

MRI Lower Leg Exerciser

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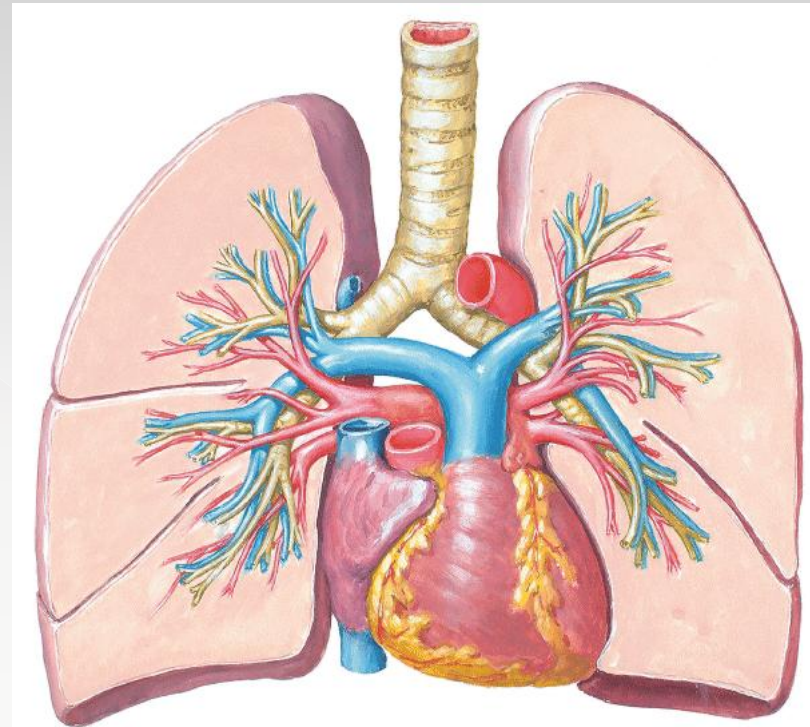
A red triangle graphic is located in the bottom right corner of the slide, pointing towards the center.

Overview

- ◉ Project Motivation
- ◉ Problem Statement
- ◉ Previous Prototype
- ◉ New Prototype
- ◉ Testing
- ◉ IRB
- ◉ Future Work

Project Motivation

- Researching pulmonary blood flow in hypertensive patients
- MRI imaging before and after exercise
 - > Doppler Ultrasound studies as well



