Functional Model for Reduction of Pediatric Radial Head Subluxation

Team Website Link

Date: September 4th, 2025 - September 10th, 2025

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

Advisor: Dr. Melissa Skala

Team Members:

Siya Agarwal - sagarwal98@wisc.edu (Co-Team Leader)

Maddie Kaltman - mkaltman@wisc.edu (Co-Team Leader and BSAC)

Jacqueline Sceats - jsceats@wisc.edu (Communicator)

Addison Dowe - agdowe@wisc.edu (Co-BWIG)

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Dante Tripathi - vtripathi3@wisc.edu (BPAG)

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 demographic anatomy, appropriate elbow biomechanics, and feedback such as a “click” for medical professionals to safely and accurately practice the skills needed for reducing nursemaid's elbow.

Brief status update

The team is continuing research to better define and understand the problem. The team has scheduled a meeting with the client, Dr. Carey Wagoner, with the goal of preparing to complete the product design specifications.

Difficulties / advice requests

There are no difficulties at this time.

Current design

There is no current design at this time.

Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
									$0.00	
									$0.00	
Category 2										
									$0.00	

									$0.00	
								TOTAL:	**$0.00**	

Major team goals for the next week

1. Continue research for the PDS
2. Talk with Dr. Skala about previous client meeting and specifics for this project
3. Discuss design ideas

Next week's individual goals

- Siya Agarwal
    - Start to work on the PDS
    - Brainstorm possible designs for the project
    - Dive further into research based on the client meeting
- Maddie Kaltman
    - Continue research
        - Learn more about the biology/mechanics of axial head subluxation (nursemaid's elbow)
        - Begin looking into similar products and potential materials
    - Work on the PDS
- Jacqueline Sceats
    - Work on the PDS and determine any additional questions for the client
    - Continue researching axial head subluxation and look into any similar products that exist
- Addison Dowe
    - Continue researching the two main techniques used to treat nursemaid's elbow
    - Look into existing models of the arm bones
- Jason Yang
    - Continue research
        - Research the existing product
        - Compare and think about improvements we can make
- Dante Tripathi
    - Continue researching the different reduction techniques and begin brainstorming some possible ways we could create functional models

Timeline

Task	September				October					November				December	
	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12
Project R&D															
Empathize	X														
Background…															
Prototyping															
Testings															
Deliverables															
Progress Reports	X														
Prelim presentation															
Final Poster															
Meetings															
Client															
Advisor	X														
Website															
Update	X														

Filled boxes = projected timeline
X = task was worked on or completed

Previous week's goals and accomplishments

- This is our first week, so there were no previous goals or accomplishments

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Siya Agarwal	9/5 - 9/11	- Researched two radial head subluxation articles and focused on the statistics of cases and demographics - Brainstormed some client meeting questions	- 2 hours - 0.5 hours	2.5 hours	2.5 hours
Maddie Kaltman	9/5-9/11	- Began researching to learn general information about	- 2.5 hours	3	3

		nursemaid's elbow and current reduction techniques - Wrote down questions to ask at the client meeting on Friday	- 0.5 hours		
Jacqueline Sceats	9/5-9/11	- Researched radial head subluxation to learn about the epidemiology of the condition and the two methods for reduction - Reviewed and wrote down questions for client	- 1.5 hours - 0.5 hours	2	2
Addison Dowe	9/5 - 9/11	- Began researching to learn about nursemaid's elbow and treatments - Prepared questions to ask the client	- 1.5 - 0.5	2	2
Jason Yang	9/5 - 9/11	- Began researching - Scanning through previous team's work	1.5	1.5	1.5
Dante Tripathi	9/5 - 9/11	- Began researching - Came up with questions for the client	1 for each	2	2