

Progress Report #4

Title: Helmet for continuous laryngoscopy with exercise

Date: 10/02/2026

Client: Mr. Jacob Tangney MS, CCC-SLP

Advisor: Dr. Randolph Ashton, PhD

Team:

Evan Zheng, BME 300 - Team Leader

Hangjay Liu, BME 300 - Communicator

Joseph Hegeman, BME 200 - BSAC

Kavin Yedlapalli, BME 200 - BWIG

Katherine Fletcher, BME 200 - BPAG

Reghan Ziegler, BME 200 - BWIG

Problem Statement

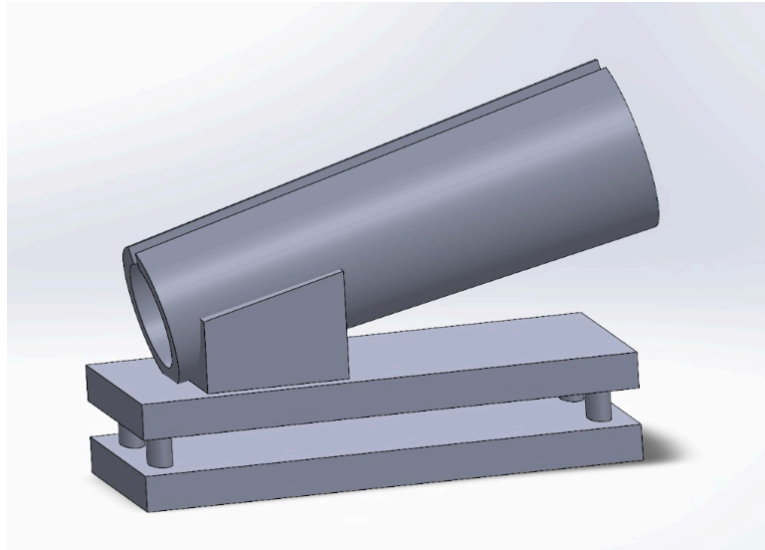
Continuous laryngoscopy during exercise (CLE) is the gold standard diagnostic tool to assess exercise induced laryngeal obstruction (ELIO). In order to observe the laryngeal obstruction, CLE is performed by attaching a laryngoscope to a head mounted apparatus which is inserted into the patient's nose and into the larynx. The patient would sprint or use a stationary bike at 50% and 100% exertion during the laryngoscopy. Currently, there is no single standardized helmet for CLE testing and all current helmets are custom made. To design a successful helmet for CLE, the laryngoscope mount must resist 6N of force and a $1.5\text{N}\cdot\text{m}$ moment applied in all directions. During full sprint, the laryngoscope must not move more than 5mm from its original position relative to the helmet and must not apply a moment greater than $30\text{N}\cdot\text{m}$ on the occipital condyle in both flexion, extension, and bending. Lastly the helmet must not slip and thus rotate relative to the patient's head more than 10 degrees from its initial wear position.

Brief Status Update

The team planned to meet with a client in person to get hands on a laryngoscope that the clinic was able to lend us. The team will send a request to obtain the 2 helmets (airsoft tactical helmet and wrestling helmet) from Emerald Doll. The team will complete the preliminary presentation and will review it before the presentation comes up on Friday. Client has a set idea on a design mount/helmet, but is open for different designs.

Difficulties / Advice / Requests

Current Designs : The angle cone mount will be mounted onto the mount area on the airsoft helmet.



Materials and expenses - N/A

Item	Description	Manufacturer	Mft Pt#	Vendo r	Vendo r Cat#	D a t e	#	Cost Each	Total
Category 1									
									\$0.00
									\$0.00
Category 2									
									\$0.00
									\$0.00
								TOTAL:	\$0.00

Major team goals for the next week

1.

Next week's individual goals

- Evan Zheng
 - Begin fabrication plan
 - Finalize cad
- Hangjay Liu:
 - 3 D print out different mount designs
 - Obtain the helmets from the client and start mounting mounts
 - Starts assembly/testing possibly
- Joseph Hegeman
 - Research rail attachment options for the mount to adjust scope anterior/posterior.
 - Try on helmets as a preliminary testing process.
- Kavin Yedlapalli
 - Research more into the tactical to understand its limitations and how to attach mount
 - Possibly start fabrication
- Katherine Fletcher
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- Reghan Ziegler
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Timeline

Task	Sept			Oct					Nov				Dec	
	11	18	25	2	9	16	23	30	6	13	20	27	4	11
Project R&D														
Empathize	X													
Background...		X	X											
Prototyping														
Testings														
Deliverables														
Progress Reports	X	X	X											
Prelim presentation														
Final Poster														
Meetings														
Client		X	X											
Advisor	X	X	X											
Website														
Update	x	X	X											

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Evan Zheng
 - Rewrite problem statement to be more quantitative and clearly define success criteria

- Create template for preliminary design presentation
- Completed assigned sections of the design matrix, then proofread and revise the whole document.
- Facilitated client meeting
- Hangjay Liu
 - Met client virtual/in person. Obtain a laryngoscope model and have a better understanding of what the client wants
 - Work on the preliminary presentation
 - Finalize design matrix
- Joseph Hegeman
 - Met client during video call and later in person.
 - Worked on preliminary presentation—researched HALOS helmet.
 - Attended and took notes during the BSAC meeting with faculty.
- Kavin Yedlapalli
 - Researched into the material properties of all helmets and their effect on comfort
 - Prepared for preliminary design presentation
 - Met client to get laryngoscope
- Katherine Fletcher
 - Attended team meeting
 - Complete assigned design matrix section
- Reghan Ziegler
 - Attended team meeting
 - Complete assigned design matrix section

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Evan Zheng	9/17/2026	Client meeting facilitation, team organization, design matrix, revised problem statement.	29	6	35
Hangjay Liu	9/14/2026	Meeting with Client virtually, working on the preliminary design, finalize our design matrix	23.5	8	31.5
Joseph Hegeman	9/17/2026	Team meeting and client meetings, BSAC meeting with faculty, preliminary design presentation work, researched HALOS helmet.	13	5	18
Kavin Yedlapalli	9/17/2026	Researched comfort statistics on helmets, prepared for design presentation,	15	4	19
Katherine Fletcher	9/17/2026	Attending team member, complete the assigned design matrix	14	4	18
Reghan Ziegler	9/17/2026	Attending team member, complete the assigned design matrix	17	2	19

