Project Title: Digital Traction with Finger Sleeves

Client: Mr. Pape Samb (asamb@jamarek.org)
Advisor: Prof. Randolph Ashton (rashton2@wisc.edu)
Co-Team Leader: Amy Dang (adang9@wisc.edu)
Co-Team Leader: Sean Carey (srcarey@wisc.edu)
Communicator: Anshpreet Sohal (sohal2@wisc.edu)
BSAC: Patricia Prakasam (pprakasam@wisc.edu)
BWIG: Henna Razeq (razeq@wisc.edu)
BPAG: Anem Karthik (kanem@wisc.edu)

Date: 10/23/26 - 10/29/26

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 device 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.

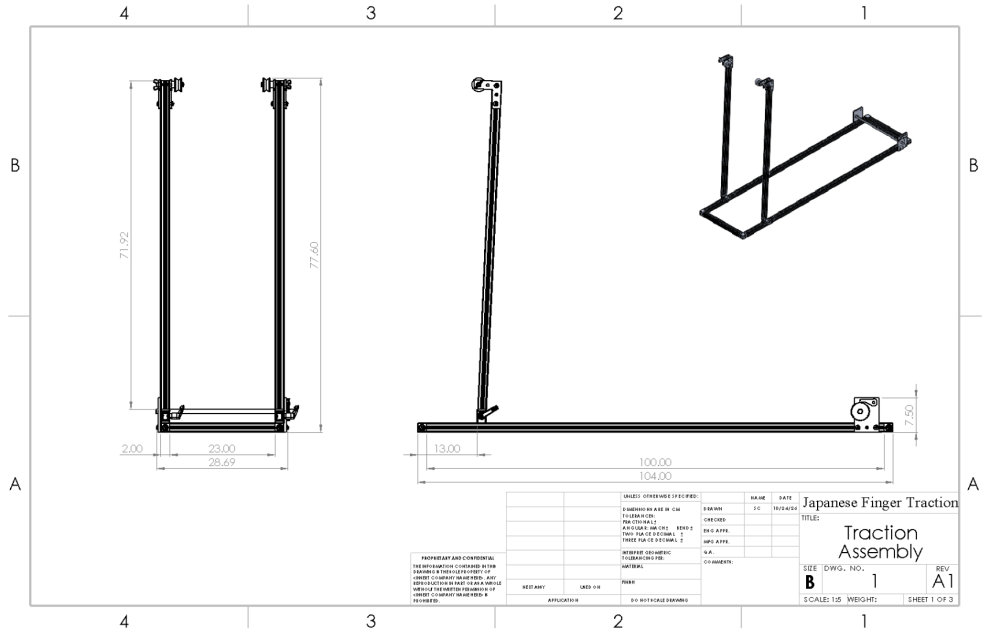
Brief Status Update:

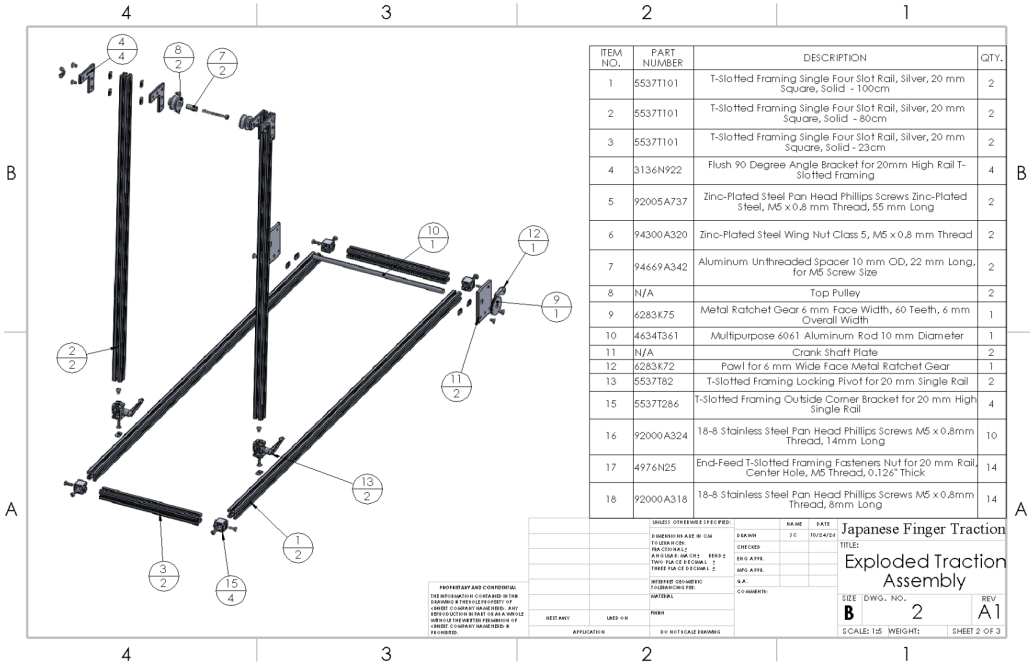
This week the team updated fabrication protocols for our new design and completed the required training for this semester. We also fabricated the wrist rotation design for show and tell.

