

Title: Emergency Cricothyroidotomy

Date: February 15th, 2024

Client: Dr. Lenard Markman

Advisor: Darilis Suarez-Gonzalez

Team:

Katerina Smereka

Zac Mayhew

Megan Finell

Mateo Silver

Problem statement

Every year in the United States over 5,000 people die due to choking. There are only a few precious minutes between loss of the airway and brain death. By creating a device which can establish an airway in case of blockage (either caused by choking or anaphylaxis), many of these people could be saved. Crucial to the success of the device is its availability. The device will be low-cost and easy to use, so it can be added to first aid kits and placed in public areas. Unlike current devices on the market, which are expensive and difficult to use, our product aims to be accessible when emergencies occur.

Brief status update

The team has done some preliminary testing on the puncture ability of the device. The team tested the performance of the device on porcine skin, porcine larynx and porcine trachea and found that the device could not puncture any of the materials. The team is now redesigning the shank to make it more sharp as well as make the BVM end more ergonomic.

Difficulties / advice requests

Any insight on attempting to make the shank sharper (perhaps inclusion of a blade on the shank) while still keeping in mind safety and overall approachability of the device.

Current design



Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Semester 1 Expenses										
All expenses									\$29.67	
Semester 2 Expenses										
Porcine Skin		N/A		Asian Midway Market		2/10/2024	1	2.97	\$2.97	
									\$2.97	
								TOTAL:	\$32.64	

Major team goals for the next week

1. Redesign the shank of the device
2. Solidify a date for outreach

Next week's individual goals

- Katerina
 - Create a functional redesign that allows for a sharper edge of the distal end
 - Design a cap

- Zac
 - Finalize new design idea
 - Begin creating a protocol for airflow testing
- Megan
 - Investigate possible redesigns and/or ways to sharpen the tip of our design
 - Research ways to test airflow volume through the device
- Mateo

Timeline

Task	Jan	Feb				March					April				May	
	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
Project R&D																
Empathize	X	X	X	X												
Background...	X	X	X	X												
Prototyping				X												
Testings				X												
Deliverables																
Progress Reports	X	X	X	X												
Prelim presentation			X													
Final Poster																
Meetings																
Client		X														
Advisor	X	X	X	X												
Website																
Update	X	X	X	X												

Filled boxes = projected timeline
 X = task was worked on or completed

Previous week's goals and accomplishments

- Katerina
 - Create sound testing protocols with MTS testing
 - Create sound testing protocols with airflow testing
 - Research potential journals for potential submission
- Zac
 - Research methods of testing flow rate
 - Brainstorm handle designs
- Megan
 - Continue writing WARF application
 - Review operation on MTS machines to prepare for testing
- Mateo
 - Reach out to Dr. Wille about testing with the MTS machine

- Reach out to outreach contact, set a date for our activity

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katerina	2/10 2/14 2/15	Obtaining pig skin Testing Researching other devices and sketching a redesign	0.5 1 2.5	4	6.5
Zac	2/13 2/14 2/15 2/15 2/15	SolidWorks of handle Testing Researching airflow testing Redesign ideas Cap design in SolidWorks	1 1 1 .5 1	4.5	8.5
Megan	2/10 2/14 2/15 2/15	Obtaining pig skin Testing Research on airflow testing and redesigns Sketching redesigns	0.5 1 1 0.5	3	7.5
Mateo	2/14 2/14	Testing Redesign research and sketches	1 2	3	9