

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: October 3, 2026 - October 9, 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

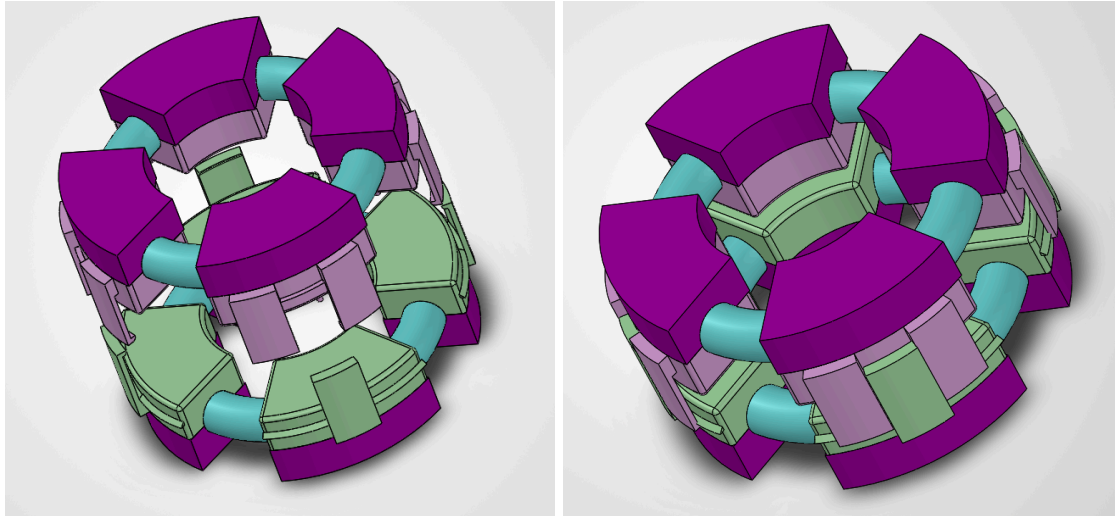
The team presented/completed the preliminary presentation and preliminary report describing the problem, design ideas, and proposed final design. The team also met in person with the clients to discuss the proposed final design and clarify key procedural steps and previous device limitations. Moving forward, the team will focus on ordering materials and fabrication of a scaled-up prototype.

Difficulties/advice requests

The team is currently developing a fabrication plan. Guidance on ordering materials and fabrication payment options would be helpful.

Current design

The team has chosen a preliminary design based on feedback and ideation from Dean. The SolidWorks snapshots below show an expanded and clamped view of the final design pieces



Materials and expenses

Item	Description	Manufacturer	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. Make fabrication plan
2. Order materials
3. Begin prototyping

Next week's individual goals

- Simon Fetherston
 - Refine Solidworks model of the device

- Begin 3D printing of prototype
- Conduct preliminary testing on the locking mechanism of design
- Catie King
 - Start 3D printing prototype
 - Work on altering prototype / adjustable mechanism
 - Research into attachment for pliers to compress coupler
- Megan Lee
 - Start to 3D print prototype
 - Start to order materials
 - Refine design as needed after printing
- Lydia Miller
 - 3D print prototype
 - Find/note areas for improvement based on prototype result
 - Look into additional materials for use
- Drew Hay
 - Order materials for initial prototype
 - Confirm payment method with clients
 - Fabricate scaled-up prototype variations

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

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Individual:
 - Simon Fetherston
 - Worked on preliminary report
 - Presented preliminary presentation
 - Met with client to discuss final design
 - Worked on accurate dimensions of Solidworks model
 - Completed feedback fruits
 - Catie King
 - Worked on preliminary report
 - Presented preliminary presentation
 - Met with clients to discuss prototype
 - Lydia Miller
 - Presented preliminary presentation
 - Preliminary report
 - Feedback fruits
 - Megan Lee
 - Presented part of preliminary presentation
 - Met with clients to discuss design
 - Researched futuring testing plans for preliminary report
 - Drew Hay
 - Presented preliminary designs during the preliminary presentation
 - Met with clients to discuss proposed final design
 - Wrote and completed sections of the preliminary report
 - Researched artery fixation methods
- Team :
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Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Simon Fetherston	10/3-10/9	- Worked on preliminary report - Presented preliminary presentation - Met with client to discuss final design - Worked on refining solidworks model - Completed group feedback	1.5 0.5 1.5 0.5 0.5	4.5	20
Catie King	10/3-10/9	- Worked on preliminary report - Presented preliminary presentation - Met with client to discuss prototype	2.5 0.5 1.5	4.5	18.5
Megan Lee	10/3-10/9	- Presented preliminary presentation - Met with clients - Wrote sections of preliminary report	0.5 1.5 3	5	19

Lydia Miller	10/3-10/9	- Presented prelim presentation - Wrote sections of prelim report - Feedback fruits	.5 3 .5	4	18
Drew Hay	10/3-10/9	- Presented preliminary designs during the preliminary presentation - Met with clients to discuss proposed final design - Wrote and completed sections of the preliminary report - Researched artery fixation methods	0.5 1.5 2.5 .5	5	19.5