

Endotracheal tube adaptor for administration of nebulized medications

Client: Dr. Mark E. Schroeder

Team Members: Ryan Childs (BSAC)
Ozair Chaudhry (Communicator)
Timothy Barry (BWIG)
Evan Joyce (Leader)

Date: April 10 to April 17, 2009

Problem Statement

The goal of this project is to develop an endotracheal tube adaptor that can consistently deliver aerosolized medication (Albuterol or Ipratropium) to an anesthetized patient during surgery by anesthesiologists at the UW-Hospital. The adaptor will be used on an intubated patient who is anesthetized with medication from an anesthesia circuit. The device should not impede the anesthesia circuit which flows at a rate of 4–5 Liters of air/minute and should solely act as a port to deliver medication should it be needed during surgery.

A recent change to the metered dose inhalers (MDI) made by GlaxoSmith&Klein, specifically the addition of an actuation counter on the top of the canister, has rendered our client's current adaptor ineffective. Our client would prefer an adaptor that either works with the patient's plastic dose dispenser, directly with the new MDIs, or as an addition to the current adaptor used. The adaptor we are pursuing acts as a "syringe" to dispense medication in a simple fashion, with one hand, into the Luer port of a readily available plastic anesthesia elbow. The elbow has a locking cap on the Luer port which will be used to prevent the circuit from being broken when the "syringe" adaptor is not in use.

Last Week's Goals

- Obtain finished prototype and give to client to pass around for survey
- Finish at least two other forms of testing
- Begin work on poster for final report

Summary of Accomplishments

- Have a completed prototype that fits perfectly into Luer port
- Began writing out survey for Mark and contacted 3M to get math equations to calculate hypothetical pressure drop. Also found a lab that has a Cascade Impactor so we can test particle size distribution
- Began working on poster for final presentation

This Week's Goals

- Begin testing prototype with Cascade Impactor and math equations for hypothetical pressure drop
- Finish at least two other forms of testing
- Begin work on poster for final report

Project Difficulties

- Corresponding with GSK (more of a long-term commitment/side project so not a major concern)
- Finding an analytical chemistry professor on campus to help measure minute medication amounts

Activities

Ozair Chaudhry

4.10.2009 Advisor and team meeting	2.00 hr
4.13.2009 Client meeting	2.00 hr
~~~~~ Testing research	1.00 hr

Timothy Barry

4.10.2009 Advisor and team meeting	2.00 hr
~~~~~ Website	1.00 hr

Ryan Childs

4.13.2009 Client meeting	2.00 hr
4.16.2009 3M phone conference	1.00 hr

Evan Joyce

4.10.2009 Advisor and team meeting	2.00 hr
4.09.2009 Progress report	1.00 hr

Project Schedule

Tasks	January		February				March				April				May	
	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8
Research and Development																
Research	█	█	█				█									
Brainstorm		█	█	█			█									
Develop Prelim. Designs				█	█	█	█									
Detail/Evaluate Designs							█	█	█							
Build Prototype							█			█	█	█	█			
Test Prototype							█					█	█	█		
Website	Timothy															
Deliverables							█									
Midsemester Presentation						█	█									
Midsemester Report						█	█									
Final Presentation							█							█	█	
Final Report							█							█	█	█
Progress Reports	Evan															

Expenses

- Prototype cost - \$675 from Physics shop