

Project Title: Digital Traction with Finger Sleeves

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Date: 9/18/26 - 9/24/26

Problem Statement

The objective of this project is to create a digital traction device using finger traps that precisely pulls the patient's hand, wrist, and forearm into a comfortable, neutral position while holding a stable static load about 1/10th of the patient's weight. To be feasible for Idrissa Pouye Hospital, the device must be portable and usable in both the plaster casting room and the operating room. This requires a compact and mobile device with wheels that can be transported easily between spaces and provides unobstructed access to the forearm for casting and arthroscopy. It must tolerate routine sterilization without degradation and maintain its mechanical material properties. In addition, the design must be simple enough to fabricate, assemble, and repair using materials and processes available in or near Dakar so that the hospital can maintain a reliable inventory even as individual devices are lost or damaged over time.

Brief Status Update

This week all team members individually brainstormed design ideas for a traction device and a base to hold the traction device. As a team we decided to move forward with three preliminary design ideas for both the traction device and the base. We evaluated all six ideas using a design matrix to choose a final design. We are hoping to meet with the client this upcoming Saturday to ask further questions about the design requirements such as cost and size constraints.

Weekly/Ongoing Difficulties:

We created preliminary design ideas on the assumption that we could buy finger traps. The client might not have the budget for it, so we would have to brainstorm ways to improve on the current finger trap design in the following week.

Current Design

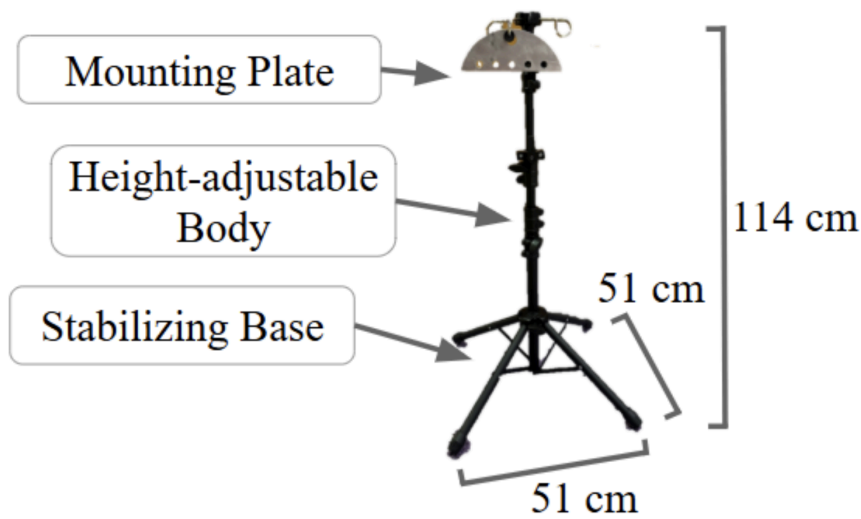


Figure 11: Mechanical Design Final Prototype, displaying stand and mounting plate portions of the design

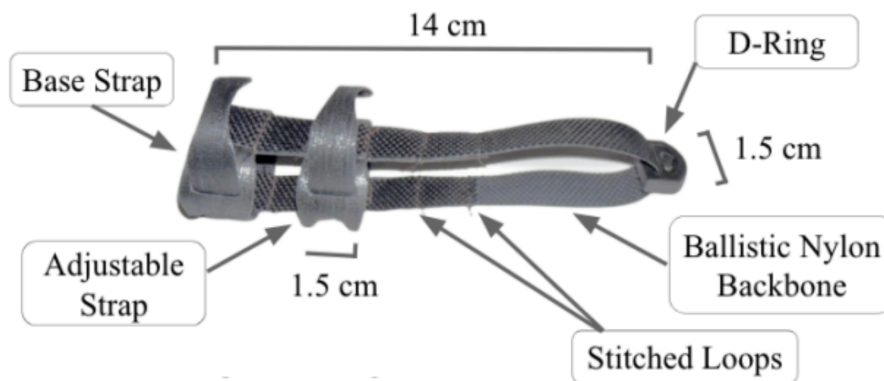


Figure 12: Final finger sleeve prototype

Summary of Weekly Team Member Design Accomplishments

Team:

This week we were focused on brainstorming design ideas for the traction mechanism and base of the device. We evaluated these design ideas using a design matrix to choose our final design.

