

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 11, 2026 - September 17, 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 diligently to develop the Product Design Specifications document following client requirements and overall device performance. The team also had an initial meeting with the client to talk about background information and an introduction to the project.

Difficulties/advice requests

The team currently does not have difficulties with the project. The team is beginning preliminary designs to create a design matrix next week. These designs may require some advice on feasibility in production and feedback about their use in the operating room.

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. Brainstorm potential designs for arterial coupler utilizing initial research and client feedback
2. Develop design matrix based on requirements detailed in the PDS in addition to feedback from clients

Next week's individual goals

- Simon Fetherston
 - Research materials and existing arterial coupler designs
 - Create at least 2 design ideas to bring to a group meeting
 - Work on design matrix
- Catie King

- Research on existing and competing designs
- Research material options?
- Begin to brainstorm design ideas
- Megan Lee
 - Brainstorm 2 design ideas
 - Continue researching existing designs
- Lydia Miller
 - Come up with 1-2 design ideas to share with the team
 - Continue any necessary research on arterial anastomosis
- Drew Hay
 - Generate 1-2 design ideas to share with the team
 - Complete Design Matrix and decide on an initial design
 - Continue researching mechanisms and materials for final design

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											
Background...	X	X											
Prototyping													
Testings													
Deliverables													
Progress Reports	X	X											
Prelim presentation													
Final Poster													
Meetings													
Client		X											
Advisor	X	X											
Website													
Update	X	X											

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Individual:
 - Simon Fetherston
 - Met with client to get an introduction to the project
 - Worked on PDS
 - Researched standards applicable to the design as well as relevant specifications

- Catie King
 - Met with client and took meeting notes
 - Worked on PDS
 - Researched standards + safety, hypertension, and anastomosis
- Lydia Miller
 - Lit review for information on anastomosis and existing methods
 - Contributed to list of client questions
 - Worked on PDS
- Megan Lee
 - Worked on PDS sections
 - Met with client
 - Researched existing anastomosis devices
- Drew Hay
 - Worked on PDS
 - Researched current devices and overview of current methods
 - Researched mechanisms for adjustable cuffs
- Team :
 - Complete preliminary design specifications
 - Continue developing an understanding of cardiovascular disease
 - Research current anastomosis devices

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Simon Fetherston	09/11-09/17	- Worked on PDS - Researched standards that would be used for the project - Met with the client to learn more about the project	2 1 1	4	5
Catie King		- Met with client and gained better understanding of project - Worked on PDS - Researched for PDS and for more background on anastomosis	1 2 1	4	5
Megan Lee	9/11-9/17	- Met with client and asked relevant questions - Contributed to PDS - Researched existing devices as well as other relevant literature	1 2 1	4	5.5
Lydia Miller	9/11-9/17	- Met with client and asked questions about the previous design group and future motivations/goals - Contributed to PDS - Additional research	1 2 .5	3.5	5

Drew Hay		- Reviewed client meeting notes - Contributed to PDS - Continued research	.5 3 1	4.5	6
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