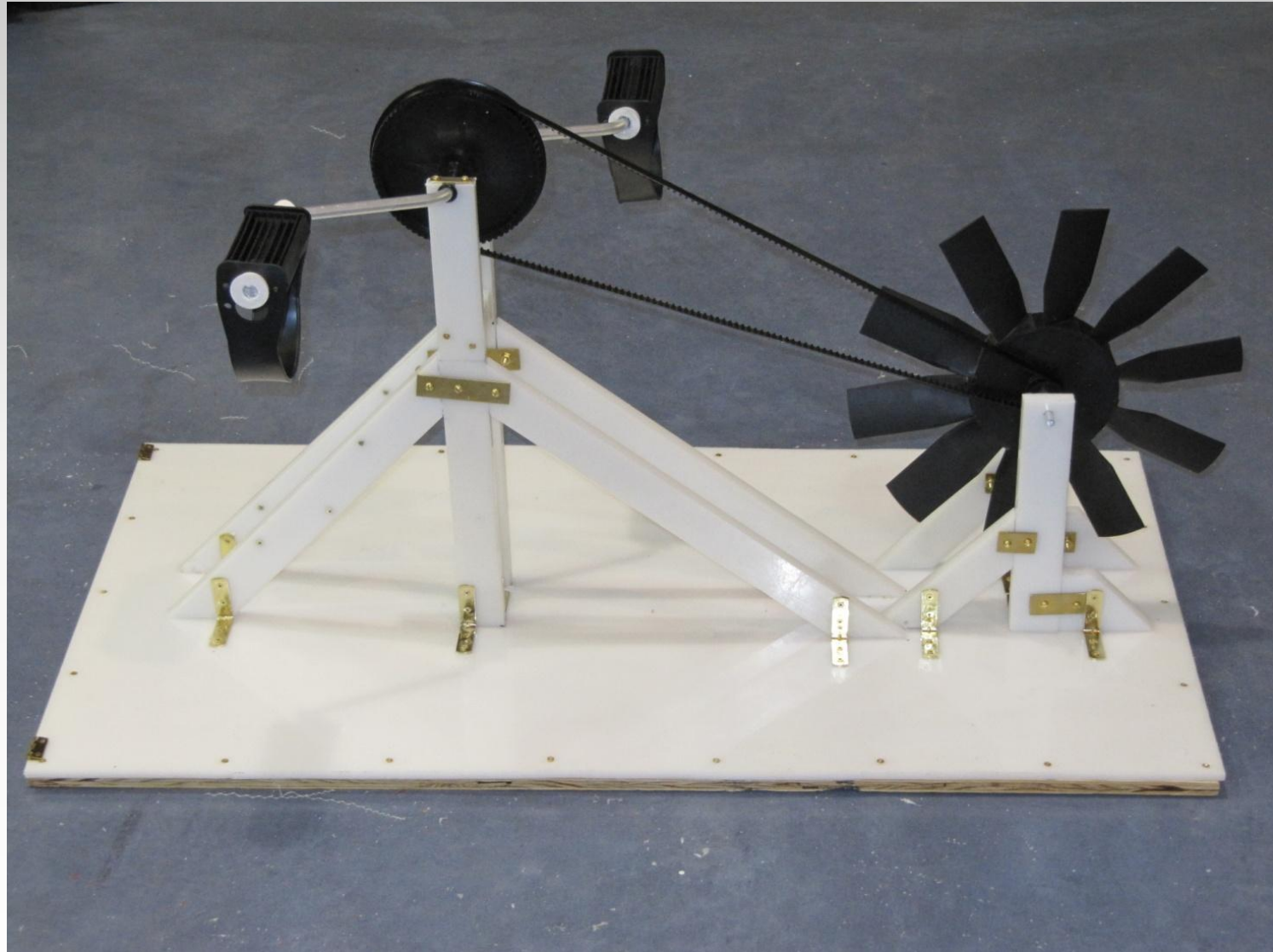
Pulmonary Arteries in Blue

(<http://www.cicmd.com/images/cicmd/anatomy%20images/arteries-pulmanary.gif>)

Problem Statement

- Design a lower leg exerciser
- Compatible with:
 - > MR imaging
 - > Ultrasound
- Cardiopulmonary research on pulmonary hypertension patients and healthy volunteers
- Repeatable loads

Previous Prototype



New Prototype

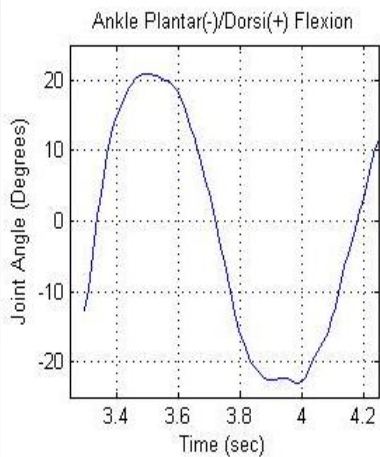
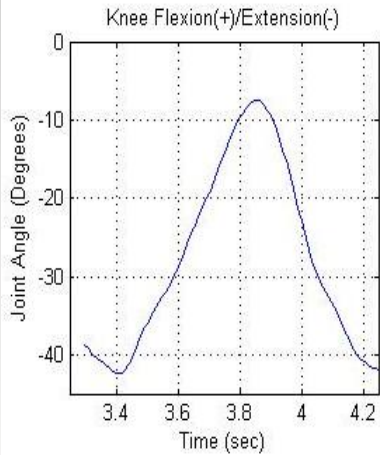