Individual:

❖ Amy Dang:

- Brainstormed design ideas for a traction mechanism and base of the device
- Made two drawings for the design matrix and completed section of the design matrix
- Team meetings to discuss design ideas

- ❖ Sean Carey:
 - Finished the PDS
 - Brainstormed design ideas for the traction mechanism and table clamps for the traction device
 - Created design drawing for traction device for the design matrix and wrote descriptions for the design and some of the criteria
 - Researched different sensors and anthropometric data
- ❖ Anshpreet Sohal:
 - Proofread and edited draft for PDS
 - Brainstormed three potential designs for the team design matrices
 - Ranked device design scores in Design matrix and filled out ease of use paragraphs
 - Researched potential MRI-safe metal materials for traction device
- ❖ Patricia Prakasam:
 - Came up with design ideas for the base and the traction mechanism for our device.
 - Created two drawings for both of the design matrices and completed the footprint and comfort sections of the matrices.
 - Team meetings to discuss design ideas.
- ❖ Henna Razeq:
 - Created designs for the base and finger trap parts of the device
 - Completed the mobility and flexibility portion of the design matrix
 - Team meeting to go over ideas and design matrix.
 - Completed research on traction and how to implement it
- ❖ Karthik Anem:
 - Brainstormed overall design ideas, focusing more on the base and debating if it should be on the floor or connected to the bed.
 - Completed the cost section of the design matrix
 - Team meetings throughout the week.
 - Researched on materials and their effect on MRI imaging.

Upcoming Team and Individual Goals:

Team:

This upcoming week we hope to meet with the client to review design requirements. We will also be working on the preliminary presentation and preliminary report.

Individual:

- ❖ Amy Dang:
 - Complete section of preliminary presentation
 - Complete section of preliminary report

- Edit preliminary final design after client meeting
- ❖ Sean Carey:
 - Complete the preliminary design report
 - Present the preliminary designs
 - Meet with client
- ❖ Anshpreet Sohal:
 - Meet with client to discuss parts of the design that might have to be cut out to make room for other aspects
 - Review design and make changes if needed following the client meeting
 - Complete preliminary design report and presentation
- ❖ Patricia Prakasam:
 - Complete sections assigned of preliminary presentation/report
 - Edit preliminary final design after taking in feedback from our client and advisor meetings
 - Finish up any final initial research about human biology/materials needed to fabricate our design
- ❖ Henna Razeq:
 - Complete sections of preliminary design report
 - Meet with client
 - Conduct additional research
 - Present our preliminary design to advisors and other peers
- ❖ Karthik Anem:
 - Meet with the client
 - Complete assigned sections of the preliminary design report.
 - Practice and present preliminary design presentation.

Project Timeline:

Project Goal	Deadline	Team Assigned	Progress	Completed
Product Design Specifications	09/18	All	Started	Yes
Design Matrix	09/25	All	Started	Yes
Preliminary Presentations	10/02	All	Not Started	No
Preliminary Deliverables	10/07	All	Not Started	No
Show and Tell	10/30	All	Not Started	No
Final Presentation	12/04	All	Not Started	No
Final Deliverables	12/09	All	Not Started	No

Timeline

Task	September				October					November				December		
	4	11	18	25	2	9	16	23	30	6	13	20	27	4		
Project R&D																
Research	X	X	X	X												
PDS	o	o	X	X												
Design Matrix	o	o	o	X												
Prototyping	o	o	o	o												
Testings	o	o	o	o												
Deliverables																
Progress Reports	na	X	X	X												
Prelim presentation	o	o	o	X												
Final Poster	o	o	o	o												
Meetings																
Client	na	o	X	o												
Advisor	X	X	X	X												
Website																
Update	X	X	X	X												

Filled boxes = projected timeline

X = task was worked on or completed – o = Not completed

Expenses

N/A

Activities Time

Team Member	Date	Activity	Time (h)	Weekly Total (h)	Semester Total (h)
Amy Dang	9/18 9/20-22 9/21 9/23 9/23	PDS Design Ideas Team meeting Team meeting Design Matrix	2 hr 4 hr 1.5 hr 1 hr 2 hr	10.5 hr	19.5 hr
Sean Carey	9/18 9/21-22	PDS Brainstorming + Research	2 hr 3 hr	11.5 hr	20 hr

	9/21 9/22-24 9/23	Team Meeting Design Matrix + Drawings Team Meeting	1.5 hr 3.5 hr 1.5		
Anshpreet Sohal	9/18 9/20-21 9/21 9/23 9/23 9/24	PDS Design Ideas Team meeting Design Matrix Team meeting Research	2.5 hr 3 hr 1.5 hr 2 hr 1 hr 1.5 hr	11.5 hr	19 hr
Patricia Prakasam	9/18 9/20-22 9/23 9/21 9/23 9/24 9/24	PDS Design Ideas Design Matrix Team Meeting Team Meeting Update on Design Matrix Research	2.5 hr 4.5 hr 0.5 hr 1.5 hr 1 hr 0.5 hr 0.5 hr	11 hr	16.5 hr
Henna Razeq	9/18 9/20-21 9/21&2 3 9/22 9/23	PDS Design Ideas Team Meeting Research Design Matrix	2 hr 3 hr 2.5 hr 1 hr 2 hr	10.5 hr	19 hr
Karthik Anem	9/18 9/21-23 9/18 9/23 9/24	Design Ideas Team Meeting PDS Design Matrix Research	2 hr 2.5 hr 2.5 hr 2.5 hr 1 hr	10.5 hr	18.5 hr