

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 25, 2026 - October 2, 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

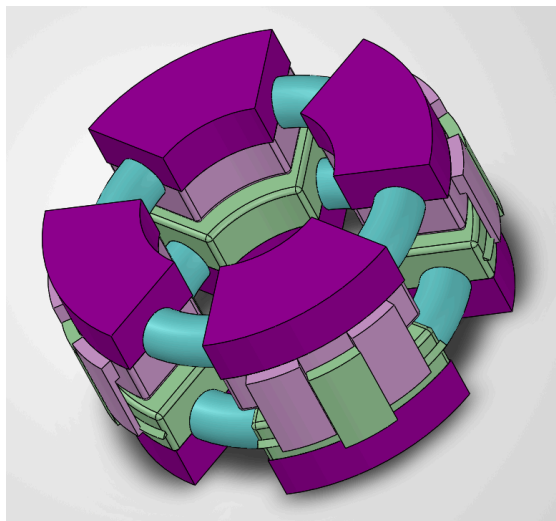
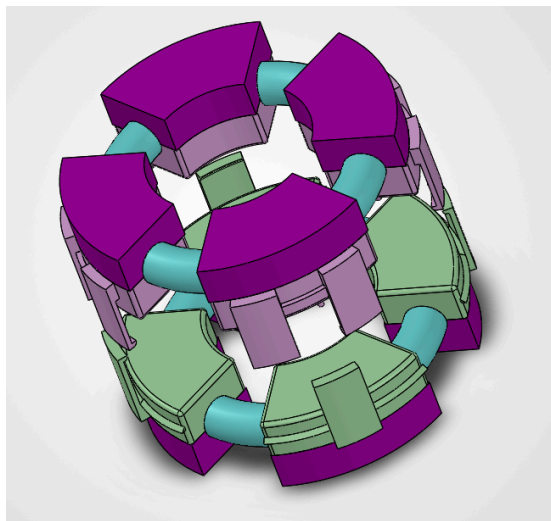
The team showed 3 ideas from the design matrix to the clients and discussed advantages and disadvantages of each design. A new idea was brought up during this meeting, which will be considered as a design possibility during the preliminary presentation. The team also finalized the preliminary presentation and will present on Friday (10/2).

Difficulties/advice requests

The team is currently working on finalizing the design and developing a fabrication plan. Guidance on where and how to fabricate certain aspects of the design may 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	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	

Website													
Update	X	X	X	X									

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Individual:
 - Simon Fetherston
 - Met with clients to discuss design ideas
 - Worked on the preliminary presentation
 - Created solidworks models of the bottom connection piece, top clamp piece for each device, and the elastic ring.
 - Catie King
 - Met with clients and discussed design ideas
 - Worked on preliminary presentation + practiced
 - Researched silicone as material option
 - Lydia Miller
 - Contributed to preliminary presentation
 - Researched materials for fabrication
 - Met with clients
 - Presented preliminary presentation
 - Megan Lee
 - Contributed to preliminary presentation
 - Present preliminary presentation
 - Researched testing ideas
 - Drew Hay
 - Met with clients to get feedback on design idea
 - Wrote and practiced presentation
 - Presented preliminary presentation
- Team :
 - Preliminary presentation
 - Finalize design choice

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Simon Fetherston	09/25-10/2	- Met with clients to discuss - Worked on preliminary presentation - Created solidworks models and assemblies of the final design	1 1 4	6	15.5
Catie King	9/25-10/2	- Worked on preliminary presentation - Researched silicone as material	1 0.5	4.5	14

		- choice - Met with clients - Met with TECH med student (Ella) - Met with team and practiced preliminary presentation	1 1 1		
Megan Lee	9/25-10/2	- Worked on preliminary presentation - Researched testing plan ideas - Practiced presentation	1 1 2	5	14
Lydia Miller	9/25-10/2	- Contributed to preliminary presentation - Researched materials for fabrication - Met with clients - Presented preliminary presentation - Met with med student (Ella)	1 1 1 .5 1	4.5	14
Drew Hay	9/25-10/2	- Met with clients for design feedback - Wrote and practiced presentation - Presented preliminary presentation	1 2 1	4	14.5