

EarVac: Negative Pressure Wound Therapy Device for Improved Microtia Reconstruction Surgery Recovery

Clients: Ms. Nada Botros

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Advisor: Dr. Russ Johnson

Team: Bryan Heaton (Leader)

Meghan Kaminski (Communicator)
Dhruv Nadkarni (BWIG)
Serena Evers (BSAC)
Harshad Gunasekar (BPAG)
Muhaison Ibrahim

Date: October 10, 2025 - October 16, 2025

Problem Statement

Newly reconstructed auricles after microtia surgery are fragile, prone to destructive fluid build up, and difficult to dress securely. Clinicians need a conformal negative-pressure wound therapy device that holds a foam dressing over the ear, maintains consistent negative pressure over complex 3D geometry, and safely collects drainage from existing drains to reduce complications and support consistent healing.

Brief Status Update

The team has made preliminary CAD designs for most aspects of the headphone design, and need to align on recent meetings at which not all team members were present. Following this, the team can begin preliminary fabrication and prototyping.

Summary of Weekly Team Member Design Accomplishments

- Team:
 - Created preliminary CAD designs for headphone design

- Aligned on recent meetings / developments
- Bryan Heaton
 - Led team alignment meeting
- Meghan Kaminski
 - Continued research
 - Planned client meeting for 10/24
 - Design revisions
- Serena Evers
 - Continued research
 - Team meeting
- Harshad Gunasekar
 - Researched possible material selections for teams selected designs
 - Researched competing designs highlighting aspects the team could include in our design
- Dhruv Nadkarni
 - Drafted a few test procedures
 - Discuss with team regarding current revisions and rep meeting.

Weekly/Ongoing Difficulties

The team has been very busy during midterms season, so finding times to meet has been challenging.

Upcoming Team and Individual Goals

- Team:
 - Continue research
 - Begin fabrication
- Bryan Heaton
 - Start prototyping with whatever materials we can easily access
 - Look into testing protocols
- Meghan Kaminski
 - Design revisions in SolidWorks
 - Continue research
 - Prepare prototype for show and tell
- Serena Evers
 - Fabrication protocol
 - Order materials
- Harshad Gunasekar
 - SolidWorks help
- Dhruv Nadkarni
 - Give team information regarding potential tests for show and tell
 - Design input for team

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Product Design Specification (PDS)	September 19, 2025	All	100%	X
Design Matrix	September 26, 2025	All	100%	X
Preliminary Presentations	October 3, 2025	All	100%	X
Preliminary Deliverables	October 8, 2025	All	100%	X
Show and Tell	October 31, 2025	All	0%	
Poster Presentations	December 5, 2025	All	0%	
Final Deliverables	December 10, 2025	All	0%	

Expenses

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
Component 1								
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Component 2								
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Component 3								
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL:								\$0.00