

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: October 20, 2025 - October 26, 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 begun brainstorming on various issues that may arise during fabrication, beginning preliminary printing of the headphone part in PLA to observe any obvious changes that must be addressed. The team has also drafted a plan for task delegation and expects more rapid progress in the coming weeks.

Summary of Weekly Team Member Design Accomplishments

- Team:

- Continue general research
 - Begin prototyping
- Bryan Heaton
 - Printed preliminary headphone part
 - Drafted plan for near future task delegation
- Meghan Kaminski
 - Looked into pressure problems
 - Confirmed meeting with clients on Friday
 - Continued general research
- Serena Evers
 - Worked on y connector pressure problem
- Harshad Gunasekar
 - Brushed up on SolidWorks to help with design before printing
 - Experimented with different design choices on SolidWorks to make the headband
 - Continued research on NPWT materials and design choices
- Dhruv Nadkarni
 - Continue drafting full test protocols.
 - Materials research for headphone holder

Weekly/Ongoing Difficulties

The team has had limited opportunities to meet in person together, so delegation of tasks and group discussion time has been limited. After tasks are delegated on Friday (10/24), this should be less of an issue.

Upcoming Team and Individual Goals

- Team:
 - Attend client meeting
 - Prepare for show and tell
 - Continue prototyping
- Bryan Heaton
 - Begin iterating headphone design
 - Consider adding soft part to headphone design for more optimal adherence to sticker
- Meghan Kaminski
 - Continue working on SolidWorks design
 - Prepare prototyping components for show and tell
 - Prepare for client meeting on 10/24
- Serena Evers
 - Y connector design
 - Figure out optimal dimensions for equal negative pressure distribution to the wound vac and drain tubes
- Harshad Gunasekar
 - Continue research on NPWT materials to implement better design ideas

- Delegate the SolidWorks components and work on needed revisions
 - Get ready for the show and tell
- Dhruv Nadkarni
 - Finish all test protocols
 - Assist team with any SolidWorks components as assigned.

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