The Knotorious Five

September 12th - September 18th

Client: Dr. Margene Anderson, Dr. Sara Colopy. Dr. Paul Merkatoris
Advisor: Professor Wally Block

Team Members:
Madison Michels (mmichels2@wisc.edu), Leader
Lucy Hockerman (lhockerman@wisc.edu), Communicator
Presley Hansen (pmhansen3@wisc.edu), BWIG
Sadie Rowe (skrowe2@wisc.edu), BPAG
Kate Hiller (khiller@wisc.edu), BSAC

Problem Statement:

In veterinary training, mastering the skill of applying appropriate suture tension is essential for successful wound closure and patient recovery, However, novice practitioners often struggle to judge the correct amount of force needed, leading to either insufficient tension or excessive tension, which can cause plastic deformation of the suture material or tissue damage. Currently, the evaluation of suture technique relies heavily upon subjective instructor feedback, lacking objective, real-time metrics to guide learners. This gap hinders consistent skill development and increases the risk of procedural errors. There is a critical need for a real-time suture tension measurement and feedback system to help students learn to apply optimal tension, prevent material or tissue compromise, and improve surgical outcomes through data-driven training.

Brief Status Update:

Initial research has been completed on the project. The product design specifications document has been completed and the team has started brainstorming design ideas to revise in future weeks.

Team Goals:

- The goal of this week was to perform the research needed to complete the PDS and gain a well-rounded understanding of the client's needs.

Individual Accomplishments:

- Lucy: This week, I researched information to complete my product design specification sections. This included information about economic impacts of our future device and an overview of surgical wound dehiscence. Additionally, I communicated with the client to schedule a personal suturing lesson in the upcoming weeks.

- Presley: This week, I researched some competing designs and used this to aid my brainstorming process for the preliminary sketches. I completed my section of the Product Design Specification (ergonomics, size, weight, materials, and aesthetics) using information from my research, and attended a meeting with the team.
- Maddie: This week I researched competing designs for a force measuring sensor used in surgical applications. I also completed my section of the product design specifications document and attended our first attempt at an advisor meeting.
- Sadie: This week, I researched competing designs and created a couple rough design sketches to communicate some initial ideas to the team. I also conducted research related to my section of the PDS, including information about the device accuracy, reliability, sensitivity, and operating conditions.
- Kate: This week I conducted research applicable to my section of the PDS. I had the standards & specifications and safety sections. I researched relevant standards our medical device should be compliant to and risk assessments that should be made to ensure our product is safe for the client.

Individual Struggles:

- Lucy: I am struggling with brainstorming different ideas that are small enough to avoid interference with suturing technique.
- Presley: I am struggling to come up with design ideas that will successfully measure the tension of the suture and also not interfere with the tying process.
- Maddie: I struggled with coming up with feasible design concepts within our client's budget. I am also trying to assess the best way to attach our device to the suture material.
- Sadie: I've been finding it challenging to move our design concepts beyond the initial sketch stage. Given our limited budget and the team's limited electronics experience, I'm trying to explore lightweight, low-tech ways to signal when adequate tension has been reached, without adding bulky sensors or complicated electronics.
- Kate: I am struggling with brainstorming ideas for a design when considering the client's budget.

Individual Goals:

- Lucy: Next week, I hope to meet with the team to finalize ideas and start building rough prototypes.
- Presley: Next weekend, I hope to work with the team to get some finalized design ideas and meet again with our client to practice tying suture knots. It would be beneficial to perform some initial strength testing on some of the suture materials we were given as well.
- Maddie: My goal during the next week is to finalize my design ideas and attempt to locate a force sensor that correlates to our project needs.

- Sadie: Next week, I plan to continue developing my design ideas by incorporating more specific technical details for detecting force. I also think it would be a good time to conduct MTS testing on various suture materials to determine the failure forces we'll be working with.
- Kate: I would like to come up with my design ideas and look into how small bluetooth devices work.

Design Accomplishments:
The team is organizing a meeting with the client to discuss project requirements.

Weekly/Ongoing Difficulties:
No difficulties have been identified at this early stage of the project.

Project Timeline:

Week	Description	Status
9/5 - 9/13 Week 1	Initial research	Complete
	Client Meeting 1	Complete
	Team Meeting 1	Scheduled for 9/12
	Advisor Meeting 1	Advisor did not attend
10/5 - 10/11 Week 5	Product Design Specifications	Due 9/16
	Team Meeting 2	Complete 9/18
10/12 - 10/18 Week 6		
10/19 - 10/25 Week 7		
10/26 - 11/1 Week 8		
11/2 - 11/8 Week 9		
11/9 - 11/15 Week 10		
11/16 - 11/22 Week 11		
11/23 - 11/29		

Week 12		
11/30 - 12/6 Week 13		
12/7 - 12/13 Week 14		
12/14 - 12/20 Week 15		
Winter Break		
1/20 - 1/24 Week 16		
1/25 - 1/31 Week 17		
2/1 - 2/7 Week 18		
2/8 - 2/14 Week 19		
2/15 - 2/21 Week 20		
2/22 - 2/29 Week 21		
3/1 - 3/7 Week 22		
3/8 - 3/14 Week 23		
3/15 - 3/21 Week 24		
3/22 - 3/28 Week 25		
Spring Break		
4/5 - 4/11 Week 27		
4/12 - 4/18 Week 28		

4/19 - 4/25 Week 29		
4/26 - 5/2 Week 30		
5/3 - 5/9 Week 31		

Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link