Probe Holder Design Team Mid-Semester Presentation

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Overview

- Background
- 2nd Generation Prototype
- Validation Process
- Journal Submission
- Future Work
- Questions

Background

- Problem:
  - Design a device to hold, position, and stabilize an ultrasound probe to be held against the arm in vascular reactivity studies
- Why is there a need?
  - Stabilization increases image quality
  - Frees up sonographer for other tasks/monitoring
  - Wrist deviated in one position for 5+ min.
  - Many clinics limit studies to 1/hour due to strain

Vascular Reactivity Study

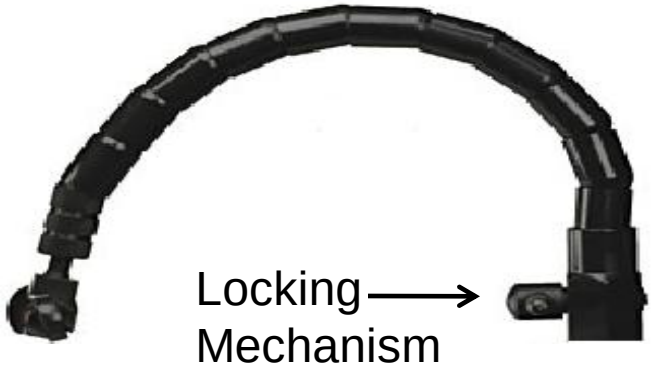
- Procedure
  - Arm extended supinated
  - Probe images brachial artery near the bicep
  - Occlude blood flow on the forearm, then release and measure response

2nd Generation Prototype

- gooseneck and articulated arm
- Velcro probe clamping mechanism
- Anatomic cradle
- Aesthetics

Gooseneck

- Lighter than articulated arm
- Easier fine-tuning adjustments
- Greater range of motion



http://www.denlorstools.com/shop/images/FOW-72-641-300.jpg

Velcro Clamp

- Two Velcro straps hold probe
- Easier handling and flexibility
- Rubber padding cushions probe

Ultrasound Transducer

Validation Process

- Develop Test Plan
- Complete IRB approval application, review
- Conduct Studies
- Analyze data

Test Plan

- Two Tests – One without device, one with
- Time Study of all steps involved
  - i.e. Position patient, apply gel, position probe, mid-study adjustments
- Feedback from sonographer
  - Ease of use, Image quality at baseline, Maintain landmarks, vessel shows true diameter, “double lines” in segment, accurate timing

IRB Approval

- Application Includes
  - Detail device specifications
  - Study details and implications
  - Subject recruitment and confidentiality
  - Consent form
  - Assessment of potential biases
- Status: Initial Review, In meeting reviews complete, Review of second revision pending (1-2 wks.)

Conduct Studies

- Studies held at research lab in UW Hospital
- Initial study limited to 10 subjects by current available resources
  - Establish correlations and determine if expanded size necessary
- Recruit volunteer subjects (You!)

