Arterial Coupler Re-Design: Adjustable Stent/Cuff Anastomosis
Progress Report 9: 3/26/2026

Client: Dr. Jasmine Craig
Advisor: Prof. Darilis Suarez-Gonzalez
Team:

- Leader: Jackie Behring
- Communicator: Arshiya (Ria) Chugh
- BWIG: Sofia Decicco
- BPAG: Allison (Ally) Rausch
- BSAC: Daniel Pies

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 are 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 Team Status Update: This week, the team progressed both design and testing efforts by researching fabrication methods and vendors for triple helical springs, ordering key components, and confirming design variations with our advisor. We reviewed prior testing results, identified improvements, and began planning more quantitative methods for final deliverables. Additionally, we developed a new adjustable cuff concept based on client feedback and supported procurement with detailed specifications and purchasing links.

Summary of Weekly Individual Design Accomplishments:

- Allison (Ally) Rausch:
    - Researched triple helical spring at-home fabrication methods & potential vendors
    - Ordered 4 Nitinol Springs of varying Mandrel Sizes
        - Confirmed variations with advisor
    - Ordered 1 Metal Shim Kit (Varying thickness of sheets)
    - Research stainless steel thickness-bending relationship
- Jackie Behring:
    - Provided detailed part specifications and direct purchase links to procurement for ordering.
    - Reviewed testing errors and implemented improvements for the next testing iteration
    - Designed an additional adjustable cuff concept following client consultation
    - Research additional vendors providing double or triple helical springs
- Sofia Decicco:
    - Tested spring with clients and team
    - Revised updated test plan with team for future testing
    - Organize deliverables and upcoming tasks for executive summary
- Arshiya (Ria) Chugh:
    - Met with advisor to discuss and analyze testing results from the previous week

    - Evaluated findings to identify areas for improvement in future testing sessions
    - Started brainstorming approaches to quantify data for final deliverables
- Daniel Pies:
    - Met with advisor to discuss difficulties from preliminary testing
    - Research and order new material for alternative method of design as suggested by client

Weekly/Ongoing Difficulties: No notable difficulties.

Upcoming Team Goals: Over the next week, the team will focus on preparing for further testing by coordinating with the client, continuing research on stent models and testing methods, and working through reimbursement logistics. We will update and organize LabArchives, begin developing a structured testing protocol, order additional springs, and conduct a second round of testing on the spring and adjustable cuff designs.

Upcoming Individual Goals:
- Allison (Ally) Rausch:
    - Work through reimbursement protocol with client
    - Continue research on procuring microsurgical stent models
    - Continue to research potential tests
- Jackie Behring:
    - Update lab archives with testing documents and results
    - Meet with client again for second round of testing with spring and adjustable cuff
    - Order double/triple helical spring
- Sofia Decicco:
    - Document updated texting plans with the final spring order and measurable outputs
    - Analyze preliminary spring testing and document time for each action based on the recorded video
    - Perform any necessary supplemental research for executive summary
- Arshiya (Ria) Chugh:
    - Communicate with client to coordinate and finalize testing sessions following the team's return from spring break
    - Update LabArchives and organize all testing documentation
    - Begin brainstorming ideas for developing a structured testing protocol
- Daniel Pies:
    - Contribute to executive summary
    - Update and implement testing protocol with double helix spring and alternative cuff idea
    -

Project Timeline

Project Goal	**Deadline**	**Team Assigned**	**State of Completion**

Arterial Coupler Re-Design: Adjustable Stent/Cuff Anastomosis
Progress Report 9: 3/26/2026

Initial Research	1/30	All	The team will continuously research throughout the semester.
Preliminary Presentation	2/6	All	Complete
Preliminary Report	2/25	All	Complete
Fabrication and Testing	3/27	All	In Progress

Expenses

Item	**Description**	**Manufacturer**	**Part Number**	**Date**	**QTY**	**Cost Each**	**Total**	**Link**
Component 1								
Micro-Spring	5 mm length, 0.5 mm diameter micro-spring	Kellogg's Research Lab	N/A	02/25/26	1	12.99	12.99	micro-spring
Microsprings	Varying Mandrel sizes (mm): 0.5, 0.9, 1.15, 1.6	Kellogg's Research Lab	N/A	03/23/26	4	8.00	36.99	VaryingMandrelSprings
Metal Shim Kit	Metal shim kit with sheets of stainless steel of varying thicknesses	Home Depot	Internet # 335115252 Model # 2-HDPH005OT053	03/24/26	1	50.30	50.30	Metal Shim Kit
TOTAL:								**$100.28**

Arterial Coupler Re-Design: Adjustable Stent/Cuff Anastomosis

Progress Report 9: 3/26/2026