BME Design: 200, 300, 301, 400 and 402

SteadyHand Progress Report #9

Date: 11/5/26

Client: Dr. James Sohn
Advisor: Dr. Shawn Gomez
Team:
- Anna Wood
- Tess Brazee
- Mara Van Dyke
- Sam Anderson
- Ben Pytlik
- Miti Patel

Problem statement

Severe joint pain in the hands due to arthritis and other inflammatory conditions is now frequently treated using low-dose radiation therapy (LDRT). Current LDRT protocols require high setup reproducibility across 6 treatment sessions. Existing positioning systems are overly complex, use complicated indexing systems, and compress digits 2-5 together. This causes significant discomfort for patients and creates unnecessarily long setup times.

This project aims to develop a hand positioning device to be used in a clinical setting that minimizes setup time and patient discomfort while ensuring consistent hand placement for each treatment session.

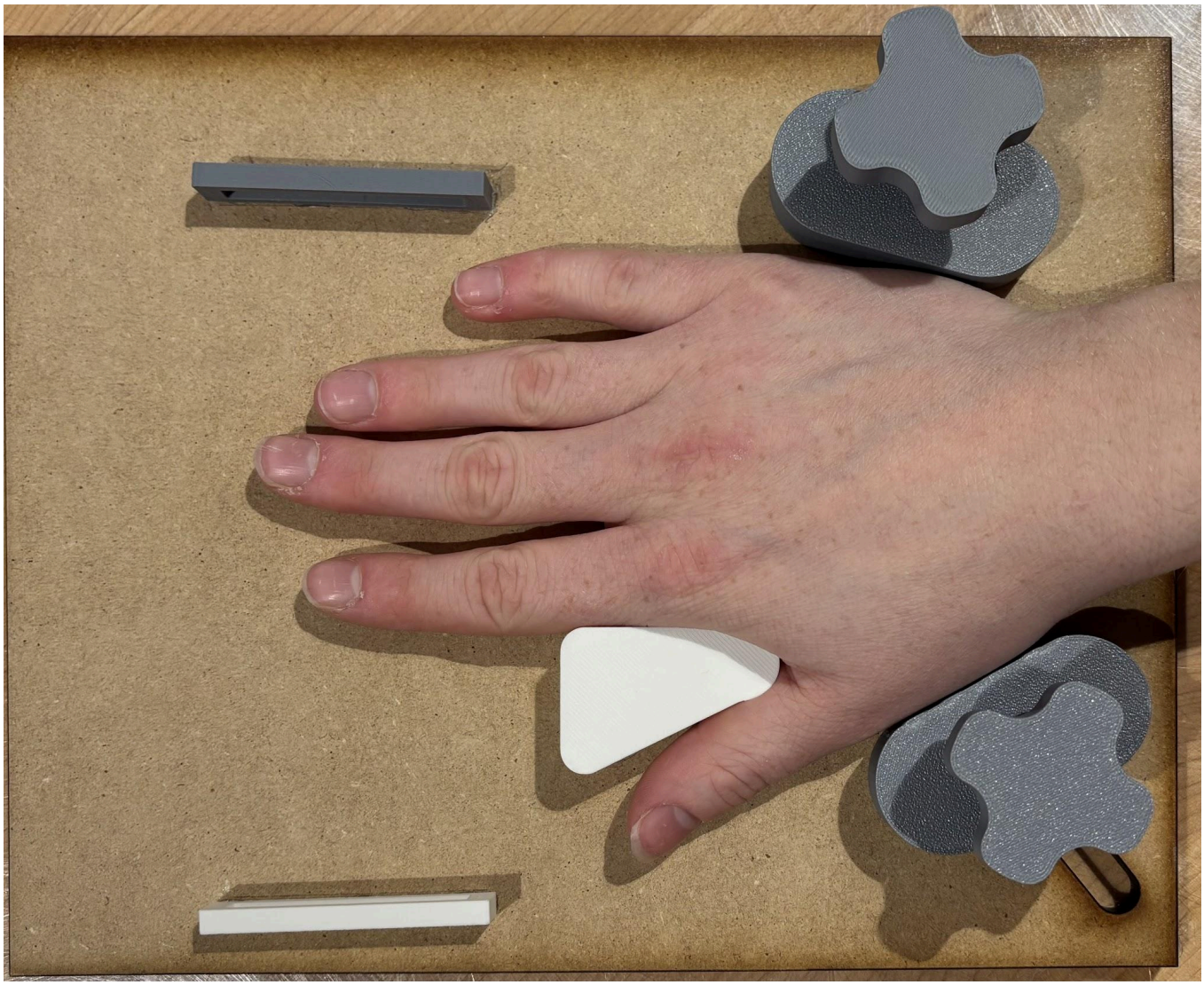
Brief status update

This week, our team evaluated design suggestions from show and tell and worked on the locking mechanism for the sliding hand positioners. We initially chose a push-button quick-release pin mechanism, but after a design consultation meeting, we decided on a simpler screw clamping mechanism. We designed this component in Onshape, added additional layers to our base plate for the sliding track, and adjusted our base plate design to accommodate wider hands.

Difficulties / advice requests

Current design

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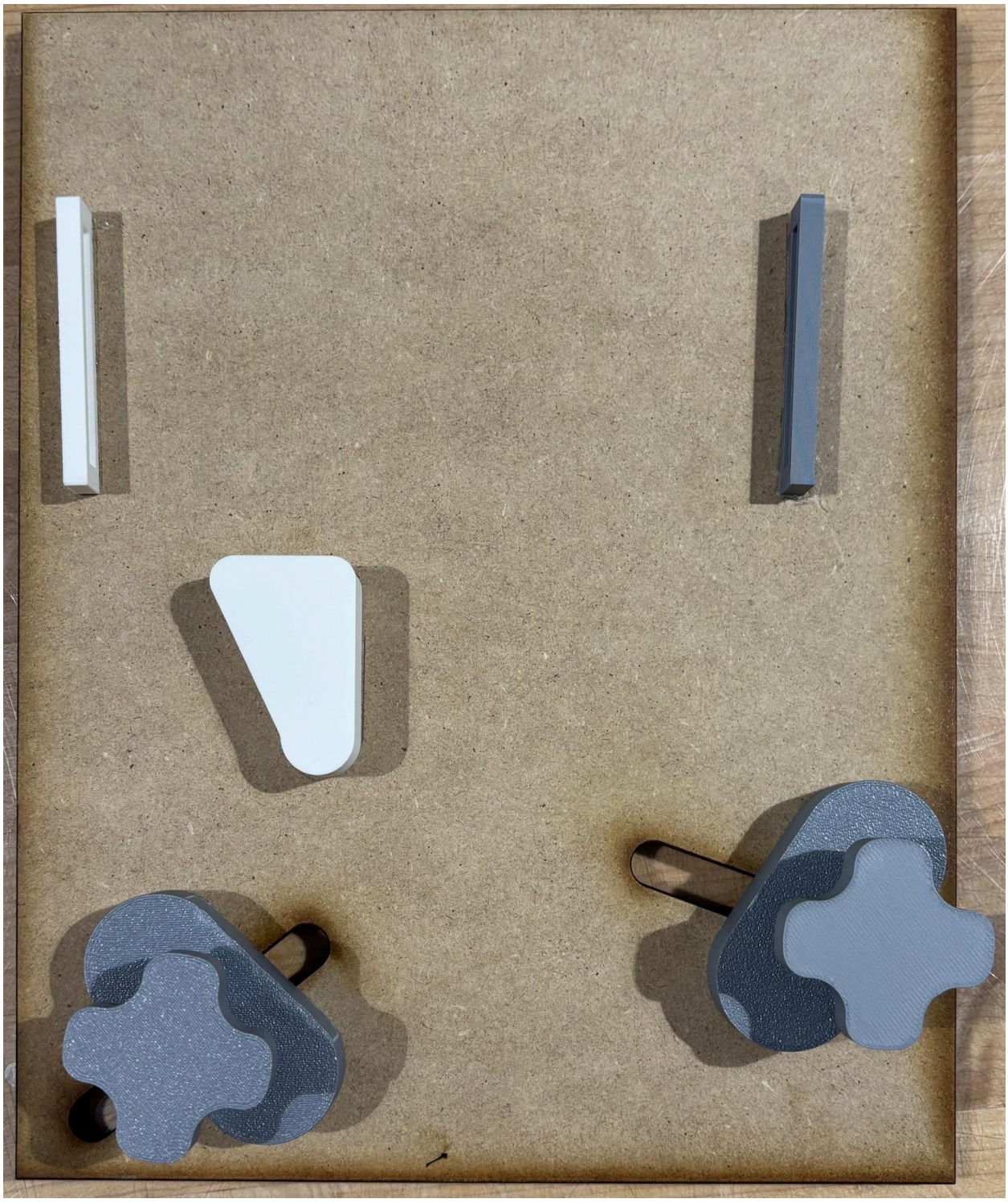


