Progress Report - Week 8

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 31, 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.

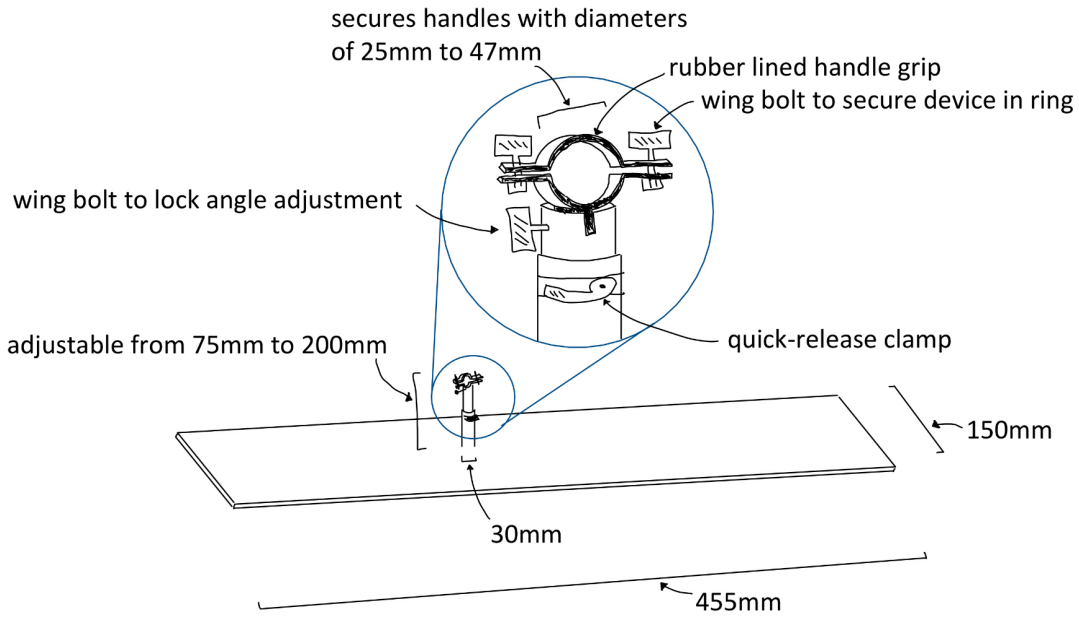
Brief Status Update:

This week, the team worked on rapid prototyping of the design. This involved modeling the design in SolidWorks, then 3D-printing the base. Rapid prototyping allows the team to evaluate the design and easily see what changes need to be made. The team was also able to get some training in welding, which will allow us to fabricate a final prototype in the future. Additionally, we will share our work thus far with our classmates tomorrow during Show-and-Tell. This activity allows us to gain feedback and insight on design challenges. Lastly, the team will be shadowing Dr. Raval tomorrow in a Mitra-Clip procedure to see the setup of the cath lab and learn more about the process of how the stabilizer will be used.

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:

- Revise design as needed and continue prototyping.

Next week's individual goals:

- Sara:
  - Work on design modifications.
  - Complete CNC mill training.
- Max:
  - I will help contribute design ideas based on feedback from show and tell and viewing the procedure
  - Help order and find the right magnets
- Noah:
  - Finish additional metal CNC permits
  - Refine solidworks model
- Kaden:
  - Work on design improvements

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	X					
Prototyping								X					
Testings													
Deliverables													
Progress Reports	X	X	X	X	X	X	X	X					
PDS		X											
Design Matrix			X										
Prelim presentation				X									
Prelim Report					X								
Final Poster													
Meetings													
Client	X					X		X					
Advisor	X		X	X		X							
Website													
Update	X	X	X	X	X	X	X	X					

Previous week's goals and accomplishments:

- Implement changes to design
    - The team implemented changes and 3D-printed an initial model of the design.
- Shadow Dr. Raval in MitraClip procedure
    - The team will be shadowing Dr. Raval tomorrow.
- Receive feedback from classmates during Show-and-Tell activity
    - The team will receive feedback tomorrow.

Activities:

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sara	11/1/24	Shadowed Dr. Raval to learn more about how the stabilizer device will be used.	2	2	17
Max	10/28/24, 10/30/24, 11/1/24	I got my MIG welding permit. I 3d printed the prototype. I shadowed Dr. Raval to get a better visual on how the device is being used.	5	5	19
Noah	10/28/24 10/30/24 11/1/24	Finished solidworks model for 3d printing Worked on metal CNC permit Shadowed Dr. Raval in the cath lab	1 3 2	6	20
Kaden	10/28/24 11/1/24	got my mig welding permit. I am going to show and tell	2	2	16