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

Clients: Ms. Nada Botros
Division of Plastic Surgery
UW School of Medicine and Public Health
nbotros@wisc.edu
(414) 687-9117

Dr. Daniel Cho
Division of Plastic Surgery
UW School of Medicine and Public Health
chod@surgery.wisc.edu

Advisor: Dr. Russ Johnson

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

Date: January 23, 2026 - January 29, 2026

Problem Statement

Newly reconstructed ears after microtia reconstruction 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. Current temporary drains often lose suction and dressings fail to seal around the ear's contours which increases a burden on clinical staff. A device specifically shaped for postoperative ear anatomy would provide a more stable seal, more reliable pressure delivery, more reliable wound drainage, and greater protection during the critical early healing period.

Brief Status Update

The team had its first meeting since poster presentations on 1/26 to review the status of the project and our goals for this semester. There is a meeting with our client scheduled for 2/6.

Summary of Weekly Team Member Design Accomplishments

- Team:
    - Team meeting to discuss semester goals
    - Advisor meeting
    - Team meeting to work with materials ordered before break
- Bryan Heaton
    - Organized team meeting for alignment and future goal planning
    - Worked on dressing - vacuum interface
- Meghan Kaminski
    - Reach out to clients to set up a meeting
    - Work on the SolidWorks design
    - Review testing procedures
- Serena Evers
    - Team meeting
    - Work on y connector
- Harshad Gunasekar
    - Attended the Team meeting
    - Work on procurement for any additional materials needed
    - Research possible ways to connect dressing with tube to vacuum
- Dhruv Nadkarni
    - Attended team and client meeting
    - Began review of test methods for prelim presentation

Weekly/Ongoing Difficulties

None for now.

Upcoming Team and Individual Goals

- Team:
    - Get a working prototype for testing
- Bryan Heaton
    - Optimize dressing for vacuum interface / compatibility
- Meghan Kaminski
    - Work on solidworks design
    - Continue general research
- Serena Evers
    - Finalize outreach plan
    - Order materials for y Y-connector and fabricate something to test
- Harshad Gunasekar
    - Finalize dressing design and method of connection with vacuum
    - Test the vacuum and dressing seal outcome
- Dhruv Nadkarni

- Continue review of test methods
- Assist with SolidWorks

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	99%	

Final Deliverables	December 10, 2025	All	0%	