Weekly/Ongoing Difficulties:

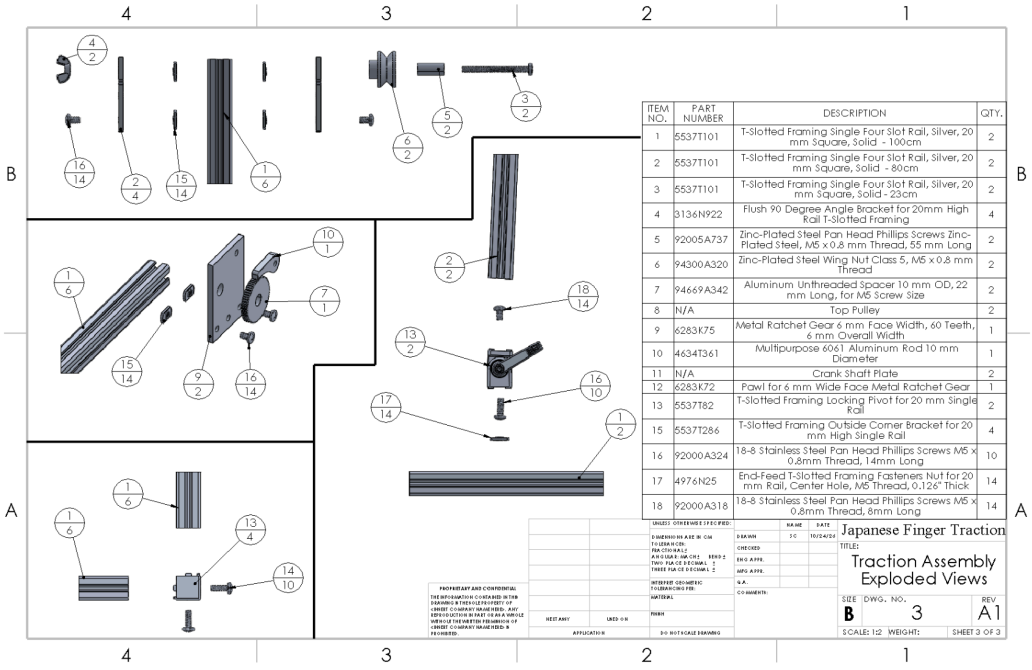
We have still not received confirmation from our client if they have ordered the materials yet. The client said that they would order it on 10/24.

Current Design





ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	5537T101	T-Slotted Framing Single Four Slot Rail, Silver, 20 mm Square, Solid - 100cm	2
2	5537T101	T-Slotted Framing Single Four Slot Rail, Silver, 20 mm Square, Solid - 80cm	2
3	5537T101	T-Slotted Framing Single Four Slot Rail, Silver, 20 mm Square, Solid - 23cm	2
4	3136N922	Flush 90 Degree Angle Bracket for 20mm High Rail T-Slotted Framing	4
5	92005A737	Zinc-Plated Steel Pan Head Phillips Screws Zinc-Plated Steel, M5 x 0.8 mm Thread, 55 mm Long	2
6	94300A320	Zinc-Plated Steel Wing Nut Class 5, M5 x 0.8 mm Thread	2
7	94669A342	Aluminum Unthreaded Spacer 10 mm OD, 22 mm Long, for M5 Screw Size	2
8	N/A	Top Pulley	2
9	6283K75	Metal Ratchet Gear 6 mm Face Width, 60 Teeth, 6 mm Overall Width	1
10	4634T361	Multipurpose 6061 Aluminum Rod 10 mm Diameter	1
11	N/A	Crank Shaft Plate	2
12	6283K72	Pawl for 6 mm Wide Face Metal Ratchet Gear	1
13	5537T82	T-Slotted Framing Locking Pivot for 20 mm Single Rail	2
15	5537T286	T-Slotted Framing Outside Corner Bracket for 20 mm High Single Rail	4
16	92000A324	18-8 Stainless Steel Pan Head Phillips Screws M5 x 0.8mm Thread, 14mm Long	10
17	4976N25	End-Feed T-Slotted Framing Fasteners Nut for 20 mm Rail, Center Hole, M5 Thread, 0.126" Thick	14
18	92000A318	18-8 Stainless Steel Pan Head Phillips Screws M5 x 0.8mm Thread, 8mm Long	14



