

Functional Model for Reduction of Pediatric Radial Head Subluxation

[Team Website Link](#)

Date: October 16th, 2026 - October 22nd, 2026

Client: Dr. Carey Wagoner - cwagoner@wisc.edu

Advisor: Dr. Melissa Skala

Team Members:

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Problem statement

Radial head subluxation, commonly known as nursemaid's elbow, is a frequent pediatric injury predominantly in children ages 1-3 that requires proper manipulation of the elbow and forearm for successful reduction. Orthopedists must learn the two techniques for reducing nursemaid's elbow: hyperpronation and supination-flexion. Maneuvers such as these require appropriate positioning, rotation, and force to return the radial head to its normal position. However, opportunities to practice these methods are limited, which creates a need for a reusable pediatric elbow simulation model. The model should replicate the correct anatomical demographics, appropriate elbow biomechanics, and provide feedback, such as a "click," to help medical professionals safely and accurately practice the skills needed to reduce nursemaid's elbow.

Brief status update

The team met for a team meeting and picked up the materials from the Engineering Centers Building. The materials turned out to not be exactly the right size and did not align with the team's CAD design. The sizings were adjusted based on previous feedback from a meeting. Additionally, the team is still waiting on materials to arrive to begin properly fabricating a prototype. The team continues to improve on the CAD model with sizing and details from the meeting with Jesse.

Difficulties / advice requests

There are no difficulties at this time.

Current Design

Work in progress to improve and create a new model.

Materials and Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link
Mechanism's										
Reset Mechanism	A detent pin reset mechanism	WHLLING	B0CWR9RSDC	Amazon	B0CWR9RSDC	10/2/2026	1	\$9.99	\$9.99	Link
Detent Ball	spring-loaded detent ball	Harfington	B0FRGDVB1M	Amazon	B0FRGDVB1M	10/2/2026	1	\$7.19	\$7.19	Link
Ball and Socket	self-lubricating ball join + rod-end fitting	uxcell	B0CT2GFR1D	Amazon	B0CT2GFR1D	10/2/2026	1	8.79	\$8.79	Link
Skin/Muscles										
Platinum Cure Silicone	20 oz translucent silicon mold-making kit	Let's Resin	B07V5FFPWC	Amazon	B07V5FFPWC	10/2/2026	1	\$17.69	\$17.69	Link
Foam	Customizable foam sheet	Amgo	B0FFLGCTFK	Amazon	B0FFLGCTFK	10/2/2026	1	\$14.00	\$14.00	Link
Screw Thread Ball Plunger 8x20 mm	Detent ball	Harfington		Amazon	hta250717hh000858 hta250717hh000886 3360A31, 3360A32 3126A28, 3126A114	10/19/2026	1	\$7.19	\$7.19	Link
Screw Thread Ball Plunger 12x20mm	Detent ball	Harfintion		Amazon	hta250717hh000858 hta250717hh000886 3360A31, 3360A32 3126A28, 3126A114	10/19/2026	1	\$8.69	\$8.69	Link
Hex Long-Nose Spring Plunger	Hex nose spring-loaded detent pin	McMaster	3126A28 3360A31	McMaster	hta250717hh000858 hta250717hh000886 3360A31, 3360A32 3126A28, 3126A114	10/19/2026	1	\$5.84	\$5.84	Link
Long-Nose Spring Plunger	Long nose spring-loaded detent pin	McMaster	3126A28 3360A31	McMaster	hta250717hh000858 hta250717hh000886 3360A31, 3360A32 3126A28, 3126A114	10/19/2026		\$7.73	\$7.73	Link
								TOTAL	\$87.11	

Major team goals for the next week

1. Schedule a meeting with Dr. Wagoner to go over progress
2. Create a prototype before show and tell
3. Order any additional materials needed
4. Create testing plans

Next week's individual goals

- Siya Agarwal
 - Start to fabricate the prototype
 - Look into ordering the other materials for the prototype
 - Start experimenting with the grooves for the detent mechanism
 - Work on training for BME 300
- Maddie Kaltman
 - Finalize CAD models for prototype with dimensions of detent
 - Acquire all additional materials needed for prototype
- Jacqueline Sceats
 - Begin prototyping elbow model when new materials arrive
 - Work on the CAD for stand
- Addison Dowe
 - Add in hardware to the CAD models
 - Finish the CAD for the skin mold
- Jason Yang
 - Start looking at foams
 - Work on CAD
 - Begin prototyping products
- Dante Tripathi
 - Begin creating prototype
 - Continue researching

Timeline

Task	September				October					November				December	
	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11
Project R&D															
Empathize	X	X	X												
Background			X	X	X	X	X								
Prototyping															
Testing															
Deliverables															
Progress Reports	X	X	X	X	X	X	X								
Prelim presentation					X										
Final Poster															
Meetings															
Client		X			X										
Advisor	X	X	X	X		X	X								
Website															
Update	X	X	X	X	X	X	X								

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

The team began to create CAD models for the elbow joint. After receiving the ordered materials, the team evaluated and did additional research to order new materials to accommodate the updated design.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Siya Agarwal	10/16 - 10/22	- Researched other materials to order and adjusted detent sizing in the purchase document - Dove further into research on detent grooves	- 0.5 hour - 0.5 hour	1 hour	19 hours
Maddie Kaltman	10/16 - 10/22	- Adjusted sizing on CAD model of forearm mechanism - Conducted research to determine scaling	- 0.5 hour - 0.5 hour	1 hour	18.5 hours
Jacqueline Sceats	10/16 - 10/22	- Researched potential hinges for shoulder - Worked on a fabrication method document for prototype	- 0.5 hour - 1 hour	1.5 hours	18 hours
Addison Dowe	10/16 - 10/22	- Worked on arm CAD model for forearm mechanism - Researched detent sizes	- 1 hour - 0.5 hour	1.5 hours	18 hours
Dante Tripathi	10/16 - 10/22	- Ordered parts - Researched	-30 min -1 hr	1.5 hours	15.5 hours
Jason Yang	10/16 - 10/22	- Worked on learning CAD - Looked at potential prototype materials - Searched for triangle nose detent mechanism	0.5 hour 0.5 hour 0.5 hour	1.5 hours	17 Hr