

Title: Emergency Cricothyroidotomy

Date: April 18, 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 redone testing and had success in puncturing the porcine skin with the cricothyroid membrane underneath. The team hopes to do some more 'relevant' testing and mimic the environment that the device would be used in to test for time it takes to use the device. Currently, data analysis on the puncture wound is undergoing to better understand the damage left by the device.

Difficulties / advice requests

None to report

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 | Tissue sample to be used in testing of the prototype. | N/A | | Asian Midway Market | | 2/10/2024 | 1 | 2.97 | \$2.97 | |
| Porcine larynx/trachea | Tissue samples to be used in testing of the prototype. | N/A | | USDA UW Madison Meat Plant | | 4/8/2024 | 3 | 15 | \$45 | |
| Porcine Skin | Tissue sample to be used in testing of the prototype. | N/A | | Asian Midway Market | | 4/11/2024 | 1 | 2.97 | \$2.97 | |
| | | | | | | | | TOTAL: | \$80.61 | |

Major team goals for the next week

The team hopes to conclude testing and begin working on final deliverables

Next week's individual goals

- Katerina
 - Complete situational testing for device
 - Work on final deliverables
- Zac
 - Complete timing test for device
 - Work on final deliverables
- Megan
 - Work on final deliverables (poster, presentation, testing analysis, etc)
 - Complete final skin testing
- Mateo
 - Work on final deliverables

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

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Katerina
 - Begin preparing preliminary deliverables
- Zac

- Test handle design
- Revise and make safety cap for device
- Megan
 - Obtain the pig tracheas/larynges (and hopefully pig skin as well)
 - Help create a way to effectively test multiple layers of tissue together
 - Test the device on new samples
- Mateo
 - Complete outreach documents
 - Finish all testing
 - Begin working on final deliverables

Activities

| Name | Date | Activity | Time (h) | Week Total (h) | Sem. Total (h) |
|-------------|-------------|--|-----------------|-----------------------|-----------------------|
| Katerina | 4/16 | Thaw larynges | 3 | 7.5 | 33.5 |
| | | Test device | 1.5 | | |
| | 4/17 | Meeting with WARF | 1 | | |
| | | Write and collect outreach deliverables | 1 | | |
| | 4/18 | Edit final executive summary | 1 | | |
| Zac | 4/11 | Finding materials for fixation device | 0.5 | 3.5 | 26.5 |
| | 4/16 | Testing on porcine tissues | 1.5 | | |
| | 4/17 | Meeting with WARF | 1 | | |
| | 4/18 | Edit final executive summary | 0.5 | | |
| Megan | 4/11 | Create testing fixation device | 2 | 5 | 34.5 |
| | 4/16 | Testing on porcine tissues | 1.5 | | |
| | 4/17 | Meeting with WARF | 1 | | |
| | 4/18 | Edit final executive summary | 0.5 | | |
| Mateo | 4/11 | Create testing fixation device | 2 | 5.5 | 30 |
| | 4/16 | Testing on porcine tissue | 1.5 | | |
| | 4/17 | Meeting with WARF | 1 | | |
| | 4/18 | Edit executive summary and outreach reflection | 1 | | |