BME Design: 200, 300, 301, 400 and 402

Progress Report #8

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 1.5N*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.

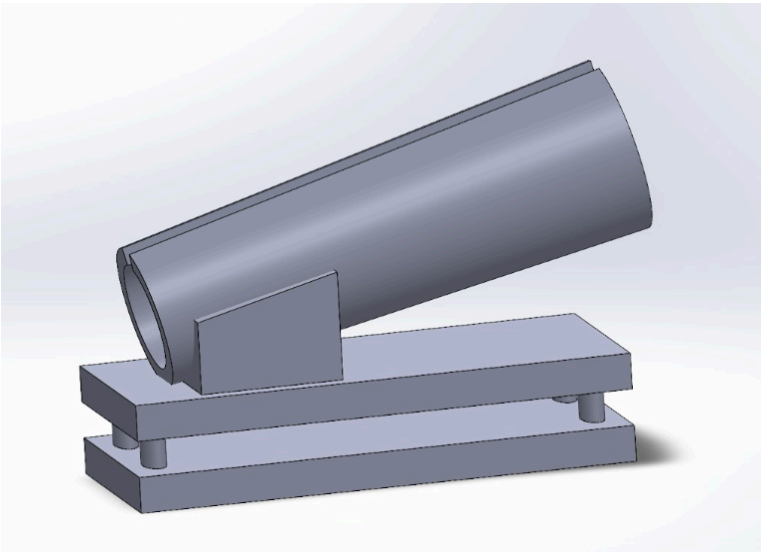
Brief Status Update

The team has received 1 helmet, the other 2 are sent to the wrong location. Will need to wait for them to get relocated so we can pick them up.

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. Fabricate the mounts
3. Attach it on to the helmet
4. Test for fit and durability
5. Get clearance out of the way so we can visit Dr. Green’s facilities

Next week's individual goals

- Evan Zheng
    - Attach the laryngoscope mounts onto the helmet
    - Contribute my portion of testing by sprinting with it on.
- Hangjay Liu:
    - Start mount the mounts onto the helmets
    - Complete required engineering training.
    - Have tables ready for data collection
    - Assist in mounting the laryngoscope mount onto helmet
- Joseph Hegeman
    - Get vaccinated for influenza to be certified to observe exercise tests.
    - Contribute to testing by sprinting with helmet/mount on.
    - Help with mounting and data taking
    - Assist in mounting the laryngoscope mount onto helmet
- Kavin Yedlapalli
    - Run tests with newly acquired helmets
    - Help with fabrication of the other mounts not fabricated yet
    - Assist in mounting the laryngoscope mount onto helmet
- Katherine Fletcher
    - Begin rendering uses for the free metal attachments
    - Continue learning solidworks
    - Assist in mounting the laryngoscope mount onto helmet
- Reghan Ziegler
    - Finish materials training
    - Continue learning Solidworks
    - Continue physical designs for phone mount
    - Assist in mounting the laryngoscope mount onto helmet

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					X	X	X	X						
Testings														
Deliverables														
Progress Reports	X	X	X	X	X	X	X	X						

Prelim presentation				X										
Final Poster														
Meetings														
Client		X	X											
Advisor	X	X	X	X	X	X	X	X						
Website														
Update	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

- Evan Zheng
  - Assisted in printing first prototype
  - Picked up helmets from UW Park St Clinic
- Hangjay Liu:
  - Advisor meeting
  - Client meeting
  - Complete required engineering training.
- Joseph Hegeman
  - Learned SolidWorks
  - Completed required lathe and mill training
- Kavin Yedlapalli
  - Design/Fabricate phone mount
  - Prepare for share and tell with other BME groups
- Katherine Fletcher
  - Learn solidworks
  - Begin engineering trainings
  - Start to lay out financial plans
  - Lead the printing process for the first mount prototype
- Reghan Ziegler
  - Continued learning Solidworks
  - Designed a mount for a phone on a helmet (this needs to be refined yet)

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Evan Zheng	10/22/2026	BME required training, Advisor meeting, fixing logistic issues with helmet acquisition. Assisted in fabricating first mount prototype	47	5	52

Hangjay Liu	10/22/2026	Advisor meeting, required BME training, client meeting	44	5	49
Joseph Hegeman	10/29/2026	Played around with SolidWorks, completed lathe and mill training, participated in BSAC meeting with faculty.	28	6	34
Kavin Yedlapalli	10/29/2026	Finished Cad designs for phone mount, printed phone mount, and added finishing details/assembled phone mount.	37	8	45
Katherine Fletcher	10/29/2026	Begin training in Solidworks. PLay around with onshape renderings. Complete one of the engineering trainings, and begin the other. Signed up for ECB training. Lead the fabrication of first prototype	29	5	34
Reghan Ziegler	10/29/2026	Continued training in Solidworks, kept on designing a new mount without CAD, started playing around with CAD.	32	4	36