

LOWER EXTREMITY LOADING DEVICE DURING MAGNETIC RESONANCE IMAGING, BME 301

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Progress Report 3 | Date: February 18 to February 22, 2024

Problem Statement:

Hamstring strain injuries (HSIs) are the most common musculoskeletal injuries experienced in many sports and recreational activities [1]. Prior HSIs have been shown to significantly increase patients' risk for additional injury, due in part to neuromuscular alterations [1]. In order to research this phenomena and supplement the current rehabilitation process for HSIs in order to mitigate reinjury risk, a biomedical device is required. This device must be compatible with magnetic resonance imaging (MRI) and mechanically induce hamstring activation on a patient in the supine position in the MRI machine. The device will then collect knee flexion and resistance data that can be observed with the MR imaging.

Brief Status Update:

This week, the team worked on using the design matrix to choose a design to move forward with. Additionally, the team worked on the Preliminary Presentation which will provide an outline of the team's work so far as well as future work, such as fabrication of the device.

Difficulties / advice requests:

- The team was hoping to better understand the design project's budget
- The team was also hoping to receive help acquiring the dimensions of the specific GE MAGNUS MRI machine's table so as to better understand the dimensions the device should adhere to.

Current design:

N/A

Materials and expenses:

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
Category 2										
									\$0.00	

Previous Week Accomplishments/Activities:

Team	<ul style="list-style-type: none"> - This week the team worked to further individual research and brainstorm individual ideas. The team also worked on putting together the Preliminary Presentation
Nikhil	<ul style="list-style-type: none"> - Conducted further design research into pulley design and structure (1 hr) - Worked on preliminary presentation slides and formatting (2 hr)
Caelen	<ul style="list-style-type: none"> - Researched commercially available solutions for non ferrous cable stack weights (2 hrs) - Contacted BME faculty about the MR compatibility status of concrete (0.5 hrs) - Began work on my slides for the preliminary presentation (1 hr)
Ethan	<ul style="list-style-type: none"> - Spent time researching further to inform me on the specific slides I would be presenting in Preliminary Presentation (2 hr) - Worked on Preliminary Presentation (1 hr)
Micah	<ul style="list-style-type: none"> - Conducted further design research specifically on materials and adjustability solutions (2 hr.) - Created and works on preliminary design presentation slides (1hr.)

Upcoming Team and Individual Goals:

Team	<ul style="list-style-type: none"> - The team will work to meet with the client to further understand project requirements like the budget and specifics to the dimensions of the MRI table. The team will also be working on finishing up the Preliminary Presentation
Nikhil	<ul style="list-style-type: none"> - Continue to work on the preliminary presentation, receive feedback from

