

Sleep Lab Monitor - Progress Report 11

4/11/09-4/17/09

Project Title:

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

Team Members:

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Problem Statement:

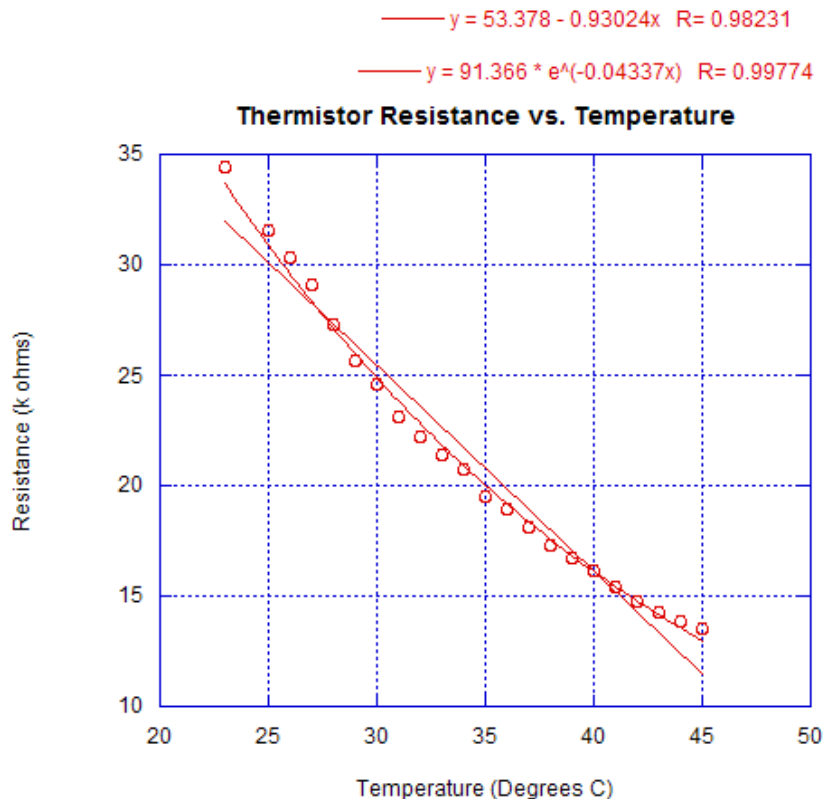
There are three measurements taken from each breath during polysomnography. The following devices are used: a thermistor to detect temperature difference between inhaled and exhaled air, pressure sensors that show a flattening pressure profile during upper airway narrowing, and CO₂ sampling tubes to 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. The temperature test will be performed on Monday, April 13th
2. Assembly of the 3rd prototype will take place if QTI samples are received this week
3. Continue to contact sleep labs

Summary of Team Accomplishments:

1. Temperature Test was performed Monday, April 13th
 - a. A graph of resistance vs. temperature is shown below



- b.
 - c. We got an average change of 0.9974 kΩ/°C, which is higher than our previous thermistor which was 0.8837 kΩ/°C.
 - d. We found that the calculated thermistor temperature was always 2 degrees ahead of the thermometer because it has a faster reponse time than the thermometer does which is ideal.
 - e. We fit the curve both an exponential and a linear fit. Although the exponential fit is a better fit, the linear fit still has a very high R=value.
2. The QTI samples were never received in the mail
 - a. The sales representative I had talked to asked me to consolidate all the e-mails and information into one e-mail
 - b. Lindsey sent an e-mail to Betty Gavigan telling her what samples we wanted so that she could put that with the information she had given him about the UPS tracking number

- c. Lindsey sent another e-mail to the sales representative and Betty Gavigan and has not heard back
- d. The team came to a conclusion to not pursue a third prototype due to time constraints
 - i. We only have one sleep lab visit date and cannot make another one
- 3. Nicole updated the PDS and WARF form
 - a. Nicole sent these documents to all team members to review

Statement of Team Goals for Upcoming Week:

1. Attend the Sleep Lab on Wednesday, April 22 at 1:10pm
2. Solder Connectors onto new prototype Monday, April 20th at 4:00pm
3. Planning to attend a client meeting at 3:30pm on Wednesday, April 22nd (time permitting)
4. Finalize the WARF form
5. Work on final presentation and poster on Sunday, April 25th
6. Have all sleep labs and surveys done by Friday, April 24th
7. Contact Dr. Green about journal to model our paper from
8. Begin working on final paper

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:

Sleep labs have been difficult to contact, as each one has different hours of operation and lab technicians are very busy.

Expenses:

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

Activities and Individual Accomplishments:

Temperature Test-2 Hours: All members were present, we used a heated water bath and thermometer to record changes in resistance with temperature changes.

Nicole – 5 hours: Updated PDS and WARF form, continued to contact sleep labs

Jason – 3 hours: continuing to contact sleep labs, reviewed PDS and WARF form

Lindsey – 4 hours: Reviewed PDS and WARF form, typed up results for the temperature test, continued to contact sleep labs, contacted sales representative and Betty Gavigan to consolidate e-mails for our order of samples

Robyn – 3 hours: continuing to contact sleep labs, reviewed PDS and WARF form

Total hours for this week: 17

Cumulative hours to date: 190.5

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	█	█	█	█											
Test Current Prototype					█										
Client Meetings	█		█		█	█				█			█		
Meetings with Professors/Tech															
Brainstorm design		█	█	█											
Design Modification alternatives/mat				█	█										
Midsemester presentation					█	█	█								
Finalize design ideas							█								
Ordering materials							█	█	█						
Construct modified prototype								█	█	█					
Test modified prototype & Materials								█	█	█	█				
Plan final poster presentation													█	█	
Write final paper												█	█	█	
Final advisor meeting															█

