

Progress Report #6

Title: Helmet for continuous laryngoscopy with exercise

Date: 10/15/2026

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

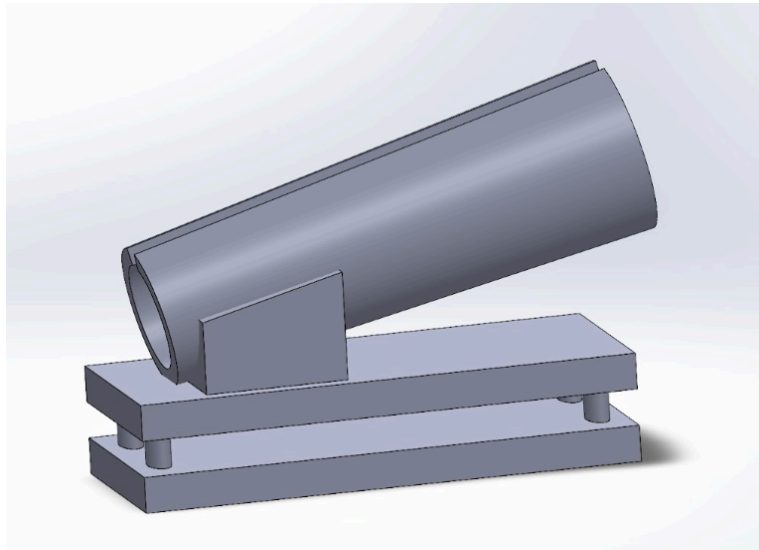
Continuous laryngoscopy during exercise (CLE) is the gold standard diagnostic tool to assess exercise induced laryngeal obstruction (ELIO). In order to observe the laryngeal obstruction, CLE is performed by attaching a laryngoscope to a head mounted apparatus which is inserted into the patient's nose 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 is awaiting for the helmets to arrive and are currently designing a rigid phone mount to attach onto the helmet for acceleration testing.

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#	Vendor	Vendor Cat#	Date	#	Cost Each	Total
Category 1 Helmet									
Tactical Helmet	Airsoft Helmet with Side Rails and NVG Mounts for Outdoor Activities Such As Airsoft, Paintball, CS Games, Etc.	GVAKVTGK						\$23.96	\$23.96
Climbing Helmet	Half Dome Rock Climbing Helmet, Adjustable Fit, Ventilated	BLACK DIAMOND						\$69.95	\$69.95
Wrestling Helmet	Wrestling Headgear	Amazon Generic						\$69.95	\$69.95
Category 2 Mount									
									\$0.00
									\$0.00
								TOTAL:	\$0.00

Major team goals for the next week

1. Obtain Helmet, print out prototype and mount them onto the helmet
2. Begin testing and collecting test results

Next week's individual goals

- Evan Zheng
 - Pick up the helmets from the clinic
 - Fabricate the mounts and mount them on the helmet
 - Contribute my portion of testing by sprinting with it on.

- Hangjay Liu:
 - Obtain Helmet
 - Print out prototype start testing
 - Fix old CAD design
- Joseph Hegeman
 - Continue to learn SolidWorks and make a prototype for rail design for mount
 - Test helmets once obtained
- Kevin Yedlapalli
 - Begin to fabricate/print out testing/phone mount
 - Finalize plan for initial testing and start developing plan for final testing potentially with Dr Green
 - Help with fabricating actual mount
- Katherine Fletcher
 - Help with mounting the mount onto helmet
 - Contribute to testing
 - Learn CAD
- Reghan Ziegler
 - Continue working on learning solidworks and make a prototype for a phone holder
 - Refine design for the new mount

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
 - Begin fabrication plan
 - Finalize cad
- Hangjay Liu:
 - Fixing old prototype CAD design
 - Research head muscle fatigue mechanism and ventilated vs non-ventilated helmet
 - Client meeting
- 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
 - I found out more about materials
 - Designed a new helmet attachment that is dynamic and able to mold to any helmet rather than just being made for one helmet

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Evan Zheng	10/16/2026	Met with client, recruited Dr. Christopher Green to the project, met with advisor, discussed research plans for the future with Dr. Green.	43	4	47
Hangjay Liu	10/16/2026	Met with client, Fixing old prototype design, met with advisor, further research on ergonomic	37.5	4	41.5
Joseph Hegeman	10/16/2026	Met with Dr. Green over Zoom, met with advisor, discussed next steps with team during team meeting. Downloaded SolidWorks	23	3	26
Kavin Yedlapalli	10/16/2026	Met with Dr. Green over zoom to discuss any ways he can help. Did research on some competing designs for a phone mount for testing purposes. Began learning solidworks. Began	24	5	29

		developing a design for a phone mount design			
Katherine Fletcher	10/16/2026	Begin training in Solidworks. P Lay around with onshape renderings. Attend a zoom meeting with Dr.Green.	18	4	22
Reghan Ziegler	10/16/2026	Begin Solidworks,	24	4	28