Figure 1. Current prototype featuring an HDF base plate and 3D printed components

Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Da te	#	Cost Each	Total	Link
Wendt										
3D printing	Individual components for plate			Wendt			1	$1.26	$1.26	
Plastic screws	Plastic screws for securing hand braces			Wendt			1	$0.20	$0.20	
Velcro	Strip of Velcro to anchor the fingers on the plate			Wendt			13 inche s	$0.10/i nch	$1.30	
Category 2										
									$0.00	
									$0.00	
								TOTAL:	**$2.76**	

Goals

Major team goals for the next week

1. Work towards a final prototype with our improved sliders, locking mechanism, and finger-locking strap.
2. Meet with Dr. Sohn to discuss our prototype and receive feedback.
3. Continue updating PDS and other relevant documentation.

Next week's individual goals

- Anna Wood
    - Start the testing process on the current prototype
    - Meet with Dr. Sohn to get prototype feedback/opinions
    - Make alternative slider designs to help with comfort and stabilization
- Mara Van Dyke
    - Finish CAD design for screw component of locking mechanism and 3D print
    - Meet with Dr. Sohn to receive feedback on prototype
    - Create testing protocol and schedule
- Tess Brazee
    - Finish prototype focusing on locking and sliding components and adaptability of base plate
    - Meet with Dr. James Sohn to receive feedback on prototype
    - Begin testing on prototype
- Sam Anderson
    - Meet with Dr. Sohn to get feedback on prototype
    - Finish the CAD design of the newest prototype

    - Test the 3D printed prototype
- Ben Pytlik
    - Continue finalizing prototype, tweaking the adaptability of the device
    - Research more about hand dimensions and universality
    - Begin testing
- Miti Patel
    - Continue to prototype with new locking components
    - Research testing options
    - Start initial drafts of final reports

Timeline

Task	Aug.	Sept.				Oct.				Nov.					Dec.
	30	6	13	20	27	4	11	18	25	1	8	16	22	29	6
Project R&D															
Empathize	X	X	X												
Background…				X	X				X						
Prototyping						X	X	X	X	X	X				
Testings															
Deliverables															
Progress Reports			X	X	X	X	X	X	X	X	X				
Prelim presentation						X									
Final Poster															
Meetings															
Client		X		X					X						
Advisor	X		X	X			X	X	X						
Website															
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

- Anna Wood
    - Attended design consultation with the team to finalize the design
    - Presented progress to other design teams at show and tell
- Mara Van Dyke
    - Discussed current design and ideas for slider locking mechanism at design consultation meeting
    - Started designing the custom screw in CAD for our screw locking mechanism
    - Worked on adjusting the dimensions of the base plate to make it more universal
- Tess Brazee
    - Brainstormed and designed push button quick release locking mechanism

    - Brought ideas to design consultation and decided on locking mechanism
    -
- Sam Anderson
    - Attended meeting with Makerspace staff to help with our design
    - Tested and altered the dimensions of the prototype
    - Attended Show and Tell and got and received feedback from peers
- Ben Pytlik
    - Helped CAD the prototype hand strap
    - Developed a locking system for the wrist holder
    - Helped to design the prototype base plate
- Miti Patel
    - Helped CAD prototype for initial base plate and hand locking systems.
    - Completed required training for machining and chemical safety.
    - Attended BSAC meeting with faculty.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Anna Wood	11/5	Presented design progress at show and tell. Attended design consultation.	2	2	26.5
Mara Van Dyke	11/5	Brainstormed locking mechanism and began working on screw in CAD, attended design consultation meeting	4	4	28.5
Tess Brazee	11/5	Met twice to prototype, brainstorm locking mechanisms, and begin to CAD the device, attended design consultation for locking mechanism, presented design at show and tell	4	4	25
Sam Anderson	11/5	Attended design consultation and Show and Tell, met with team to iterate on prototype	3	3	25.5
Ben Pytlik	11/5	Met twice this week to prototype and CAD the design, helped manufacture the base plate as well as the locking system for the slider hand positioner	4	4	28.5
Miti Patel	11/5	Presented designs at show and tell and gave other groups feedback on their designs, made changes to our design based on the feedback given at show and tell, helped create additional CAD designs	3	3	26