

Tracheotomy tube security device

Client: Dr. Timothy McCulloch

Team Members: Katie Pollock (Leader)

Becca Clayman (Communicator)

Kim Safarik (BWIG)

Paul Fossum (BSAC)

April 10 to April 16, 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

- Continue fabrication, finish belt design portion in front.
- Continue working on balloons in the back
- Begin work on the alarm circuit, order an LED/buzzer and begin fabrication.
- Brainstorm potential testing that could be performed on the finished product

Summary of Accomplishments

- We have attempted the math about pressure and force on the balloons/strap, but are still confused as to what exactly we are looking to optimize or trying to find.
- We have finished the belt design in the front, it could still be improved with a little sanding.
- Paul went to RadioShack and got LED lights. We will be able to complete the circuit as soon as we get battery housing at the hardware store. We will also need to find a place to solder the circuit (hopefully just in the shop).
- For testing on the final product, we plan on doing absorbance testing to see how well the strap repels water, stretch testing on the balloons to see how much they expand when force is applied. This will be better defined by next week.

This week's goals

- Define and begin testing methods for absorbancy and force/stretch testing on balloons.
- Complete further math on force and pressure.
- Obtain information about getting a phantom for the final presentation.
- Determine which materials in the strap will be reusable and which will be disposable.
- Begin work on poster

Project Difficulties

We have decided to use condoms as our balloon material as they seem to stretch appropriately. We are having issues sealing them, but have found that tying them in a knot and covering the end with heat shrink tubing seems to work pretty well. We are having trouble with the math because we are unsure of what we are actually looking for. Becca has been calling around trying to get a phantom for our final presentation, but so far the search has proved futile.

Activities –Team total should be added to each individual total

Member	Activity	Hours	Cumulative
Katie Pollock	Strap fabrication (belt connection)	.75	12.25
	Hardware store run	.5	
	Progress report	.25	
Becca Clayman	Poster work	1	9.50
	Hardware store run	.5	
	Communication	.25	
Kim Safarik	Update website	.25	6.75
	Drawings and math	.5	
Paul Fossum	BSAC meeting	.75	8.50
	Radioshack	.5	
TEAM	Advisor Meeting	.5	26.075
	Team meeting/fabrication	1.5	

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	1/30/09	2/13/09	14		█	█														
4	Client meeting, obtained basic materials	2/4/09	2/5/09	1			█														
5	Refined 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	2/27/09	2/28/09	1						█											
9	Work on mid semester presentation	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	1								█									
12	Order materials	3/13/09	3/14/09	1																	
13	Spring break	3/14/09	3/22/09	8																	
14	Fabrication of strap	3/23/09	4/10/09	18																	
15	Comfort testing/safety evaluation	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	4/27/09	5/1/09	4																	
19	Report	5/2/09	5/2/09	1																	

We are still a little behind schedule. Fabrication has begun, but isn't quite finished yet. We anticipate another week or so of fabrication before we can begin any kind of testing. We may end up having to eliminate our second round of testing.

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

Total : \$16.85