

Sleep Lab Monitor - Progress Report 13

11/28/08-12/5/08

Project Title:

A combined Thermistor, Pressure, and CO₂ device for use in the Sleep Laboratory

Team Members:

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Client:

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Problem Statement:

There are three measurements taken from each breath during polysomnography. The following devices are used: a thermistor to detect temperature difference between inhaled and exhaled air, pressure sensors that show a flattening pressure profile during upper airway narrowing, and CO₂ sampling tubes to sense End Tidal CO₂. These three measurements are taken from two different devices placed under the child's nose, with two prongs going into each nostril. This method can be inaccurate if a nostril was to become obstructed, and each device may not sample from both nostrils as well as the mouth. Moreover, the current apparatus may be uncomfortable for the child as well as insecure on the child's face. This could cause a disruption of sleep and a possibility of the devices becoming unfastened during the night. To solve these problems, the goal is to design and develop a prototype that combines these three measuring devices into one apparatus that samples from both of the nostrils as well as the mouth, and attaches to the child in both a durable and comfortable fashion.

Reinstatement of Team Goals from Last Week:

1. Finish the prototype
 - a. Finish heat shrinking the wires onto the cannula
 - b. Add the GrassLead connectors to the thermistor wires
2. Install LabView on a laptop to use for the presentation
3. Client Meeting
4. Work on the final presentation
5. Finish poster
6. Give presentation

Summary of Team Accomplishments:

1. Attachment System – After adding the heat shrink to enclose the thermistor wires, the tubes became too large for the diameter of one of the attachment devices
 - a. Heat the tube more to shrink it down further
 - i. This shrunk it down a little, but not enough
 - b. Cut the attachment piece by hand for a bigger diameter
 - i. This turned out to be very difficult
 - ii. Small cuts and progress were made however
2. Surface mount thermistors
 - a. Proved to not be very durable
 - b. Broke in half, and came unsoldered quite often
 - c. Decided in order to make a durable prototype to switch thermistors
3. Redid entire prototype with beaded thermistors
 - a. These thermistors are much more durable
 - b. Much easier to solder by hand
 - c. For the future, we will look into using a smaller thermistor
4. LabView was installed on a Laptop
 - a. However, the cord to plug the ELVIS into the laptop could not be located
 - b. Thus, we will have to use a desktop from the lab with the ELVIS
 - c. Therefore, we have obtained a licensing code from the company to use the software
5. GrassLead connectors
 - a. If we connect the GrassLead connectors to the prototype now, we will be unable to plug the thermistors into our circuit and into the ELVIS
 - b. Thus, using the GrassLead connectors will have to wait for future work until we test the prototype in the sleep lab
6. Continued to write paper
7. Completed poster
8. Split up the presentation among group members
9. Obtained screen shots of sleep lab from Dr Green to use during the presentation
10. Went to the client meeting
 - a. Discussed final prototype and presentation
 - b. Discussed where to go from here
11. Will give presentation on 12/5/08 at 12:41 PM

Statement of Team Goals for Upcoming Week

1. Finish Paper
2. Complete Notebooks
3. Attend last advisor meeting

Project Schedule

9/5/08 – 9/12/08: Choose team and project, Meet Client, Get specifications for project
9/13/08 – 9/19/08: Develop PDS, Perform background research
9/20/08 – 9/26/08: Background research, preliminary design ideas
9/27/08 – 10/3/08: Continue to brainstorm for ideas
10/4/08 – 10/10/08: Work on design and choose design alternatives
10/11/08 – 10/17/08: Complete Mid Semester Presentations
10/18/08 – 11/27/08: Develop final design and complete prototype
11/28/08 – 12/12/08: Complete and give Final Presentation, submit notebooks and paper

Team Difficulties:

1. Getting surface mount thermistors to be durable enough to use with the prototype
2. Having to switch thermistors this late in the project
3. Figuring out how to use the ELVIS and LabView during the presentation

Expenses:

1. Surface mount thermistors
15 X \$0.239/ea = \$3.59
2. Lacquer coated thermistor disks
10 X \$0.51/ea = \$5.10
3. Bead/pearl shaped, ethoxyline resin coated thermistors
10 X \$0.333/ea = \$3.33
4. Other disk thermistors
10 X \$0.277/ea = \$2.77
5. Surface mount coin shaped thermistors
10 X \$0.21/ea = \$2.10
6. Heat shrink 1/8 IN X 4FT clear
8 ft for \$2.16
7. Heat shrink 1/4 IN X 4FT clear
8 ft for \$3.26
8. Heat shrink 3/16 IN X 4FT clear
8 ft for \$2.62

Total thus far = \$24.93

Activities and Individual Accomplishments:

Team Meeting 12/1: 2 hours

 Worked on the final poster

Team Meeting 12/3: 5 hours

 Replaced thermistors on prototype

 Tested the prototype

Client Meeting 12/3: 1 hour

Team Meeting 12/4: 2 hours

 Went over final presentation

 Practiced our parts as a team

Setting up for final presentation 12/5: 2 hours

Final Presentation 12/5: 2 hours

Nicole – 7 hours: Replacing thermistors, poster & presentation work, attempting to obtain a mannequin head

Jack – 7.5 hours: Replacing thermistors, cutting the attachment piece, progress report, poster & presentation work

Lindsey – 7 hours: Testing the prototype, getting the LabView licensing, poster & presentation work

Robyn – 7.5 hours: Updated website, took the final poster to be printed, testing prototype, poster & presentation work

Total hours for this week: 44 hrs

Cumulative hours to date: 291.5 hrs

Sleep Lab Monitor Gantt Chart Fall 2008												Completed:			
												In Progress/Planned:			
	9/5	9/12	9/19	9/26	10/3	10/10	10/17	10/24	10/31	11/7	11/14	11/21	11/28	12/5	12/12
Propose project	■														
Background research	■	■	■	■											
Client Meetings		■		■	■		■		■					■	
Meetings with Professors/Techs				■	■	■	■		■	■	■	■		■	
Develop PDS			■	■	■										
Brainstem design ideas				■	■	■	■	■							
Design alternatives/matrix					■	■	■								
Midsemester presentation work						■	■								
Finalize design ideas							■	■	■	■					
Ordering materials process/research								■	■	■	■	■			
Construct prototype										■	■	■	■		
Test prototype & Materials										■	■	■	■		
Plan final poster presentation													■	■	
Write final paper													■	■	■
Final advisor meeting															■