

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

Clients: Ms. Nada Botros

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Team: Bryan Heaton (Leader)

Meghan Kaminski (Communicator)

Dhruv Nadkarni (BWIG)

Serena Evers (BSAC)

Harshad Gunasekar (BPAG)

Muhaison Ibrahim

Date: November 13, 2025 - November 20, 2025

Problem Statement

Newly reconstructed auricles after microtia surgery are fragile, prone to destructive fluid buildup, 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 split into sub-teams to work on various parts of the device. We are aligning on individual findings to ensure the device has the best chance to function after prototyping, and the team is currently waiting for materials to come in to start on these prototypes.

Summary of Weekly Team Member Design Accomplishments

- Team:
 - Prototype
 - Begin testing
- Bryan Heaton
 - Began prototyping dressings, using cutting tools and human models (harshad) to figure out what works
 - Researched vacuums
- Meghan Kaminski
 - Reworked the Solidworks
 - 3D printed updated design
 - Facilitated orders of materials
- Serena Evers
 - Found vacuum and y connector parts
- Harshad Gunasekar
 - Bought adhesive spray and headphone padding part (on the way)
 - Kept track of purchased materials in budget spreadsheet
 - Fabricated a the headphone with integrated
- Dhruv Nadkarni
 - Developed additional test methods
 - Worked on SolidWorks Assembly

Weekly/Ongoing Difficulties

None for now.

Upcoming Team and Individual Goals

- Team:
 - Continue prototyping
 - Continue testing
 - Conduct statistical analysis
 - Begin poster
 - Begin final report
- Bryan Heaton
 - Continue prototyping dressing
 - Ensure alignment between dressing and headphone teams
- Meghan Kaminski
 - Pick up 3D print
 - Test 3D print connection site
 - Initiate meeting with clients
 - Work on the final report and final poster
- Serena Evers

- Work on final report and fabrication
- Harshad Gunasekar
 - Continue to gather materials needed for prototyping
 - Keep track of them in the budget spreadsheet
 - Help with the fabrication of the prototype
- Dhruv Nadkarni
 - Prepare for development of product

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	100%	X
Poster Presentations	December 5, 2025	All	0%	

Final Deliverables	December 10, 2025	All	0%	
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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