

Title: Emergency Cricothyroidotomy

Date: February 29nd, 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 went to teamlabs to sharpen the device. The team has redone testing on porcine organ mimics and found that the sharpened device does indeed puncture laryngeal trachea and the cricothyroid membrane.

Difficulties / advice requests

Between the last round of testing and this round, the porcine skin was not well kept in the freezer and it ended up freezer burning. Upon thawing, it did not keep the same elasticity needed to mimic skin. Future retesting of porcine skin needs to occur.

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

Complete airflow testing and device more quantitative testing

Next week's individual goals

- Katerina
 - Do airflow testing on SOLIDWORKS
 - Consider increasing ergonomics with potential integration of a handle
- Zac

- 3d print handle for device to improve ergonomics
- Help with airflow testing on SolidWorks
- Megan
 - Research butchers in the area to get additional pig skin and possibly a neck
 - Help plan future testing (airflow, MTS, etc)
- Mateo
 - Plan larger scale testing: MTS or functionality testing?
 - Look more into Anaesthesia Journal, past medical device publications
 - Calculate statistical power, sample size needed

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	X											
Background...	X	X	X	X	X											
Prototyping				X	X											
Testings				X												
Deliverables																
Progress Reports	X	X	X	X	X											
Prelim presentation			X													
Final Poster																
Meetings																
Client		X														
Advisor	X	X	X	X	X											
Website																
Update	X	X	X	X	X											

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Katerina
 - Sharpen device in TeamLab
 - Complete airflow testing
 - Deliver preliminary reports
- Zac
 - Help with sharpening device in Teamlab
 - Test sharpened device
 - Finish section of preliminary report

- Megan
 - Help with fabricating sharper point in TEAM lab
 - Test if sharpened device punctures pig skin
 - Discuss airflow testing and method/protocol with team
 - Complete my sections of preliminary deliverables
- Mateo
 - Design consultation with TEAM Lab
 - Sharpening device in TEAM Lab

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katerina	2/23	Sharpen device in teamlabs	0.5	4.5	12
	2/23	Meet with team	0.5		
	2/24	Create and assign preliminary deliverables	0.5		
	2/26	Complete assigned part of preliminary deliverables	1		
	2/28	Device testing with team	1		
	2/29	Update labarchives	1		
Zac	2/23	Sharpen device	0.5	3.5	13
		Team Meeting	0.5		
	2/28	Device testing	1		
	2/29	Preliminary deliverables	1.5		
Megan	2/23	Sharpen device in TEAM labs	0.5	4	12.5
		Team Meeting	0.5		
	2/28	Testing sharpened device	1		
	2/29	Research Journal of Anesthesia	0.5		
	2/29	Finish preliminary deliverable sections	1.5		
Mateo	2/23	Sharpen device in TEAM Lab	0.5	3	15
		Team Meeting	0.5		
	2/26	Testing	1		
	2/27	Preliminary deliverables	1		