Motion Capture Testing

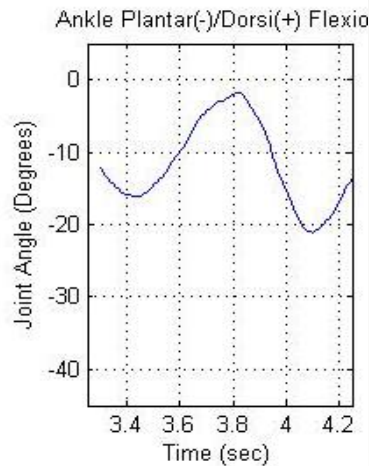
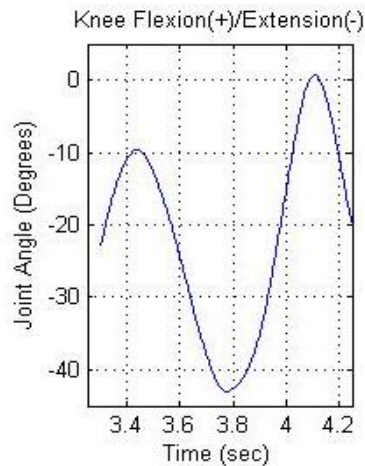


Testing Results

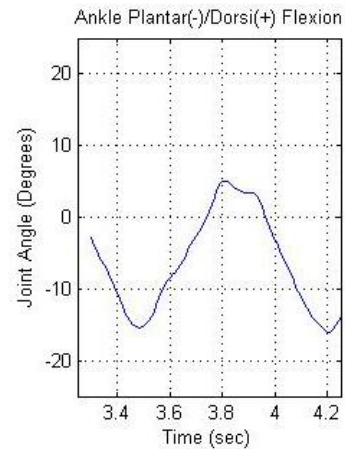
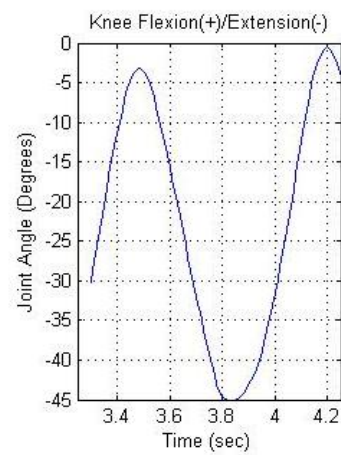
Cycling



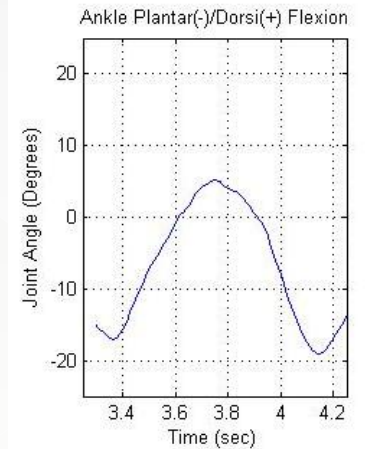
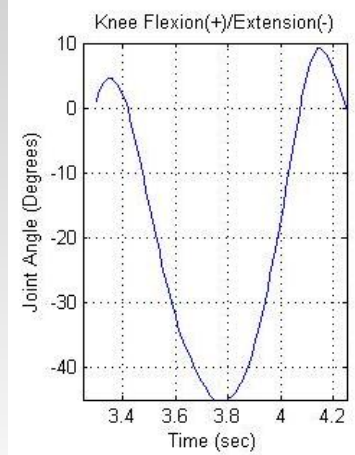
Baseline



Raised 4 in.



Raised at 5°



Ultrasound Testing



IRB Protocol

- Recruit 10 healthy subjects
 - > Recruitment flyer
 - > Primary Screening
 - > Secondary Screening
- Primary Ultrasound Scanning
 - > Determine if subject has TR Jet
- Secondary MRI Scanning
 - > Determine effect of exercise device

Future Work

- Get IRB approval for healthy subject study
- Finalize design construction
 - > Mechanical testing of exercise tubing
- Recruit subjects for study
- Complete trials

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- ◉ Dr. Claudia Korcarz
- ◉ Oliver Wieben, PhD
- ◉ John Cejka
- ◉ Kelly Hellenbrand

References

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Questions?