Analyze Data

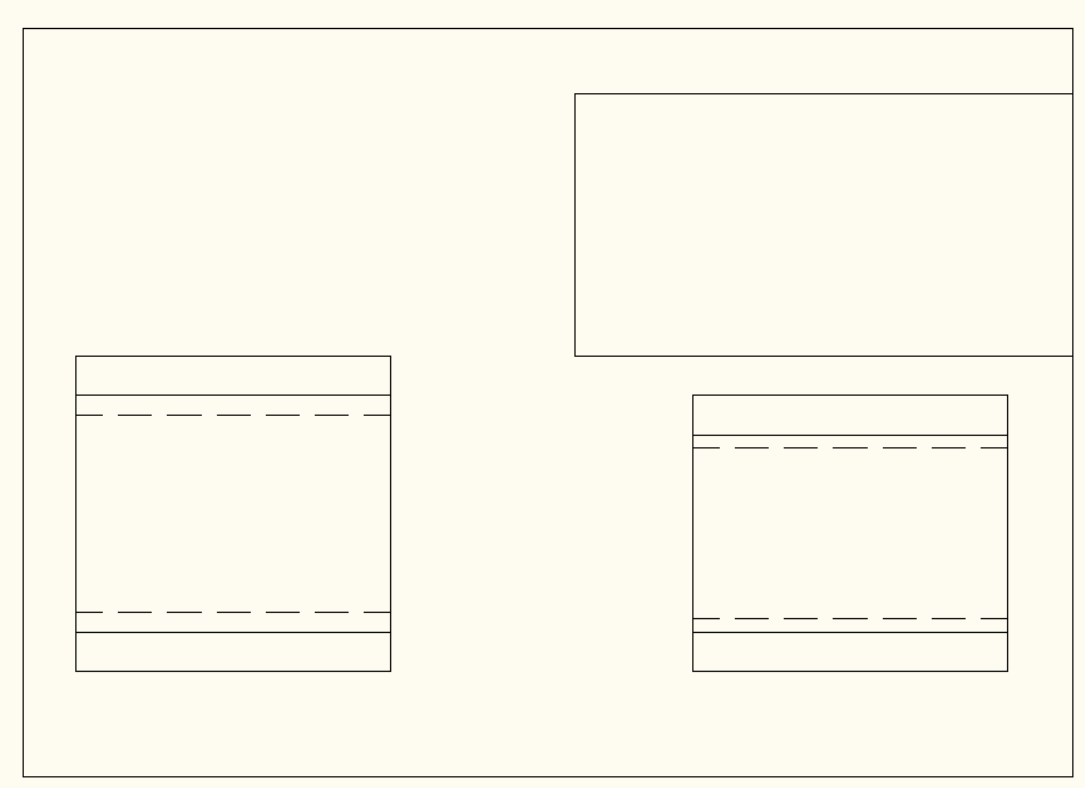
- Length of study
- Quality of data obtained
- Usability Feedback

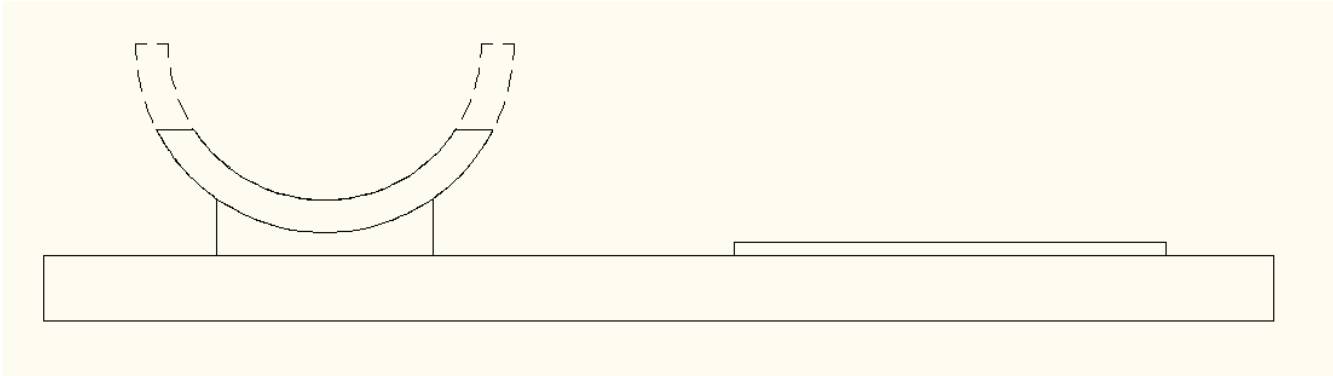
- Learning Curves?
- Device Shortcomings/Failure?

