

Sleep Lab Monitor - Progress Report 9

3/28/09-4/3/09

Project Title:

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

Team Members:

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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. Have all sleep labs contacted by Wednesday, April 1st
2. Order new thermistors by Monday, March 30th
3. Contact Linda, the lab technician, about setting up next testing date at end of April

Summary of Team Accomplishments:

1. Each team member chose two thermistors and sent specs out
 - a. Each member reviewed each thermistor and chose the best one for the meeting
2. Nicole sent out the final revised survey
 - a. Survey included a word-for-word dialog of what to say on the phone
 - b. Sent out a website with all the sleep lab numbers
3. Team meeting in M1053 ECB, Wednesday, April 1st
 - a. Picked a thermistor to order
 - b. Ordered Honeywell 112-103FAJ-B01 glass bead thermistor with a time constant of 4 sec.
 - c. Jason will called Newark in Oconomowoc to order the Honeywell 111-103EAJ-H01 with a time constant of 0.5s because they require an order of 100
 - d. Lindsey e-mailed Professor Tompkins to get free samples of the QTI thermistors however, we do not know the time constant in air, in liquid it is 400ms
 - e. Discussed timeline for the rest of the semester
 - i. Next week: put together prototype
 - ii. Week of April 13th: Perform Temperature Test
 - iii. Week of April 20th: Perform lab testing
4. We have started contacting a few sleep labs continued to be contacted
 - a. We have found that we may need to call a few times and later in the day when the lab technicians are available

Statement of Team Goals for Upcoming Week:

1. Continue to contact sleep labs
2. Once thermistors come in the mail, we will build new prototype next week
3. Get in contact with Dr. Green or Linda to schedule our sleep lab testing

Project Schedule

1/23/09-1/30/09: First client meeting, background research for modifying current prototype

1/31/09 – 2/6/09: Perform background research

2/7/09 – 2/13/09: Background research, modification alternatives

2/14/09 – 2/20/09: Continue to brainstorm for modification ideas, test current prototype

2/21/09 – 2/27/09: Work on design and choose design modification alternatives

2/28/09 – 3/6/09: Complete Mid Semester Presentations
3/7/09 – 3/27/09: Develop modifications and build new prototype
3/28/09 – 4/24/09: Test modified prototype
4/25/09 – 5/1/09: Complete and give Final Presentation, submit notebooks and paper

Team Difficulties:

We had trouble finding a thermistor with small enough time constant that are in stock. GE thermistors have not been found on any of the distributor sites and the original Honeywell thermistor with a time constant of 0.5 s was only available in quantities of 100 at \$10 each.

Expenses:

Honeywell 112-103FAJ-B01 Thermistor: \$43.56

Activities and Individual Accomplishments:

Group Meeting-1: Chose thermistor to order and discussed timeline for the rest of the semester

Nicole – 4: researched thermistors, contacted sleep labs, in contact with GE to try and order one more thermistor with a faster time constant.

Jason – 3: researched thermistors, contacted sleep labs

Lindsey – 4 hours: researched thermistors, contacted sleep labs, contacted QTI to get free samples

Robyn – 3 hours: researched thermistors, contacted sleep labs

Total hours for this week: 15

Cumulative hours to date: 150.5

Sleep Lab Monitor Gantt Chart Spring 2009												Completed:			
												In Progress/Planned:			
	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13	3/20	3/27	4/3	4/10	4/17	4/24	5/1
Background research	Completed	Completed	Completed	Completed											
Test Current Prototype					Completed										
Client Meetings	Completed		Completed		Completed	Completed				In Progress			In Progress		
Meetings with Professors/Tech															
Brainstorm design		Completed	Completed	Completed											
Design Modification alternatives/mat				Completed	Completed										
Midsemester presentation					Completed	Completed	Completed								
Finalize design ideas							Completed								
Ordering materials							Completed	Completed	In Progress						
Construct modified prototype								Completed	In Progress	In Progress					
Test modified prototype & Materials									In Progress	In Progress	In Progress	In Progress			
Plan final poster presentation													In Progress	In Progress	
Write final paper												In Progress	In Progress	In Progress	
Final advisor meeting															In Progress

