

Progress Report #5

Title: Helmet for continuous laryngoscopy with exercise

Date: 10/08/2026

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

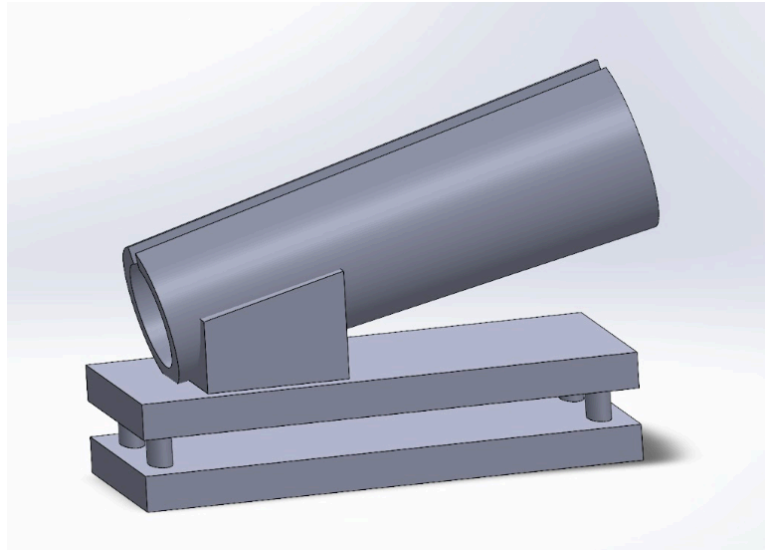
Continuous laryngoscopy during exercise (CLE) is the gold standard diagnostic tool to assess exercise induced laryngeal obstruction (ELIO). In order to observe the laryngeal obstruction, CLE is performed by attaching a laryngoscope to a head mounted apparatus which is inserted into the patient's nose 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 1.5N*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 30N*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 has met with Mr. Tangney and obtained a laryngoscope from the speech clinic. The helmets have been ordered and are on their way. The team presented their preliminary design presentation and finished their preliminary report. A plan to fabricate an initial prototype has been developed. A plan to test the device has been developed.

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:
 - Obtain physical helmet
 - Start mounting the laryngoscope mount
 - Start testing and obtaining data
- Joseph Hegeman
 - Research rail attachment options for the mount to adjust scope anterior/posterior.
 - Try on helmets as a preliminary testing process.
 - Attend and take notes on BSAC meeting 10/09/26.
- Kavin Yedlapalli
 - Begin fabrication process
 - Conduct more research to further evaluate effectiveness helmets and potential modifications
- Katherine Fletcher
 - Begin mount renderings
 - Start to lay out financial plans
- Reghan Ziegler
 - Continue researching materials
 - Augment current designs to accommodate for client needs

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	X										
Prototyping														
Testings														
Deliverables														
Progress Reports	X	X	X	X										
Prelim presentation				X										
Final Poster														
Meetings														
Client		X	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

- Evan Zheng
 - Created the framework for the final CAD design to plug in dimensions when the helmet arrives
 - Met with client at the clinic and obtained laryngoscope
 - Organized team practice for presentations
- Hangjay Liu
 - Worked on the preliminary design/proof read
 - Practiced and complete the preliminary presentation/slide
 - Meet with client at clinic and check out laryngoscope
- Joseph Hegeman
 - Met with client to observe and measure laryngoscope.
 - Delivered preliminary design presentation with team.
 - Completed Motivation and Competing Designs sections on preliminary design report.
- Kavin Yedlapalli
 - Researched into the chemical and physical durability properties of the tactical and climbing helmet
 - Completed section of preliminary report and helped revised before submitting
- Katherine Fletcher
 - Attended team meeting
 - Complete assigned design matrix section
 - Refined measurements and materials for mount designs
- Reghan Ziegler
 - Attended team meeting
 - Complete assigned design matrix section
 - Researched other mount designs
 - Met with client about laryngoscope

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Evan Zheng	9/17/2026	Client meeting at the clinic, presented our preliminary designs, designed a new mount for first prototype printing.	35	8	43
Hangjay Liu	9/14/2026	Client meeting at clinic, preliminary presentation/report. Fixed/proof read preliminary report.	31.5	6	37.5
Joseph Hegeman	10/08/2026	Client meeting, preliminary design presentation, work on preliminary design report, BSAC meeting.	18	5	23
Kavin Yedlapalli	9/17/2026	Researched more into the chemical and physical durability of the tactical and climbing helmets. Completed assigned section of preliminary report and helped revise	19	5	24

Katherine Fletcher	9/17/2026	Attending team member, complete the assigned design matrix, prepared for design presentation.	18		
Reghan Ziegler	9/17/2026	Attending team meeting, attended client meeting with laryngoscope, completed design matrix/presented part, researched alternative helmet designs	19	5	24