Journal Submission

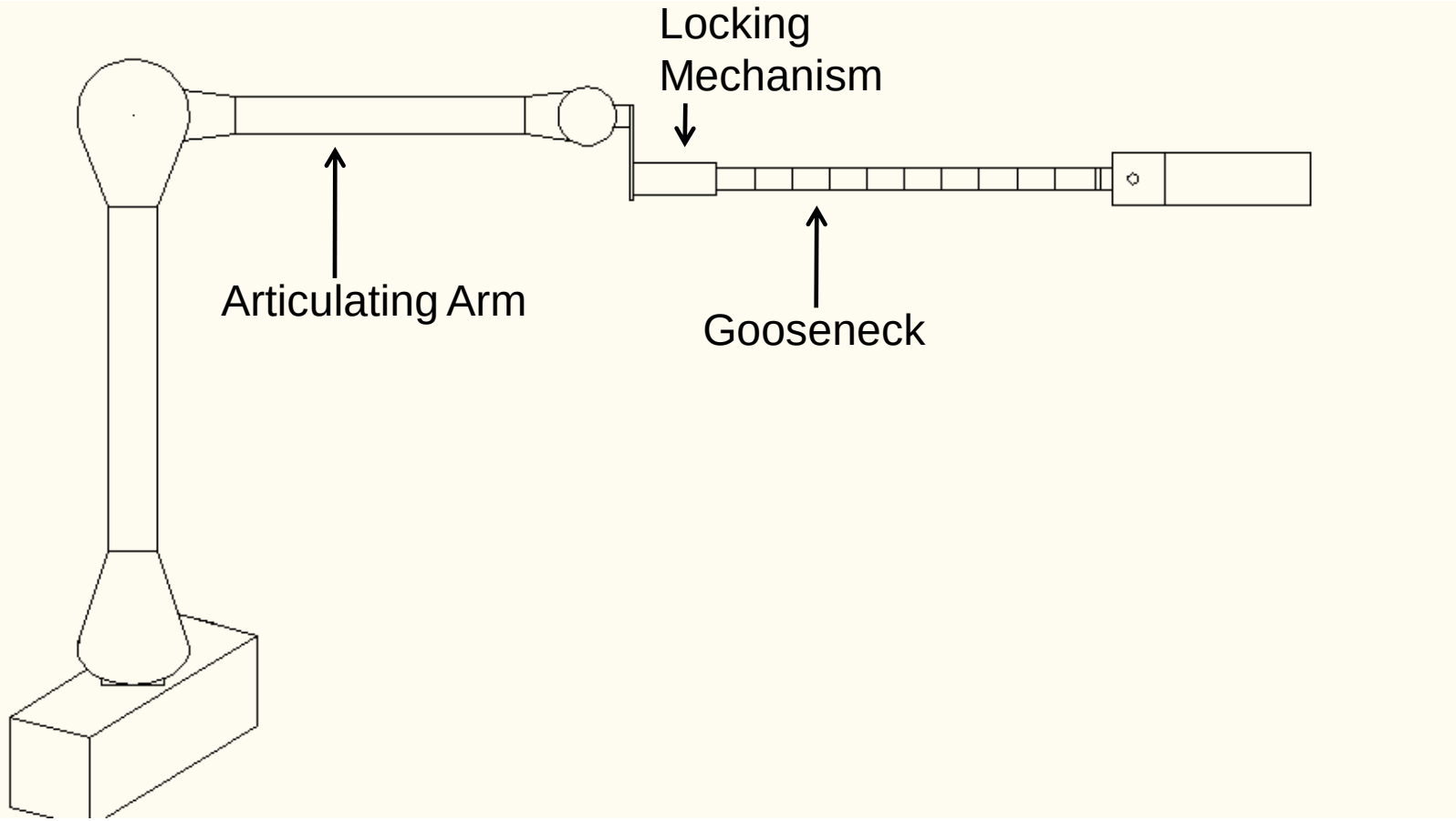
- Journal of Medical Devices
- Content
  - Motivation
  - Mechanical Design
  - Proof of Concept
  - Inspire Future Applications

