

Progress Report Week 4: Week of February 13th to February 19th 2008

Liver Phantom for MRI Guided Trans-arterial Chemoembolization Simulation

Client: Dr. Wally Block Ph.D. University of Wisconsin – Biomedical Engineering Department
Advisor: Dr. William Murphy Ph.D. University of Wisconsin – Biomedical Engineering Department
Team: Benjamin Engel, Leader
Ryan Carroll, BWIG
Eric Printz, Communicator
Justin Schmidt, BSAC

Problem Statement

Liver cancer treatment can often involve higher, more targeted doses of chemotherapy if delivered directly to the liver. Professor Block's MRI lab is integrating capabilities to guide cancer treatment to the liver using magnetic resonance imaging. Current x-ray treatments significantly over treat the liver because while x-ray can be useful in the visualization of catheters, they can't visualize soft tissue, specifically the tumor. It is proposed to develop a liver phantom that will simulate the arterial vessels of the abdomen as well as the liver in an effort to simulate treatments and train interventional radiologists on the use of the new MRI guided techniques. The project will include adding flow capabilities through the use of a programmable fluid pump to simulate pulsatile flow.

The current coil being used is insufficient for the images needed so a new coil was designed using a circular PVC tube. Because the new coil is circular there are issues with it moving around during the procedures. Also, during the MRI procedures the subject along with the coil is required to be transported to the X-ray to verify the placement of the catheter inside the liver segments. To minimize movement of the subject and coil it is proposed to design a table that securely holds both the coil and subject without significant movement. The table must be compatible with both the MRI and X-ray and be easily transported from one to another.

Week 4 Goals

- Discuss the different types of material we did research on with Wally or Ethan to make sure they are compatible with the MRI and X-ray machines.
- Order the material required to start building the table.
- Finish the Solid Works drawing to help us build the table

Week 3 Activities

Team Member	Accomplishments	Hours	Running Total (Hours)
Benjamin Engel	Meeting with Eric Bader, individual research	2	7
Ryan Carroll	Meeting with Eric Bader, Meeting with Chris Westphal	2.5	5.5
Justin Schmidt	Meeting with Eric Bader, individual research,	2	5.5

	Contact Ethan about type of material		
Eric Printz	Meeting with Eric Bader, individual research, Discussed material with Ethan	2	6.5

Week 4 Accomplishments

- We discussed the material HDPE with Ethan and he said it would be a good material for the table.
- We talked to Eric Bader, a BME grad student that is familiar with the MRI and developed a table in the past, and got some accurate measurement that they used to create their table.
- Sent in first order of materials (Friday February 20th).

Week 5 Goals

- Finalize the design that we will use for initial prototype.
- If we receive the ordered material we can begin fabricating.
- Talk to Wally about the type of journal article we should use as a template for our final paper.

Schedule

	Scheduled
	Completed
	Monday of Required Presentation

	19-Jan	26-Jan	2-Feb	9-Feb	16-Feb	23-Feb	2-Feb	9-Mar	16-Mar	23-Mar	30-Mar	6-Apr	13-Apr	20-Apr	27-Apr	4-May
Propose project																
Conduct background research																
Discuss parameters w/ client																
Develop PDS																
Brainstorm/solidify design ideas for initial prototype																
Midsemester presentation																
Order materials																
Construct prototype																
Safety Testing/improvements																
Usability Testing w/ interventional radiologists																
Final Presentation Preparation																
Final Paper																

Project Difficulties

- No difficulties to report thus far

Expenses

- No expenses to report thus far