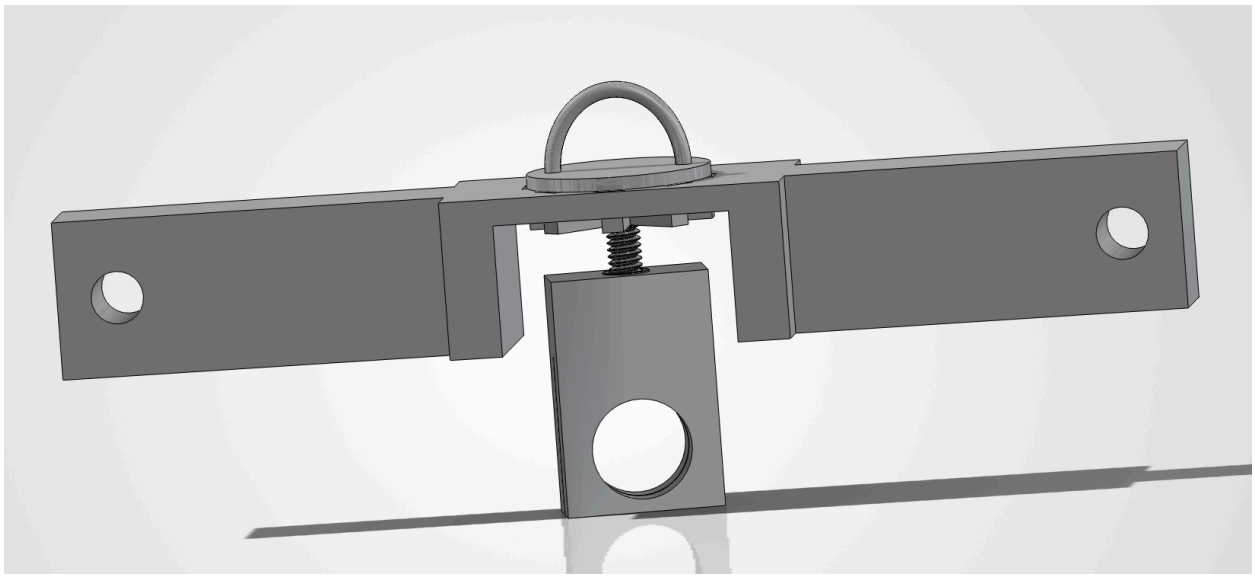
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Japanese Finger Traction

Traction Assembly Exploded Views

SIZE B | DWG. NO. 3 | REV A1

SCALE: 1:2 WEIGHT: SHEET 3 OF 3



New Final Design: Guillotine Pulley traction mechanism with new base design (top image) and wrist rotation mechanism (bottom image).

Summary of Weekly Team Member Design Accomplishments

Team: Worked on fabrication protocols for the new design and completed required training for the semester. Additionally, we fabricated the wrist rotation design.

Individual:

- Amy Dang:
  - Created solidwork drawings for wrist rotation design
  - Completed human subject training
- Sean Carey:
  - Update Traction Solidworks Assembly
  - Made Mechanical And Assembly Drawings
  - Client Meeting
- Anshpreet Sohal:
  - Completed human subject training
  - Created Solidworks drawings for base design fabrication protocol
  - Worked on wrist rotation prototype for show and tell
- Patricia Prakasam:
  - Created Traction Assembly Device Fabrication Protocol
  - Finished up Intro to Machining training
- Henna Razeq:
  - FInished intro to Machining
  - Created Wrist Device Fabrication Protocol
- Karthik Anem:
  - Created Base Assembly Device Fabrication Protocol
  - Sorted the BPAG Expenses sheet

Upcoming Team and Individual Goals:

Team: Fabricate prototype and begin updating testing protocols and FEA analysis.

Individual:

- Amy Dang:
  - Meet with client
  - Update wrist rotation solidwork design in solidworks
  - Fabricate traction device
- Sean Carey:
  - Meet with client
  - Fabricate prototype
  - Begin writing test protocols
- Anshpreet Sohal:
  - Meet with client
  - Begin fabrication
  - FEA analysis
- Patricia Prakasam:
  - Meet with client

- ➢ Assist with fabrication
- ➢ Help with testing protocols

❖ Henna Razeq:

- ➢ Meet with client
- ➢ Begin Fabricating
- ➢ Research testing protocols

❖ Karthik Anem:

- ➢ Begin Fabricating
- ➢ Meet With client
- ➢ Add on a connector to the clamp

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	Started	Yes
Preliminary Deliverables	10/07	All	Started	Yes
Show and Tell	10/30	All	Started	Yes
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	X	X	X	X	X							
PDS	o	o	X	X	X	X	X	X	X							
Design Matrix	o	o	o	X	X	X	X	X	X							
Prototyping	o	o	o	o	o	o	o	X	X							
Testings	o	o	o	o	o	o	o	o	o							
Deliverables																
Progress Reports	na	X	X	X	X	X	X	X	X							
Prelim presentation	o	o	o	X	X	X	X	X	X							
Final Poster	o	o	o	o	o	o	o	o	o							

