

BME 400 - Heart Phantom

Team Members:

Peter Strohm (Team Leader)
Lacey Halfen (Team Leader)
Jess Hause (Communicator)
Erin Main (BSAC)
Fan Wu (BWIG)

Client:

Orhan Unal

Progress Report Week 10 – 12/1/08 to 12/7/08

Problem Statement:

This project consists of designing a heart phantom to be used for the initial testing of a new, solenoid-tipped catheter awaiting FDA approval. This catheter will ultimately be used to treat atrial fibrillation under MRI guidance. The transparent phantom will be used to test the maneuverability of the catheter under MRI guidance as well as the high resolution imaging capabilities in the vicinity of the solenoid tip. It will consist of clear tubing of various sizes representing tortuous vasculature leading to a single heart chamber. All “veins” must terminate at one end of the phantom and be sealed so they may be filled with a saline solution in either a static or dynamic state without risk of leaking.

Summary of Accomplishments:

- Peter and Erin with client Monday morning to test prototype and order a few more parts.
- Worked as a team and individually on the poster.
- Peter and Erin went to UW-Hospital on Wednesday to assemble the new parts into the prototype and finalize the poster.
 - New manifold to pump water through the branched tubes.
 - Added quick disconnect attachments for easy connection to pump.
 - Clamped all connections with circular clamps or cable ties.
 - Glued/caulked heart and all leaking edges.
 - Tested prototype under MRI using Gadolinium to track flow.
- Met as a team on Thursday to practice our poster presentation.
- Gave poster presentation on Friday.

Goals last Week:

- Finish poster and give presentation.
- Finish prototype.
- Meet with client before presentation to test prototype.

Goals this Week:

- Finish paper.

- Write peer reviews.
- Finish notebooks.
- Discuss next semester.

Project Difficulties:

- None.

Activities:

Date	Person	Activity	Time Spent
12/1/08	Peter, Erin	Met with client to test prototype.	2.00 hr
12/1/08	Erin	Ordered parts with client.	2.00 hr
12/2/08	Team	Team and individual work on poster.	2.00 hr
12/3/08	Peter, Erin	Constructed and tested prototype at UW-Hospital. Finalized poster.	7.00 hr
12/4/08	Jess	Picked up poster, communicating with client throughout week.	3.00 hr
12/4/08	Team	Practiced presentation.	2.00 hr
12/5/08	Team	Gave presentation.	2.00 hr

Team Hours:

Weekly.....19.00 hrs
 Total.....145.00 hrs

Project Timeline:

Aug. 31	Project Proposal (Sept. 2)	Project Selection	x
		Contact Client	x
Sept. 7		Individual Research	x
Sept. 14		Client Meeting (Sept. 19)	x
		Project Timeline	x
		PDS	x
Sept. 21		Research	x
		Individual Brainstorm	x
		Group Brainstorm	x
Sept. 28		Develop Designs	x
Oct. 5		Design Alternatives (2)	x
		Mid-semester PowerPoint	x
Oct. 12	Mid-Semester Presentations (Oct. 17)	Finalize Design Alternatives	x
		Decide on Final Design	x
		Design Matrix	x
		Prepare for Presentation	x
Oct. 19	Design Notebooks (Oct. 22)	Finalize Design	x
		Order Supplies	x
Oct. 26		Work on Design	x

Nov. 2		Work on Design	x
Nov. 9		Work on Design	x
		Begin Paper	x
Nov. 16		Finalize Prototype	X
		Continue Working on Paper	X
Nov. 23		Testing	X
		Complete Paper	
		Design Poster	X
Nov. 30	Final Design Presentations (Dec. 5)	Complete Testing	X
		Prepare for Presentation	X
Dec. 7	Design Notebooks (Dec. 10)		
	Final Paper (Dec. 10)		
	Client Eval (Dec. 10)		
	Peer/Self Evals (Dec. 12)		

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Progress Report Week 10 – 11/17/08 to 11/30/08

Problem Statement:

This project consists of designing a heart phantom to be used for the initial testing of a new, solenoid-tipped catheter awaiting FDA approval. This catheter will ultimately be used to treat atrial fibrillation under MRI guidance. The transparent phantom will be used to test the maneuverability of the catheter under MRI guidance as well as the high resolution imaging capabilities in the vicinity of the solenoid tip. It will consist of clear tubing of various sizes representing tortuous vasculature leading to a single heart chamber. All “veins” must terminate at one end of the phantom and be sealed so they may be filled with a saline solution in either a static or dynamic state without risk of leaking.

Summary of Accomplishments:

- Retrieved finished circular end caps from client
- Began construction of prototype
 - Finished acrylic box
 - Assembled most of tubing connections
- Began work on final paper and poster
- Bought various materials for construction: acrylic caulk, plastic hemispheres, paint brushes

Goals last Week:

- Return parts list and circular end caps to client at the beginning of the week
(Client has tools to completely remove any traces of metal from end caps)
- Retrieve the end caps from the client once all metal is removed
- Drill holes in end cap for tubing to go through and secure tubing in place
- Glue entire casing together
- If heart arrives, begin construction of that
- Finalize vasculature pathways/lengths, and begin putting them together

Goals this Week:

- Finish poster and give presentation
- Finish prototype

- Meet with client before presentation to test prototype

Project Difficulties:

- The acrylic hemispheres have not arrived yet, but we bought replacement plastic hemispheres for temporary use.

Activities:

Date	Person	Activity	Time Spent
11/17/08 to 11/21/08	Team	Construction in ECB	10.00 hr
11/18/08	Peter, Erin, Lacey	Bought paint brushes and acrylic caulk	1.50 hr
11/24/08	Team	Construction in ECB	2.00 hr
11/30/08	Peter, Erin	Bought plastic hemispheres.	2.00 hr
	Independent Work	Paper, poster work	3.00 hr each

Team Hours:

Weekly.....30.50 hrs
 Total.....136.00 hrs

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Aug. 31	Project Proposal (Sept. 2)	Project Selection	x
		Contact Client	x
Sept. 7		Individual Research	x
Sept. 14		Client Meeting (Sept. 19)	x
		Project Timeline	x
		PDS	x
Sept. 21		Research	x
		Individual Brainstorm	x
		Group Brainstorm	x
Sept. 28		Develop Designs	x
Oct. 5		Design Alternatives (2)	x
		Mid-semester PowerPoint	x
Oct. 12	Mid-Semester Presentations (Oct. 17)	Finalize Design Alternatives	x
		Decide on Final Design	x
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Nov. 2		Work on Design	x
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		Begin Paper	x
Nov. 16		Finalize Prototype	
		Continue Working on Paper	x
Nov. 23		Testing	
		Complete Paper	
		Design Poster	
Nov. 30	Final Design Presentations (Dec. 5)	Complete Testing	
		Prepare for Presentation	
Dec. 7	Design Notebooks (Dec. 10)		
	Final Paper (Dec. 10)		
	Client Eval (Dec. 10)		
	Peer/Self Evals (Dec. 12)		