

Arterial coupler re-design: Adjustable stent/cuff anastomosis

Client: Dr. Jasmine Craig and Dr. Weifeng Zeng

Advisor: Prof. Justin Williams

Team:

Simon Fetherston (Leader)
Catie King (communicator)
Megan Lee (BWIG)
Lydia Miller (BSAC)
Drew Hay (BPAG)

Date: September 18, 2026 - September 24, 2026

Problem statement

Microsurgical arterial anastomosis is a cornerstone of reconstructive surgery, enabling tissue transfer and limb salvage. Current techniques are highly time-consuming, technically demanding, and highly dependent on surgeon expertise. Suturing vessels as small as 1 mm can take even the most experienced surgeons 30-60 minutes, extending operating times and jeopardizing tissue viability. Existing stent-based approaches introduce complications by contracting the vessel lumen and lack adaptability across the wide range of vessel diameters encountered in clinical practice. There is a critical need for a biocompatible, adjustable, and easy-to-use device that can reliably reduce operative time while maintaining vessel integrity and minimizing complications.

Brief status update

The team has been working to create design ideas and develop a detailed design matrix. The team will use the design matrix to determine which design to begin the prototyping phase with.

Difficulties/advice requests

The team is currently working on narrowing down designs. The team could use support on which designs could be feasible. The team is looking for feedback on both the manufacturing capabilities of each design as well as if they could be functional for the anastomosis procedure.

Current design

The team is creating preliminary designs to evaluate in a design matrix.

Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
									\$0.00	
									\$0.00	
Category 2										
									\$0.00	
									\$0.00	
								TOTAL:	\$0.00	

Major team goals for the next week

1. Finalize design to begin prototyping
2. Prepare preliminary presentation
3. Develop detailed sketches and models of the design to present during the preliminary presentation

Next week's individual goals

- Simon Fetherston
 - Work on preliminary presentation
 - Research fabrication techniques of competing designs
 - Work on a large-scale preliminary model of the chosen design

- Catie King
 - Work on preliminary presentation
 - Research into materials for project
 - Research fabrication techniques
- Megan Lee
 - Work on preliminary presentation
 - Redesign idea based on client feedback
 - Begin researching materials
- Lydia Miller
 - Work on preliminary presentation
 - Revise design idea based on client feedback and design matrix feedback
 - Plan and begin initial fabrication
- Drew Hay
 - Work on preliminary presentation
 - Meet with clients to discuss current design ideas and get further feedback on goals of the device
 - Plan/begin prototype fabrication

Timeline

Task	Sep			Oct					Nov				Dec
	10	17	24	1	8	15	22	29	5	12	19	26	3
Project R&D													
Empathize	X	X	X										
Background...	X	X	X										
Prototyping													
Testings													
Deliverables													
Progress Reports	X	X	X										
Prelim presentation													
Final Poster													
Meetings													
Client		X											
Advisor	X	X	X										
Website													
Update	X	X	X										

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Individual:
 - Simon Fetherston

- Created 2 design ideas
 - Worked on design matrix
 - Researched current methods that could be incorporated into design
- Catie King
 - Research mechanism for design idea
 - Created design idea
 - Worked on design matrix
- Lydia Miller
 - Brainstormed design ideas
 - Worked on design matrix
- Megan Lee
 - Brainstormed design ideas with team
 - Worked on design matrix
 - Continued research
- Drew Hay
 - Researched design mechanisms
 - Met with team to discuss design ideas and generate realistic designs
 - Worked on design matrix
- Team :
 - Completed design matrix
 - Finalized preliminary designs

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Simon Fetherston	09/18-09/24	- Created 2 preliminary designs - Met with team to review preliminary designs and develop design matrix - Worked on criteria analysis for each design in the design matrix - Researched current anastomosis designs and how they could be incorporated in our design	1 1 1 1.5	4.5	9.5
Catie King	9/18-9/24	- Created preliminary design - Met with team to brainstorm design ideas - Met with team to review preliminary designs and develop design matrix - Work on criteria analysis for each design in design matrix	1 1.5 1 1	4.5	9.5
Megan Lee	9/18-9/24	- Met with team to discuss project and design ideas - Brainstormed design idea - Worked on design matrix - Continued research on arterial anastomosis	2.5 1 0.5 0.5	4.5	10

Lydia Miller	9/18-9/24	- Brainstormed 2 preliminary designs - Met with client and team (x2) to discuss project and design ideas - Wrote section of design matrix	1 2.5 1	4.5	9.5
Drew Hay	9/18-9/24	- Brainstormed preliminary design ideas - Met with clients and team to discuss best designs to move forward with - Wrote sections of the design matrix	1 2.5 1	4.5	10.5