Meetings																
Client	na	o	X	o	X	o	X	o	X							
Advisor	X	X	X	X	o	X	X	X	X							
Website																
Update	X	X	X	X	X	X	X	X	X							

Filled boxes = projected timeline
X = task was worked on or completed – **o = Not completed**

Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link
Print										
Part 1	CF-PLA	DI Lab	X	X	X	10/19/2026	1	$2.61	$2.61	
Part 2	CF-PLA	DI Lab	X	X	X	10/19/2026	1	$0.11	$0.11	
Part 3	CF-PLA	DI Lab	X	X	X	10/19/2026	1	$0.35	$0.35	
Brackets Test	CF-PLA	DI Lab	X	X	X	10/21/2026	1	$0.55	$0.55	
Brackets, gears, paw, crank, pulley	CF-PLA. 1 top pulley. 4 3-way corner brackets. 7 2-way corner brackets. 1 surface corner bracket. 1 gear. 1 paw. 1 crank plate. 1 L bracket. 1 T bracket	DI Lab	X	X	X	10/28/3036	1	$3.07	$3.07	

Writ rotation	CF-PLA All 3 parts of the wrist rotation	DI Lab	X	X	X	10/28/2026	1	$3.20	$3.20	
Traction Device										
T-Tube	Single Four Slot Rail, Silver, 20 mm Square, Solid			McMaster Carr	5537T82		4	$35.73 / 10ft	$142.92	https://www.mcmaster.com/5537T101-5537T504/
T-tube rotating joint	Locking Pivot for 20 mm Single Rail			McMaster Carr	5537T82		2	$23.49	$46.98	https://www.mcmaster.com/5537T82/
Aluminum Unthreaded Spacer	10 mm OD, 22 mm Long, for M5 Screw Size			McMaster Carr	94669A342		2	$2.50	$5.00	https://www.mcmaster.com/94669A342/
Zinc-Plated Steel Pan Head Phillips Screws	Zinc-Plated Steel, M5 x 0.8 mm Thread, 55 mm Long			McMaster Carr	92005A737		1	$13.80 / 10	$13.80	https://www.mcmaster.com/92005A737/

Zinc-Plated Steel Wing Nut	Class 5, M5 x 0.8 mm Thread			McMaster Carr	94300A320		1	$4.61 / 25	$4.61	https://www.mcmaster.com/94300A320/
Multipurpose 6061 Aluminum Rod	10 mm Diameter, 1 ft.			McMaster Carr	4634T36		1	$3.87	$3.87	https://www.mcmaster.com/4634T36-4634T361/
Hinge	Rail-to-Rail Hinge for 20 mm High Rail, Silver			McMaster Carr	5537T859		4	$13.89	$55.56	https://www.mcmaster.com/5537T859/
18-8 Stainless Steel Pan Head Phillips Screws	M5 x 0.8mm Thread, 14mm Long			McMaster Carr	92000A324		1	$11.90 / 50	$11.90	https://www.mcmaster.com/92000A324/
End-Fed T-Slotted Framing Fasteners	Nut for 20 mm Rail, Center Hole, M5 Thread, 0.126" Thick			McMaster Carr	4976N25		6	$2.27 / 10	$13.62	https://www.mcmaster.com/4976N25/

18-8 Stainless Steel Pan Head Phillips Screws	M5 x 0.8mm Thread, 8mm Long			McMaster Carr	92000A318		$1.00	$8.50 / 50	$8.50	https://www.mcmaster.com/92000A318/
								TOTAL:	**$316.65**	

Activities Time

Team Member	**Date**	**Activity**	**Time (h)**	**Weekly Total (h)**	**Semester Total (h)**
Amy Dang	10/23 10/23	Solidworks Training	2 1.5	3.5	46.5 hr
Sean Carey	13/23-24 10/24 10/28-29	Solidworks + Drawings Client Meeting Fabrication protocols	5 hr 0.5 hr 1 hr	6.5 hr	61.5 hr
Anshpreet Sohal	10/23-26 10/25 10/27	SolidWorks Training Fabrication protocol	1 hr 2 hr 0.5 hr	3.5 hr	48.5 hr
Patricia Prakasam	10/23-29 10/27-29	Traction Device Protocol Intro to Machining	2.5 hr 4.5 hr	7 hr	38.5 hr
Henna Razeq	10/28 10/27	Intro to Machining Wrist Device Protocol	4 hr 1.5 hr	5.5 hr	40 hr
Karthik Anem	10/27 10/28	Protocol Chart Sorting - expense sheet	1.5 Hr 0.5 Hr	2 Hr	42.5 hr