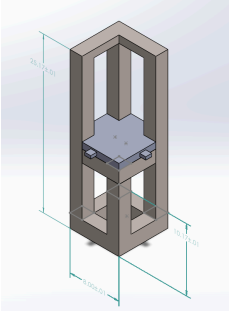
Patients who are non-weightbearing on a lower limb often have difficulty safely navigating stairs when returning home, particularly when weakness or other physical limitations prevent them from using crutches. Current solutions are either improvised, uncomfortable, difficult to adjust, or designed for 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 we discussed final designs, ran preliminary CAD simulations, and ordered materials. We ordered 6063 Aluminum h-beams for the base of the design. We are still looking into materials for the cushion, handles, security straps and thin sheet of metal for the horizontal base.

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										
									$0.00	
									$0.00	
								TOTAL:	**$0.00**	

Goals

Major team goals for the next week

1. Created a fabrication plan
2. Begin fabrication of the design base once ordered materials are received
3. Ordered the rest of the materials needed, including the foam handles, cushion, straps, and metal sheet

Next week's individual goals

- 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 and handles
    - Start fabricating once materials arrive
- 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 Fabricating
    - Begin trainings

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								
Prelim presentation						X										
Final Poster																
Meetings																
Client		X														
Advisor		X	X	X	X	X	X									
Website																
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
  - Keep updating PDS
  - Get materials prepped for show and tell
  - Look into and order cushion materials
- Katie Matheus
  - Order materials, finalize report
  - Research articles for cushion
  - Finished trainings for biosafety autoclave
- Meghan Hayes
  - Update CAD based on ordered parts
  - Update PDS
  - Run CAD simulation testing
- Madeline
  - Continue researching materials before final decision
  - Continue updating PDS
- Zach
  - Run CAD simulation testing
  - Identify and order materials for frame of device
- Victoria
  - Identify and order materials for base
  - Identify thickness for material of the base

Summary of Team Accomplishments

1. Ran preliminary CAD simulations

2. Ordered materials for the design base

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Carmen Tanem	10/11	discussed materials to order and researched for cushion design	2	2	20
Katie Matheus	10/9 10/13 10/14/26	Finalize and submit report Team meeting discuss materials and dimensions Complete training	1 1 0.5	2.5	19.5
Meghan	10/11 10/13	Updated and ran rough CAD simulations Met with team members Research sterility and disease	2 1 1	4	19
Victoria	10/13 10/11	Discussed materials to order Identified thickness and material size for base, based off of CAD simulations Identified material for handles	1 1.5 0.5	3	19.5
Madeline	10/11 10/13	Researched other designs to find potential improvements Met with team members	2 1	3	20
Zach	10/10/26 10/11-14/26	Ran rough CAD simulations Met with others to discuss and order materials	2 1	3	20