

Progress Report #3

Title: Helmet for continuous laryngoscopy with exercise

Date: 09/17/2026

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 gathered together to discuss various mount/helmet designs and ranked all the criterias. Currently working on the design matrix. Waiting for client response to see the laryngoscope.

Difficulties / Advice / Requests

Current Designs :

Materials and expenses - N/A

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	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. Complete more research on fabrication methods
2. Present our preliminary designs and decisions to BME 200/300 peers
3. Obtain materials for prototyping
4. Begin prototyping

Next week's individual goals

- Evan Zheng
 - Obtain dimensions of the helmet and laryngoscope
 - Update Cad model according to the helmet
 - Begin rapid prototyping
- Hangjay Liu:
 - Fix CAD model, make it more useful for laryngoscope
 - 3 D print out our first iteration of prototype
 - See the laryngoscope and obtain dimension
- Joseph Hegeman
 - Attend and bring any team concerns to the BSAC faculty meeting on 9/24
 - Choose specific helmets to purchase, ensuring correct sizing and other requirements

- **Kavin Yedlapalli**
 - Start creating more realistic and accurate models for design through CAD
 - Find improvements for chosen design
 - Research further into suggested materials
- **Katherine Fletcher**
 - Begin rendering the chosen design on MATLAB
 - Start budgeting for the design process
- **Reghan Ziegler**
 - Complete sections of design matrix (writeup)
 - Prepare for presentation
 - Continue research and refine idea

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												
Prototyping														
Testings														
Deliverables														
Progress Reports	X	X	X											
Prelim presentation														
Final Poster														
Meetings														
Client		X												
Advisor	X	X												
Website														
Update	x	X												

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- **Evan Zheng**
 - Organize meetings for the team to discuss the design matrix
 - Decided on design matrix criteria and ratings
 - Designed an idea for laryngoscope mount on SolidWorks
- **Hangjay Liu**
 - CAD design for laryngoscope
 - Meet with team to rank criteria for helmet/mount
- **Joseph Hegeman**
 - Researched helmet options
 - Created pros and cons list for helmet options
 - Met with team to rank criteria for helmet/mount

- **Kavin Yedlapalli**
 - Research into some competing designs
 - Take inspiration from and generate new ideas on how to make the helmet system more secure, easier to use, and more comfortable
- **Katherine Fletcher**
 - Developing more mount designs
 - Began making structural decisions for the how the mount will attach to the wrestling helmet
- **Reghan Ziegler**
 - Came up with a rough sketch of a mount idea
 - Researched needed materials and how they react in certain situations
 - Helped rank the design matrix for both helmet and mount

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Evan Zheng	9/17/2026	Solidworks, team organization, design matrix, revised problem statement.	14	15	29
Hangjay Liu	9/14/2026	Solid work, team meeting, design matrix.	10	13.5	23.5
Joseph Hegeman	9/17/2026	Helmet research + pros/cons list, team meetings, design matrix	5	5	12
Kavin Yedlapalli	9/17/2026	Made own mounting design, attending team meetings, completed assigned sections of PDS	7	8	15
Katherine Fletcher	9/17/2026	Made mounting design, assisted in matrix scoring, completed assigned portions of the PDS	9	5	14
Reghan Ziegler	9/17/2026	Sketched design, evaluated limitations of said design, research into my assigned writing for the design matrix, went to team meeting	8	9	17