

EYE DROPPER ASSISTANT, BME 402

Date: 02/15/24

Client: Dr. Beth Martin (beth.martin@wisc.edu)

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Co-Team Leaders: Kasia Klotz (kmklotz@wisc.edu), Anabelle Olson (amolson27@wisc.edu)

Communicator: Eva Coughlin (emcoughlin@wisc.edu)

BPAG: Tommy Kriewaldt (tkriewaldt@wisc.edu)

BWIG: Jenna Krause (jlkrause4@wisc.edu)

BSAC: Tevis Linser (linser@wisc.edu)

Note: Team member Tommy is currently participating in a Co-Op and is devoting time to that position. Tommy will work on what he can this semester for the project but due to this conflicting commitment his contributions *may* be limited.

Problem Statement

Administration of eye drops is difficult for patients, especially older adults and those with limiting diseases like arthritis. This results in eye drop waste and tip contamination. The team will design a device to assist patients in squeezing the eye drop bottle, while releasing a consistent amount of solution per drop. This device will improve the administration of eye drops for the patient while minimizing eye drop waste.

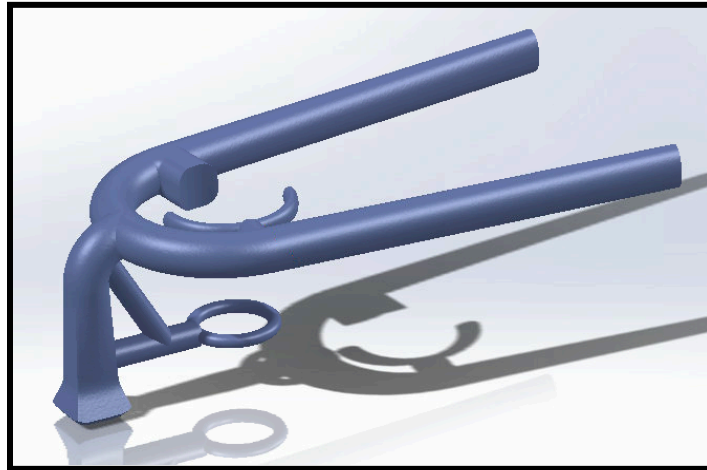
Brief Status Update:

The team attended the disclosure meeting with WARF and found out we will hear back about a decision on March 22nd. The team presented the preliminary presentation to our advisor. A few of the team members presented the outreach presentation in person at Sun Prairie on Thursday, and the kids were excited for the project. The team is now exploring options for different materials for the product in order to improve manufacturing processes.

Difficulties / Advice Requests :

The team is exploring options for manufacturing. Injection molding is one option, however it can be expensive and there are limited resources here at UW. The other option is to stick with 3D printing. Either way, the team plans on exploring a variety of materials to maximize the lifetime of the product.

Current Design:



Design Changes:

- Nose piece removed and platform implemented for user to rest on eyebrow bone.

Materials and Expenses:

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
Existing Devices								
Droppy Eye Drop Dispenser	Competing Design	Droppy, Amazon	DR001	9/25	1	9.99	9.99	Link
GentleDrop Eye Drop Guide	Competing Design	GentleDrop, Amazon	ASIN: B0BQBHRKV1	9/25	1	17.99	17.99	Link
Prototyping								
Silicone Eyelash Curler	Prototype Materials (Handle Grips)	PETUNIA SKINCARE, Amazon	ASIN: B00UVLNDVQ	10/25	1	7.49	7.49	Link
MakerSpace Print	Prototype v1	UW Makerspace Ultimaker 3D Print	N/A	10/31	1	4.96	4.96	N/A