Journal Media – Arm Board

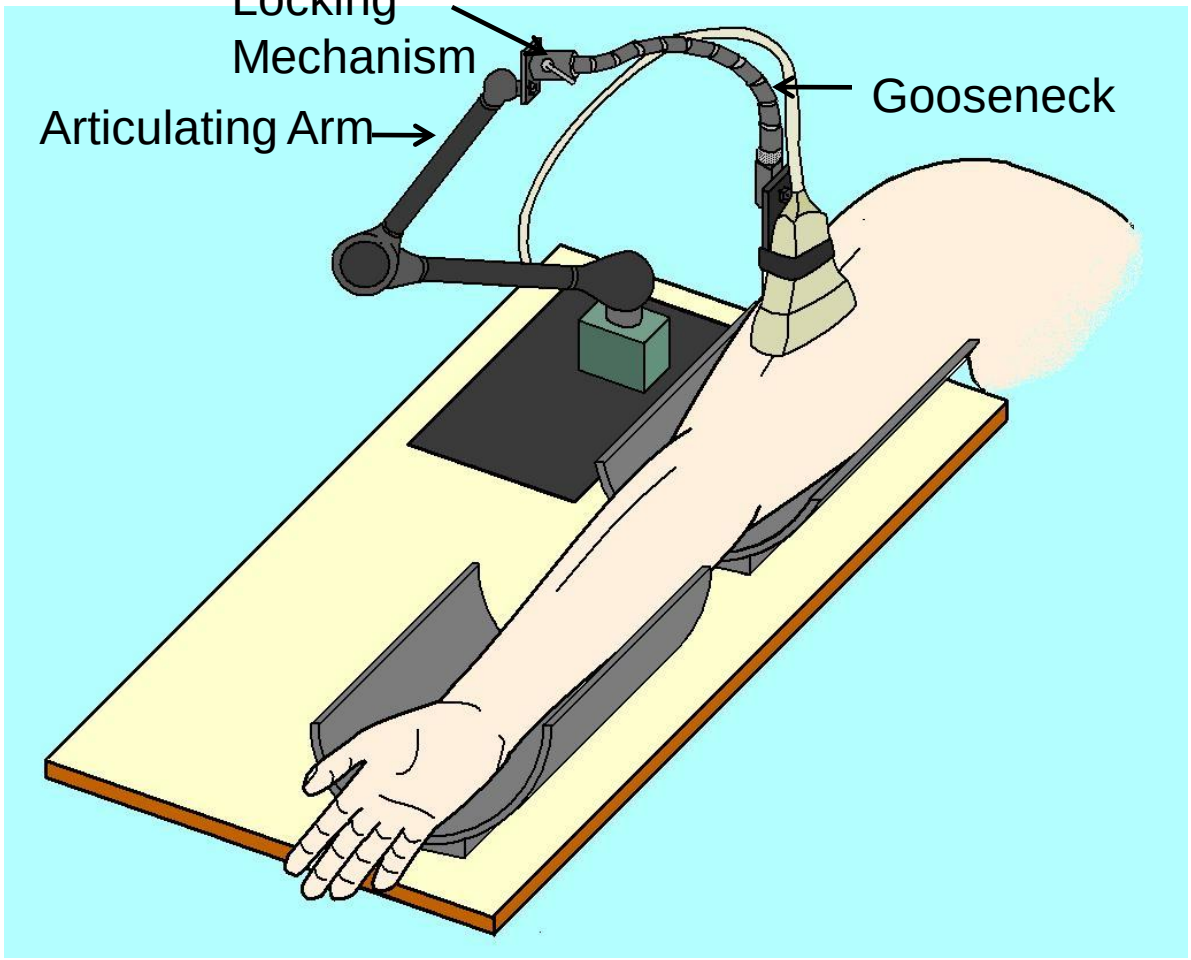




Journal Media – Arm Assembly



Journal Media – Full Assembly



Future Work

- Conduct clinical tests
- Analyze data
- Complete journal article and submit for publication

- Outreach – PEOPLE Program at West High School

Questions?