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

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Team: Bryan Heaton (Leader)
Meghan Kaminski (Communicator)
Dhruv Nadkarni (BWIG)
Serena Evers (BSAC)
Harshad Gunasekar (BPAG)
Muhaison Ibrahim

Date: October 24, 2025 - October 30, 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 began iterating on our preliminary prototype to make improvements and implement planned ideas. The team is now delegated to various tasks (headphone / headband CAD and rapid prototyping, y-connector logistics and CAD if necessary, and miscellaneous needs with the sticker and headphone part) and should now be able to make quick progress on future prototypes

Summary of Weekly Team Member Design Accomplishments

- Team:

    - Continued prototyping
    - Created sub-teams for more efficient work
- Bryan Heaton
    - Researched adhesive options for the soft headphone part to the sticker
    - Delegated sub-team work
    - Created master to-do list for sticker / headphone logistics
- Meghan Kaminski
    - Redesigned headband with connection to the ear muff
    - 3D printed the ear muff and headband
    - Continued general research
- Serena Evers
    - Worked on the Y-connector
    - General research
- Harshad Gunasekar
    - Researched adhesive options for headphone to skin adhesion
    - Researched various vendors for design components, specifically for headphone part
    - Start budget spreadsheet to ensure we are on track with any purchase options
- Dhruv Nadkarni
    - Redesigned ear muff with connection to headband.
    - Continued development of test methods.

Weekly/Ongoing Difficulties

None for now.

Upcoming Team and Individual Goals

- Team:
    - Continue prototyping
    - Ensure compatibility between sub-team generated parts
- Bryan Heaton
    - Begin creating a system for organizing all the work we complete for future semesters
    - Finalize vendors for various necessary design components
    - Begin ordering components for sticker
- Meghan Kaminski
    - Readjust SolidWorks design
    - Print parts in final choice materials
    - Test connection between muff and headband
- Serena Evers
    - Continue work on the y-connector
    - Work with Meghan and Dhruv for CAD assembly
- Harshad Gunasekar
    - Finalize vendors and start ordering parts for the headphone
    - Keep the budget spreadsheet up to date to ensure we are staying within budget

- Dhruv Nadkarni
    - Decide on which test methods are most important to keep
    - Assist team with any necessary SolidWorks or documentation practices.

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**