

Tracheotomy tube security device

Client: Dr. Timothy McCulloch

Team Members: Katie Pollock (Leader)

Becca Clayman (Communicator)

Kim Safarik (BWIG)

Paul Fossum (BSAC)

April 24 to April 30, 2009

Problem Statement

In patients who have had a tracheotomy performed, a major post surgery problem is discomfort from the tracheotomy collar. The collar must be secured tightly to keep the tracheotomy tube in place so the patient can breathe. However, if the collar is kept at the proper tension, it can cause ulcers on the patient's skin. Our goal is to design a tracheotomy strap that is comfortable, easy to clean, and equipped with monitoring devices to ensure that proper pressure is exerted on the tube and neck.

Last Week's Goals

- Resolve circuit triggering problems
- Complete balloon testing and do more trials of absorbance testing
- Finish construction of strap
- Finish poster, print, and prepare for presentation

Summary of Accomplishments

- The group met with our advisor on Friday and discussed our progress. We decided to stick with absorbency testing, and because the balloons do not deform at the pressures we operate at, have quantitative subject testing on their opinions of comfort and function of our strap as compared to the straps currently in use.
- We completed absorbency testing on our strap, the white cotton strap used by Dr. McCulloch and the blue foam strap used by his colleagues. We found that the mesh material used in our strap was the least absorbent.
- We completed subject testing. We found that our subjects had average opinion that our strap was most comfortable, safest, and most functional. Our strap tied the blue foam strap for least abrasive.

- We resolved our circuit issues. The circuit will be external, and triggered when the strap changes position, which will occur if the patient’s neck expands or contracts. When the strap moves the leads of the circuit, which have been prevented from touching the foil underneath a small piece of plastic, are allowed to touch the foil completing the circuit and turning on an alert light that allows a nurse to see that the strap has changed position. The circuit simply slides on the front part of the strap after the strap has been secured. The leads are held in place by a thin piece of cloth attached to the neck with medical tape.
- We completed the poster and assigned presentation roles. Becca will be doing the introduction and background, Kim will be doing the strap design with circuit explanation and demonstration, Katie will be doing the testing, and Paul will be doing cost analysis and future work.

This week’s goals

- Complete poster presentation
- Complete project paper

Project Difficulties

None to report at this time.

Activities –Team total should be added to each individual total

Member	Activity	Hours	Cumulative
Katie Pollock	Additional Poster work	1	18.25
	Poster review	.5	
	Progress report	.5	
Becca Clayman	Poster work - finalization	2	15.50
	Poster printing	1	
	Communication	.5	
Kim Safarik	Update website	.5	11.00
	Poster review	.5	
Paul Fossum	BSAC meeting	.75	12.25
	Additional Poster work	1	
	Poster review	.5	
TEAM	Advisor meeting – Friday	2	36.575
	Team meeting - poster– Sunday	1	
	Team meeting - practice - Wed	2	
	Team meeting - practice- Thurs.	2	

Project Schedule

Number	Task	Start	End	Duration	1/23	1/30	2/6	2/13	2/20	2/27	3/5	3/13	3/20	3/27	4/3	4/10	4/17	4/24	5/1	5/8	
1	Assign teams and duties	1/23/09	1/21/09	1	█																
2	Research project statement and contact client	1/23/09	1/30/09	7	█	█															
3	Initial Brainstorming Client meeting, obtained basic materials	1/30/09	2/13/09	14	█	█	█														
4	Refined materials	2/4/09	2/5/09	1			█														
5	brainstorming	2/5/09	2/27/09	22			█	█	█												
6	PDS	2/13/09	2/20/09	7				█													
7	Design Matrix	2/21/09	2/27/09	6					█												
8	Select final Idea Work on mid semester presentation	2/27/09	2/28/09	1						█											
9		2/27/09	3/5/09	7						█											
10	Mid semester report	3/5/09	3/13/09	7							█										
11	Mid semester presentation	3/5/09	3/13/09	7							█										
12	Order materials	3/2/09	3/14/09	12								█									
13	Spring break	3/14/09	3/22/09	8									█								
14	Fabrication of strap Comfort testing/safety evaluation	3/23/09	4/10/09	18										█	█	█					
15		4/10/09	4/17/09	7												█					
16	Redesign	4/17/09	4/24/09	7													█				
17	Final testing	4/24/09	4/25/09	1														█			
18	Final presentation	4/24/09	5/1/09	4															█		
19	Report	5/1/09	5/8/09	8																█	█

We are on schedule. We have completed testing. The poster and prototype are finished and we are ready to present on Friday.

Expenses

Item	Amount	Price
Jersey mesh fabric	0.5 yds	\$1.50
Box to store materials	1	\$0.99
Sponge(as back up)	1	\$1.95
Glue (Liquid Nails)	1	\$3.47
Eyehooks(no longer using)	1 bag	\$0.98
Nylon gloves	6 (1 pack)	\$2.47
Heat shrink tubing(large)	1 pack	\$1.97
Heat shrink tubing(small)	1 pack	\$1.95
LED lights	2 lights	\$1.57

Battery	1 6V medical battery	\$5.49
Duct tape	1 roll	\$6.99
Medical tape	1 roll	\$4.49
Double sided tape	1 roll	\$3.49

Total : \$37.31