

# Democratizing Placement of Endoluminal Negative Pressure Devices for Gastrointestinal Leaks

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**Advisor:** Prof. John Puccinelli

**Team:** Simon Fetherston (Leader)  
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## Problem statement

Currently, large defects in the GI tract (often caused by surgical complications) are treated with surgery. For external wounds, the use of negative pressure wound therapy has become widely used. This therapy, colloquially called VAC therapy, leads to improved healing of superficial wounds. For the past few years, some surgeons have been placing similar VAC devices into the GI tract through the mouth or anus to treat defects in the GI tract. The success of this therapy has been outstanding, with some studies finding that 90% of wounds that would have otherwise required surgery can be closed without making any additional incisions at all. The process of VAC placement is currently labor intensive and requires some skill in manipulating an endoscope, which has limited its widespread use. Development of a streamlined way to deploy VAC therapy into the GI tract would allow more surgeons to use this therapy to heal anastomotic leaks.

## Brief status update

This week the team worked on developing product design specifications. Using information from the client meeting and background research, the team was able to develop an initial PDS document. This document will guide the development of design ideas. The team will now begin creating preliminary designs and evaluate them using a design matrix.

## Difficulties / advice requests

The team had difficulty creating the product design specifications and narrowing down the scale of the project to be achievable within the course of a semester. The client meeting on 02/04/2026 served as an excellent opportunity to answer questions and concerns regarding the EndoVAC therapy and specifications for the design. As a design matrix is created, the team will likely require advice on what techniques are feasible to perform within the operating room.

## Current design

There is no current design. The initial product design specifications have been created. These specifications will be utilized to create preliminary designs. The preliminary designs will then be evaluated in a design matrix to form a current design.

## Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
<b>Category 1</b>										
									\$0.00	
									\$0.00	
<b>Category 2</b>										
									\$0.00	
									\$0.00	
								<b>TOTAL:</b>	<b>\$0.00</b>	

## Major team goals for the next week

1. Evaluate preliminary designs using a design matrix
2. Begin to think about potential testing strategy and how that may affect the design given a semester time constraint
3. Continue gathering research on specific dimensions and materials that could be useful to the design

## Next week's individual goals

- Simon Fetherston
  - Research materials used in the development of endoscopic tubes/overtubes and sponges
  - Prepare individual preliminary design ideas to present to the team
  - Work on a design matrix
- Evelyn Mikkelson

- Research sponge alternatives and how they work in EndoVAC
- Brainstorm design/material ideas
- Meet with team to finalize design matrix
- Mariah Smeeding
  - Brainstorm design ideas and work on design matrix
  - Research other materials that may work instead of PU and compare.
- Yeanne Hwang
  - Research on sponge material and the limitation of current method
  - Specify problem statement
  - Brainstorm design ideas

## Timeline

Task	Jan	Feb				March					April				May	
	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
<b>Project R&amp;D</b>																
Empathize	X	X														
Background...	X	X														
Prototyping																
Testings																
<b>Deliverables</b>																
Progress Reports	X	X														
Prelim presentation																
Final Poster																
<b>Meetings</b>																
Client		X														
Advisor	X	X														
<b>Website</b>																
Update	x	X														

Filled boxes = projected timeline

X = task was worked on or completed

## Previous week's goals and accomplishments

- Individual:
  - Evelyn Mikkelson
    - Research EndoVAC mechanism of action
    - Learn more about challenges in EndoVAC
    - Brainstorm questions for client and meet with her
    - Work on PDS
  - Simon Fetherston
    - Continue researching EndoVAC therapy to understand societal and economic impacts as well as potential design specifications

- Meet with Dr. Shada to discuss the project and help develop design specifications
    - Research existing materials and standards that exist in connection with EndoVAC therapy
  - Mariah Smeeding
    - Complete PDS and send out a copy to advisor and client
    - Meet with our Client Dr. Shada for the first time to discuss project direction
    - Begin the researching process
  - Yeanne Hwang
    - Meet client to ask questions and get understanding about the project goal
    - Work on PDS
    - Research 4 entries
- Team :
  - Met with Dr. Shada to discuss project goals and answer questions regarding the design and development of the project
  - Continued background research to understand endoluminal vacuum therapy including the tools and procedure used.
  - Created product design specifications to be used to guide the design process

## *Activities*

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Evelyn M	02/03/2026	Research how EndoVAC works and current methods of performing the procedure	1.5	2.5	4.5
	02/04/2026	Work on PDS and related research	1		
Simon F	02/03/2026	Research standards applicable to the design and continued research on EndoVAC therapy	1	3	6
	02/04/2026	Meet with clients to determine product design specifications and form project goals	1		
	02/03-05/2026	Work on PDS	1		
Yeanne H	02/01	Meet client to ask questions and get understanding about the project goal	1	3.5	4.5
	02/03	Work on PDS	1		
	1/30	Research 4 entries	1.5		
Mariah S	02/02-03/26	Research different materials currently used in endoVAC therapy and how sponge is deployed	1.5	3.5	6
	02/04/26	Meet with client	1		
	02/04-05/26	Work on PDS	2		