

Tracheotomy tube security device

Client: Dr. Timothy McCulloch

Team Members: Katie Pollock (Leader)

Becca Clayman (Communicator)

Kim Safarik (BWIG)

Paul Fossum (BSAC)

April 3 to April 9, 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

- Go to the hardware store and determine what kinds of valves are readily available.
- Determine a solution to the valve issue. Decide whether or not to continue to pursue it.
- Make a decision about which strap we are actually going to use for the front of the collar
- Find a suitable material for the balloons in the back.
- Obtain client consent/acknowledgement to proceed with design

Summary of Accomplishments

- This week we met as a group and went to the hardware store. We determined that no valves were readily available that could be utilized in the design and are officially switching to the alarm circuit on the back.
- The alarm circuit will be simple, consisting of a battery, light/buzzer, and an open connection that when closed by the balloon contracting (due to decreased pressure such as the neck losing water and contracting) will set off the light or

buzzer. This should be extremely easy to construct and implement, we will just need to obtain a simple LED light or a buzzer which Paul is doing research on and will update us about on Friday.

- The group bought several materials that we thought would work for the balloon including painting tarp and nylon gloves. Unfortunately, these do not expand the amount that would be required for good pressure dispersal and that would be ideal for the circuit idea we have in mind. In the end we ended up experimenting with using condoms for the balloon material and they are currently working very well. We intend to pursue using them.
- The strap has been fabricated. Its main portion on the back is 9 in long, and each strap is 9 in long, this will accommodate neck sizes of approximately 12 in to 21 in, which encompasses a broad variety of neck sizes. In the future, or if we finish this design before it is time to present, we could also fabricate a child size and bariatric sized strap.
- We could not find any bi-directional cable ties flexible or long enough to satisfy our design. We are officially switching to the belt design. There will be a plastic apparatus attached to the sides of the strap with molded paper clip pins that go through the strap and secure the belt in a given position.
- Our client still has not responded to our emails about whether or not he is ok with pursuing this design. We are currently going ahead with it until we hear differently.

This 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

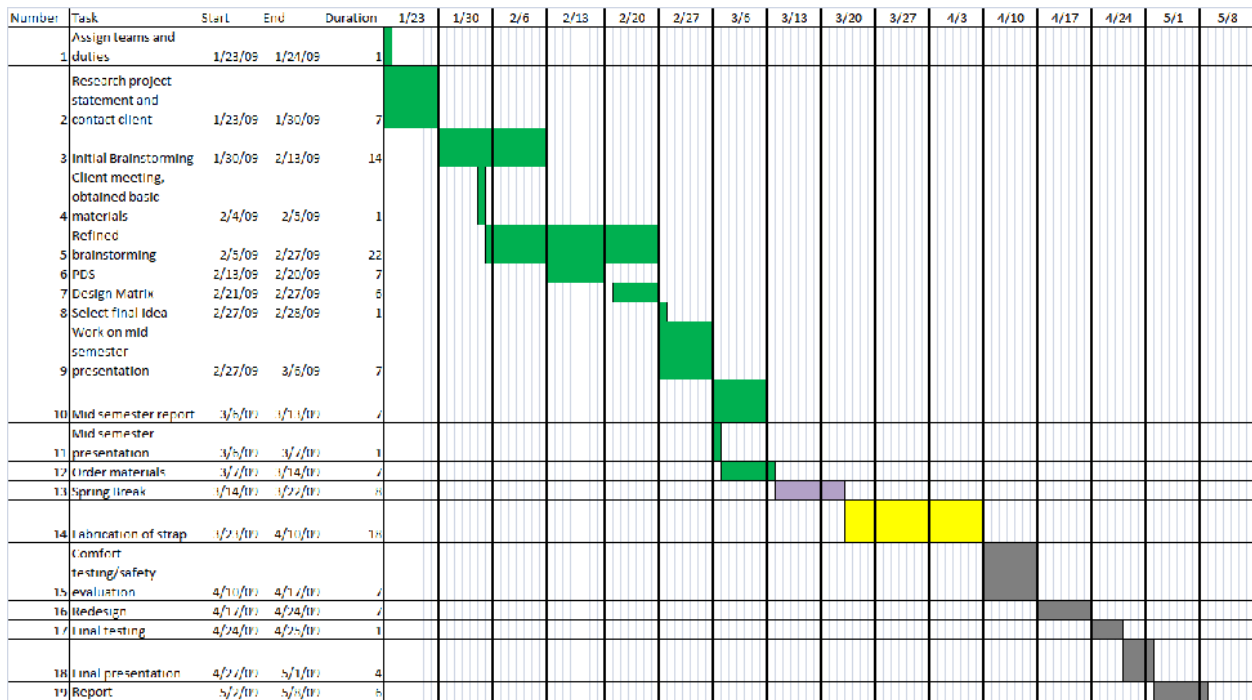
Project Difficulties

Fabrication is going extremely well. We have been doing some problem solving with the balloons on the back, which may prove troublesome, but currently that seems to be going fine as well. We anticipate problems joining the circuit and balloons together once we obtain the circuit materials.

Activities –Team total should be added to each individual total

Member	Activity	Hours	Cumulative
Katie Pollock	Strap fabrication	2	10.75
	Alarm circuit research	.5	
	Progress report	.25	
Becca Clayman	Further balloon fabrication	1.5	8.75
	Communication	.5	
Kim Safarik	Update website	.25	6.00
Paul Fossum	Pricing research on alarm	1	7.25
TEAM	Hardware store trip	1.75	24.075
	Team meeting/fabrication	1.25	

Project Schedule



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

Total : \$15.28