**Arterial Coupler Re-Design: Adjustable Stent/Cuff Anastomosis**
Progress Report 7: 10/23/2025

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

- Leader: Allison (Ally) Rausch
- Communicator: Jacqueline (Jackie) Behring
- BWIG: Sofia Decicco
- BPAG: Arshiya (Ria) Chugh
- 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:** The team met with the client to discuss the updated project direction. This involves focusing on the different stent geometries and how this will impact the overall mechanics of our stent.

**Summary of Weekly Individual Design Accomplishments:**

- Allison (Ally) Rausch:
    - Met with client to align on future plans
    - Begin drafting testing and fabrication protocols
- Jacqueline (Jackie) Behring:
    - Researched different metal 3D printing websites to acquire quote for stent design
    - Met with client to update on project status
        - Talked about project outsourcing and if anyone in hospital had access to stents
- Sofia Decicco:
    - Focused in on the geometry of overall stent design
    - Used existing data to understand teams desired strut width measurement
- Arshiya (Ria) Chugh:
    - Researched metal 3D printing techniques and their feasibility.
    - Researched methods for 3D printing stents and loader tubes, and began reaching out to vendors for quotes and potential fabrication options.
- Daniel Pies:
    - Researched potential materials for mock ups of stents and loading tubes
    - Contribute to team meeting and ideation of preliminary prototyping

**Weekly/Ongoing Difficulties:** No notable difficulties.

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**Upcoming Team Goals:** Team will 3D print more prototype models through the Makerspace. The team will plan to investigate different materials that can mimic the deformability of nitinol without using a material so high in cost for preliminary testing.

**Upcoming Individual Goals**:

- Allison (Ally) Rausch:
  - Finalize fabrication protocols
  - Complete fabrication of prototype for show and tell
  - Continue to work on testing protocols
- Jacqueline (Jackie) Behring:
  - 3D print another stent using flexible resin
  - Continue researching and reaching out to different outsourcing companies
- Sofia Decicco:
  - Start prototyping stent geometries team is currently considering
  - Look into makerspace materials that will allow us to print an example deformable stent for show and tell
- Arshiya (Ria) Chugh:
  - Continue researching optimal stent geometries and collaborate with the team to finalize the design.
  - Prepare for next week's Show and Tell by assisting in printing preliminary stent and loader tube prototypes to gather feedback from peers and advisors.
- Daniel Pies:
  - Gather props, materials, and examples for show and tell
  - Research stent geometries, materials, and sourcing

**Project Timeline**

| **Project Goal** | **Deadline** | **Team Assigned** | **State of Completion** |
|---|---|---|---|
| Initial Research | 9/8 | All | The team will continuously research throughout the semester. |
| Product Design Specification (PDS) Draft | 9/19 | All | Completed |
| Design Matrix Criteria and Design Ideas | 9/26 | All | Completed |

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| Preliminary Oral Presentation | 10/3 | All | Completed |
| Preliminary Report | 10/9 | All | Completed |
| Final Design Selection | 10/10 | All | Completed |
| Fabrication and Prototyping | 10/16 | All | In Progress |
| Final Poster Presentation | 12/5 | All | |

**Expenses**

| **Item** | **Description** | **Manufacturer** | **Part Number** | **Date** | **QTY** | **Cost Each** | **Total** | **Link** |
|---|---|---|---|---|---|---|---|---|
| **Component 1** | | | | | | | | |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **TOTAL:** | | | | | | | | **$0.00** |