Progress Report - Week 7

Title: Stabilizer Device for Intra-Cardiac Echocardiography (ICE) to Assist Structural Heart Interventional Procedures

Client: Dr. Amish Raval
Advisor: Dr. Darilis Suarez-Gonzalez
Team: Sara Morehouse (Leader)
Max Aziz (Communicator)
Noah Hamrin (BWIG & BPAG)
Kaden Kafar (BSAC)

Date: October 24, 2024

Problem Statement:

Intracardiac echocardiography (ICE) is a technique commonly used during catheter-based interventional procedures to treat congenital heart disease, valvular heart disease and myocardial disease. Typically, the ICE catheter is advanced into the right atrial from a femoral vein, where it is positioned for imaging purposes. A separate catheter to perform the interventional procedure such as a transseptal needle or Watchman left atrial appendage occluder delivery system is then introduced. Many times, the ICE catheter drifts out of place, the imaging perspective is lost and the ICE catheter needs to be readjusted. Therefore, there exists a need for a simple re-sterilizable device to stabilize a variety of commercially available ICE catheters during interventional procedures. The device must prevent movement of the ICE catheter so that it does not migrate out of place when in use.

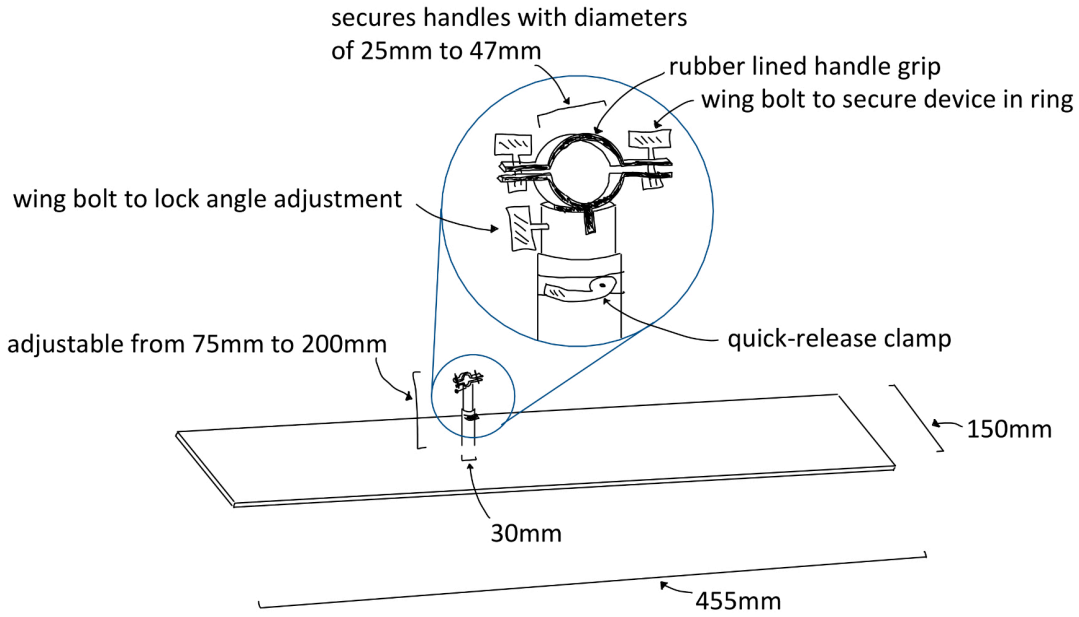
Brief Status Update:

This week, the team met with the Design Hub through the UW Design and Innovation Lab. In this meeting, we were able to discuss the modifications that need to be made to the Body Weight Holder design; specifically, we made a plan for the clamping mechanism to hold the handle of the ICE catheter. Additionally, we were able to access another version of ICE catheter, which looks slightly different from the catheter we had already seen.

Difficulties / Advice Requests:

N/A at this time.

Current Design:



The team plans to move forward with the Body Weight Holder design. However, some modifications will be made. These include separating the device into two components, the base and the holder. The base will consist of the rectangular plate with a pole and will be placed underneath the sterile drape with the pole between the patient's legs. The holder component will attach to the pole over the sterile drape via an attachment mechanism, which could potentially be a magnet. The holder will also be modified to utilize a hinge jaw clamp that is easy for the user to secure. This will hold the handle of the catheter parallel to the table.

Materials and Expenses:

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
-									$0.00	
-									$0.00	
-									$0.00	
-									$0.00	
-								**TOTAL:**	**$0.00**	

Major team goals for the next week:

- Implement changes to design
- Shadow Dr. Raval in MitraClip procedure
- Receive feedback from classmates during Show-and-Tell activity

Next week's individual goals:

- Sara:
  - Fabricate a model of the design
  - Gain a better understanding of the procedure during Show-and-Tell
- Max:
  - Shadow Dr. Raval to gain a better understanding of how the ICE catheter is used
  - Help with fabrication for show and tell
- Noah:
  - finish solidworks model
  - 3D print prototype
- Kaden:
  - Work on solid works model
  - 3D print and test prototype

Timeline:

Task	September			October				November					December
	13	20	27	4	11	18	25	1	8	15	22	29	6
Project R&D													
Background research	X	X	X		X								
Design development			X	X	X	X	X						
Prototyping													
Testings													
Deliverables													
Progress Reports	X	X	X	X	X	X	X						
PDS		X											
Design Matrix			X										
Prelim presentation				X									
Prelim Report					X								
Final Poster													
Meetings													
Client	X					X							
Advisor	X		X	X		X							
Website													
Update	X	X	X	X	X	X	X						

Previous week's goals and accomplishments:

- Make modifications to design
    - The team was able to make a plan for the components that need to be modified in the Design Hub meeting.
- Create fabrication plan/protocol
    - The team plans to fabricate a 3D-printed model in the next week.

Activities:

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sara	10/25/24	Met with team and worked on design	1	1	15
Max	10/22/24	Met with team, came up with design ideas, and emailed about shadowing	1	1	14
Noah	10/23/24 10/24/24	Met with design consultant Worked on solidworks model	2	2	14
Kaden	10/23/24	Met with design consultant and worked on design	2	2	14