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
MakerSpace Print	Prototype v2	UW Makerspace Ultimaker 3D Print	N/A	11/10	1	5.07	5.07	N/A
MakerSpace Print	Prototype v3	UW Makerspace Bambu Labs 3D Print	N/A	11/13	1	4.5	4.5	N/A
MakerSpace Print	Prototype v3	UW Makerspace Bambu Labs 3D Print	N/A	11/14	1	4.96	4.96	N/A
MakerSpace Print	Prototype v3	UW Makerspace Ultimaker 3D Print	N/A	11/15	1	8.16	8.16	N/A
MakerSpace Print	Prototype v4	UW Makerspace Ultimaker 3D Print	N/A	11/17	1	10.08	10.08	N/A
MakerSpace Print	Test Fixture	UW Makerspace Ultimaker 3D Print	N/A	11/29	1	13.78	13.76	N/A
MakerSpace Print	Final Prototype	UW Makerspace Ultimaker 3D Print	N/A	12/1	1	7.36	7.36	N/A
MakerSpace Print	Multiple Final Prototypes	UW Makerspace Ultimaker 3D Print	N/A	12/8	1	11.6	11.6	N/A
MakerSpace Print	Final Prototypes	UW Makerspace Ultimaker 3D Print	N/A	12/8	1	7.84	7.84	N/A

Upcoming Team and Individual Goals:

Team: The team is going to begin conducting research for the journal entry. The team continues to refine and make edits to the IRB as needed. The team plans on further exploring packaging options as well as altering the prototype to make it easier to injection mold.

Individual:

- ❖ Jenna:
 - Start working on preliminary report
 - Create a journal article template
 - Meet with chief engineer to discuss injection molding possibilities
- ❖ Eva:
 - Hear back from IRB and schedule date for initial human testing with Prof. Beth Martin
 - Meet with Prof. Beth Martin on Friday and make plan for involvement
 - Update LabArchives with research, IRB information, and further testing information
- ❖ Tevis:
 - Meet with Paula to solidify plans moving forward with injection molding.
 - Start redesigning and testing materials based on 3D printing vs injection molding
 - Do some research on materials and 3D printing capabilities
- ❖ Tommy:
 - Sketch more design ideas about joining separate components of the device
 - Create a solidworks model of the handle portion of the device
 - Begin sketching preliminary packaging design ideas
- ❖ Kasia:
 - Complete preliminary report
 - Meet with client on friday to discuss plan moving forward
 - Create protocol for fatigue testing
 - Continue working on IRB
- ❖ Anabelle:
 - Complete preliminary report
 - Meet with client to talk about plans
 - Brainstorm ideas for testing the cyclic loading on the device
 - Continue work on IRB

Timeline:

Task	Jan	Feb				March					April				May	
	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
Project R&D																
Research	✓	✓														
Prototyping	✓	✓														
Testing																
Deliverables																
Progress Reports	✓	✓	✓													
Prelim presentation			✓													
Final Poster																
Meetings																
Client		✓														
Advisor	✓	✓	✓													
Website																
Update	✓	✓	✓													

Project Goal	Deadline	Assigned	Progress	Completed
Preference Human Testing	2/29	All	In Progress	
Preliminary Oral Presentation	2/9	All	Completed	Yes
Preliminary Deliverables	2/28	All	Not Started	
Show and Tell	3/22	All	Not Started	
Executive Summary	4/19	All	Not Started	
Final Poster Presentation	4/26	All	Not Started	
Final Deliverables	5/1	All	Not Started	

Summary of Weekly Team Member Design Accomplishments

Team: The team effectively communicated project progress and upcoming timelines to our advisor. The team also met with WARF for the initial disclosure meeting. The team members met with WARF for the initial disclosure meeting.

Individual:

- ❖ Jenna:
 - Look into research journals to base our preliminary report on
 - Had a meeting discussing redesign of the prototype
 - Look into more injection molding options.
- ❖ Eva:
 - Worked on screening document to finish IRB edits
 - Met with the team to find an appropriate journal for our article submission
- ❖ Tevis:
 - Began researching journals to write to
 - Met with team members to plan redesign of prototype
- ❖ Tommy:
 - Met with the team to discuss alterations to our design
 - Sketched some early design ideas for modular design
 - Attended outreach meeting and discussed research
- ❖ Kasia:
 - Created a consent/information form for IRB
 - Began working on journal article
 - Researched existing journal articles for reference
- ❖ Anabelle:
 - Began researching journal articles we could submit to
 - Met with mentor team and created a research plan for our team