

Progress Report - Week 10

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

Client: Dr. Amish Raval

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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 transeptal 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.

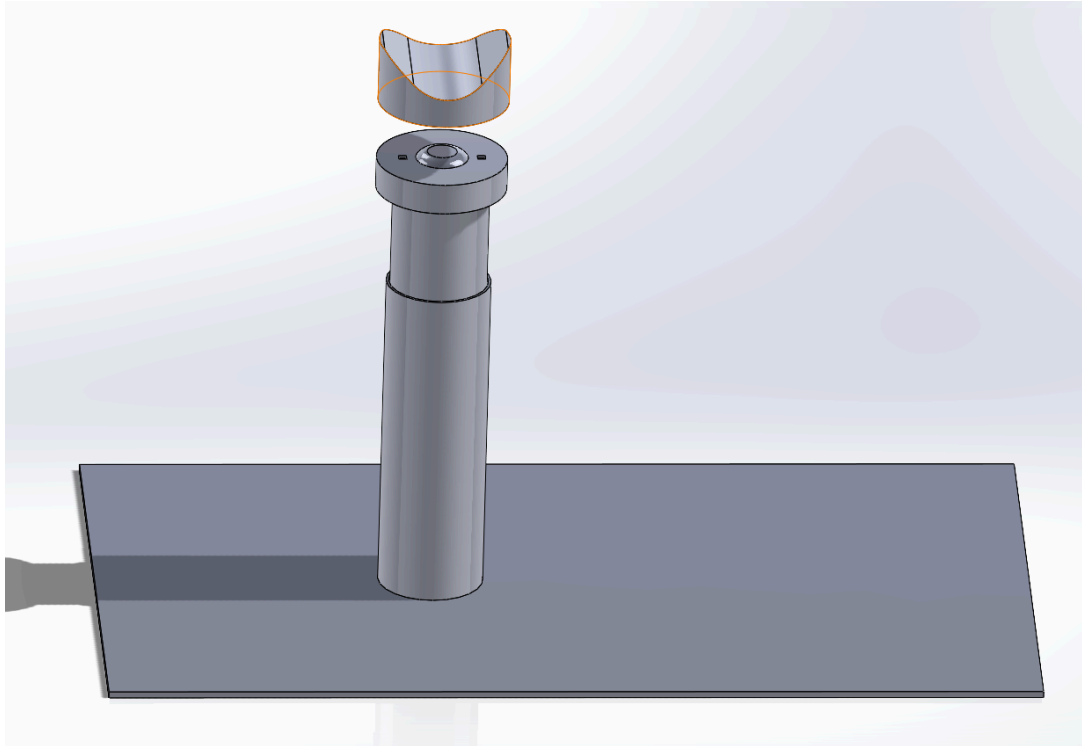
Brief Status Update:

This week, the team worked on ordering materials that we will need to fabricate the prototype. We have updated the design with information from shadowing Dr. Raval and we will begin fabricating as soon as all materials arrive. Fabrication will involve welding and machining with CNC, then assembling all pieces. As soon as we have the prototype fabricated, we can begin testing the device.

Difficulties / Advice Requests:

N/A at this time.

Current Design:



The Body Weight Holder design consists of 3 main components: the base plate, the shaft, and the top holder. The base plate will be welded to the bottom part of the shaft, and the top part of the shaft will be inserted into the bottom shaft and held in place with a quick release clamp. This clamp will allow for adjustable height. The top part of the shaft includes a circular base that will have magnets, which will attach to the top holder component. The magnets will allow the top holder to be secured to the shaft through a surgical sterile drape. Additionally, the top holder will be lined with rubber on the internal surface to provide a secure hold on the catheter handle. There will also be rubber straps that secure over the handle of the catheter.

Materials and Expenses:

Item	Description	Manufacturer	Mft Pt#	Vendor	Date	#	Cost Each	Total	Link
3D printed prototype	3D-printed model of our initial prototype concept	n/a	n/a	MakerSpace	10/31/24	1	\$6.97	\$6.97	n/a

PLATT Bike Seat Post Clamp Aluminium Alloy Bicycle Quick Release Seatpost Collar 34.9mm	Quick release clamp - 34.9 mm size	PLATT	n/a	Amazon	11/8/24	1	\$8.99	\$8.99	amazon.com
McMaster 5848K11	1/4" x 1/4" x 1/8" magnet	McMaster	5848K11	McMaster	11/8/24	2	\$2.57	\$5.14	https://www.mcmaster.com/5848K11
McMaster 5848K15	3/8" x 3/8" x 1/8" magnet	McMaster	5848K15	McMaster	11/8/24	2	\$3.10	\$6.20	https://www.mcmaster.com/5848K15
McMaster 5848K83	1/4" x 3/4" x 1/4" magnet	McMaster	5848K83	McMaster	11/8/24	2	\$6.76	\$13.52	https://www.mcmaster.com/5848K83
DGSL Neoprene Rubber Sheet	1" Wide x 1/16" Thick x 10' Long Rubber sheet	DGSL	n/a	Amazon	11/8/24	1	\$9.99	\$9.99	amazon.com
Adhesive Rubber Strips Neoprene Rubber Sheets, Rolls & Strips with Adhesive Backing	2" Wide x 1/16" Thick x 10' Long Rubber sheet with adhesive backing	n/a	n/a	Amazon	11/8/24	1	\$12.98	\$12.98	amazon.com
McMaster 89955K169	1-3/8" OD shaft - 1ft long	McMaster	89955K169	McMaster	11/8/24	1	\$29.37	\$29.37	https://www.mcmaster.com/89955K169
McMaster 89955K959	1-1/8" OD - 1 ft long	McMaster	89955K959	McMaster	11/8/24	1	\$25.20	\$25.20	https://www.mcmaster.com/89955K959
McMaster 4459T188	Sheet metal 4130 easy-to-weld steel 6"x36"	McMaster	4459T188	McMaster	11/8/24	1	\$63.80	\$63.80	https://www.mcmaster.com/4459T188

Client	X					X		X					
Advisor	X		X	X		X			X				
Website													
Update	X	X	X	X	X	X	X	X	X	X			

Previous week’s goals and accomplishments:

- Finish prototype
 - We ordered materials to begin fabricating the prototype, including the raw metal, quick release clamp, magnets, and rubber. We will begin fabricating as soon as the supplies arrive.
- Create testing plan
 - We have begun planning testing procedures for the prototype, which will include evaluation of the magnets, force required to dislodge the top holder component, as well as testing the device with various catheter sizes.

Activities:

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sara	11/12/24	Finish CNC permit, worked on testing plan	3	3	23
Max	11/13/24	Updated notebook, testing plan, and emailed for parts	2	2	22
Noah	11/11/24	Worked to refine solidworks model and fabrication plan	1	1	24
Kaden	11/14/24	Worked on testing plan, materials, and lab archives	1	1	18