

Progress Report Week 12-13: Weeks of November 20th to December 3rd 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.

Week 12-13 Goals

- Caulk enclosure walls to seal
- Attach all connectors to enclosure wall
- Create seal on top of box and attach latches which close the cover
- Test vasculature with flowing water
- Connect vasculature to inside of phantom and seal all connections
- Attach entire unit to pump to test integrity of device
- Fill box to test integrity of the box
- Run various scans to test the phantoms ability to be imaged

Week 12-13 Activities

Team Member	Accomplishments	Hours	Running Total (Hours)
Benjamin Engel	Phantom construction, integrity and imaging testing at UW Hospital, creation of poster	30	80.5
Ryan Carroll	Phantom construction, integrity and imaging testing at UW Hospital, creation of poster	30	83.5
Justin Schmidt	Phantom construction, integrity and imaging testing at UW Hospital, creation of poster	30	80.5
Eric Printz	Phantom construction, integrity and imaging testing	30	82

	at UW Hospital, creation of poster, significant contact with client		
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Week 12-13 Accomplishments

- Phantom contractions was finalized and integrated with current pump and water lines
- Transported phantom to UW hospital for testing
- Integrity testing carried out to verify that the vasculature was leak proof, the box was leak proof, and that adequate flow was achieved in all of the vessels
- Imaging studies carried out to verify that phantom does not create significant artifact and that all physical characteristics of the phantom comply with the scanner and scan room
- Created media for effective presentation (poster, videos)

Week 14 Goals

- Deliver presentation
- Divide and write final paper
- Develop goals for coming semester

Schedule

	Scheduled
	Completed
	Monday of Required Presentation

	9/1	9/8	9/15	9/22	9/29	10/6	10/13	10/20	10/27	11/3	11/10	11/17	11/24	12/1	12/8	12/15
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

Expenses

- Currently do not have compiled list of expenses. This will be added at a later time.