EYE DROPPER ASSISTANT, BME 402

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Client: Dr. Beth Martin (beth.martin@wisc.edu)
Advisor: Tracy Puccinelli (tracy.puccinelli@wisc.edu)
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.

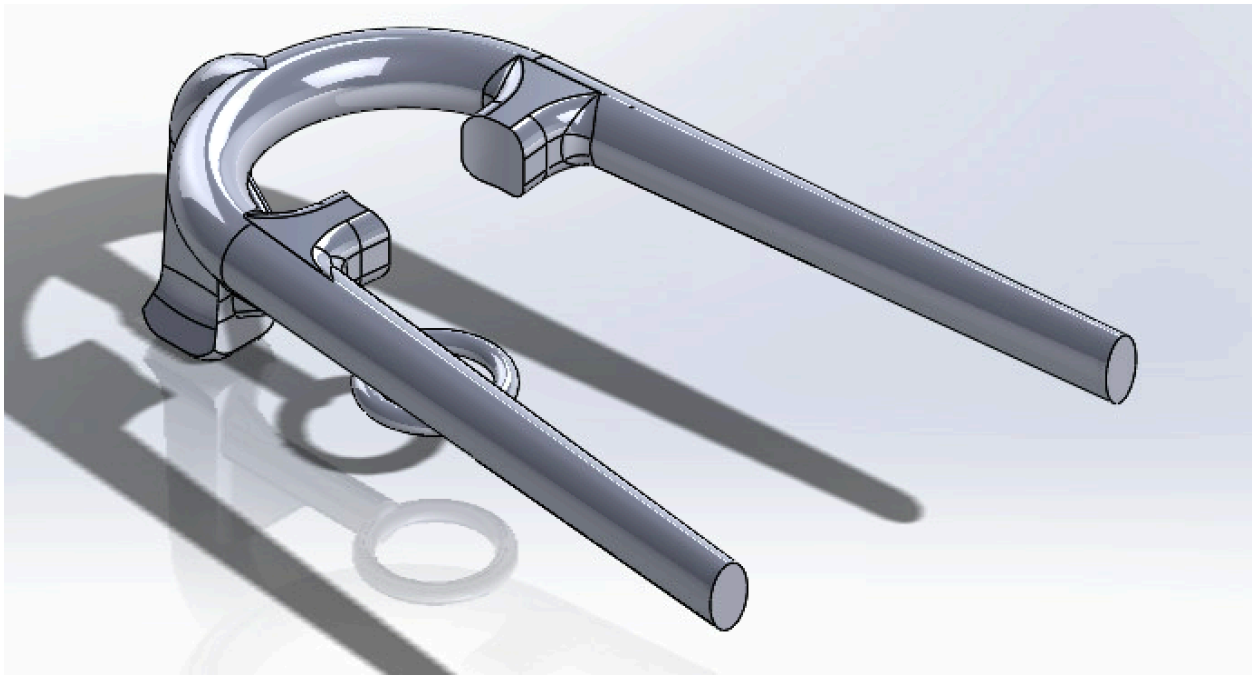
Brief Status Update:

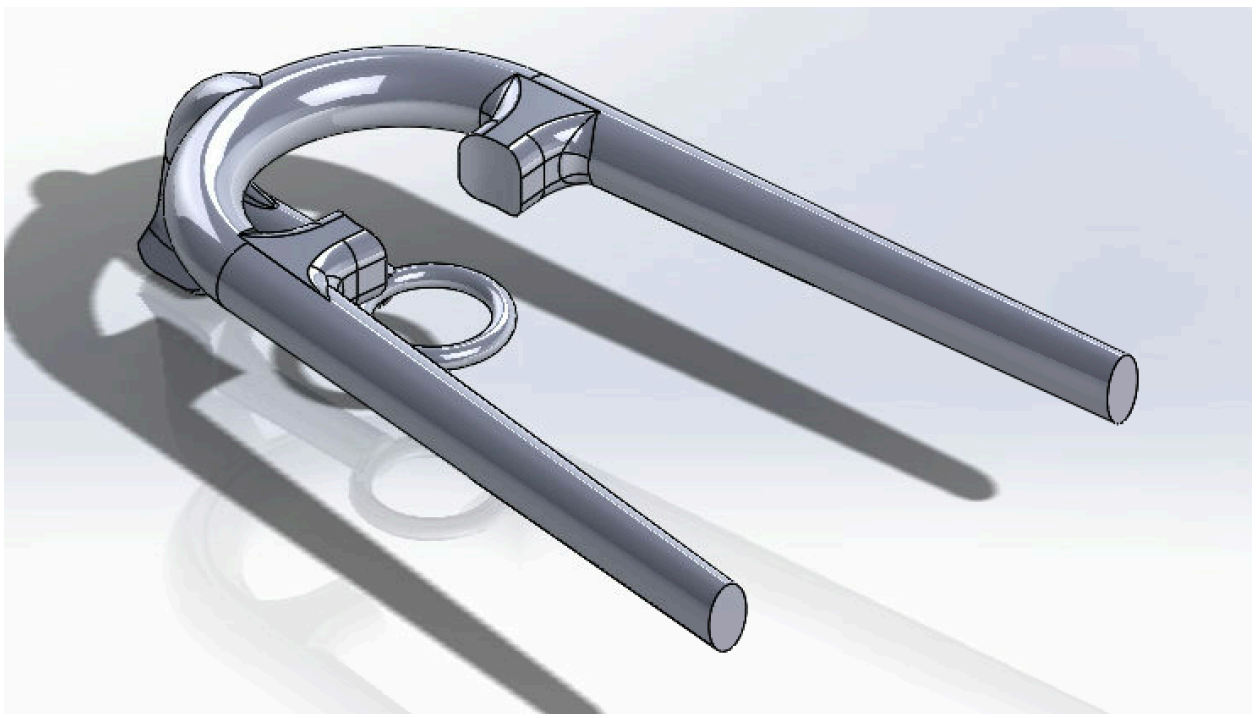
The team is working on their second IRB protocol with hopes of submitting by the end of this week or early next week. Some team members are further investigating injection molding and packing options. The team has continued networking. The final session for preference testing will happen tomorrow.

Difficulties & Advice Requests:

The team is trying to complete as much testing as possible to maintain credibility for the device. This involves a lot of work with the IRB, which is a new area for all team members. The team is doing their best to navigate this new space.

Current Design:





Design Changes:

- Nose piece removed and platform implemented for user to rest on eyebrow bone.
- Altered the squeezing mechanism to be more uniform for injection molding.
- Separated components to allow for less complex injection molding procedures.

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
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

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
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	Multiple Final Prototypes	UW Makerspace Ultimaker 3D Print	N/A	2/6	1	7.84	7.84	N/A
MakerSpace Print	Prototype Adjusted For IM	UW Makerspace Ultimaker 3D Print	N/A	2/23	1	2.15	2.15	N/A
MakerSpace Print	Parts for Connection Mechanism	UW Makerspace Ultimaker 3D Print	N/A	2/26	1	2.8	2.8	N/A
MakerSpace Print	Prototypes for Testing	UW Makerspace Ultimaker 3D Print	N/A	3/4	1	8.2	8.2	N/A
MakerSpace Print	Prototypes for Testing	UW Makerspace Ultimaker 3D Print	N/A	3/4	1	8.75	8.75	N/A

Upcoming Team and Individual Goals:

Team: The team will complete their final round of preference testing on Friday. The team is hoping to submit another IRB application in the near future, as well as conduct the single drop test with peers.

- Jenna:
  - Attend Tong Lecture in WID.
  - Finish complete packaging quote with packaging items in stock.
  - Work on creating mold cavity in solidworks and printing mold at the makerspace
- Eva:
  - Complete preference testing on Friday and begin analyzing results
  - Start writing protocol for eye drop administration testing at retirement community
  - Prepare for meeting with Mark Baum from Harrow (send email with summary and a few key slides)
  - Complete some research on Harrow Health
- Tevis:
  - Attend tong lecture
  - Reach out to companies to discuss more formal possibilities for manufacturing
  - Continue researching ways to make mold cavity to have for presentation
- Tommy:
  - Measure the small eye drop bottles with further precision
  - Model new design in solidworks
  - Obtain materials for outreach program
  - Finish solidworks model for outreach program
- Kasia:
  - Meet with Mark from Harrow Opthalmics
  - Complete IRB protocol for next round of testing
  - Continue networking
- Anabelle:
  - Complete the preference testing with the team on friday and after begin to analyze results
  - Continue working on IRB for eye drop administration testing

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	Completed	Yes
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 conducted their first round of human preference testing last week. Based off of this initial testing, a change was made to the initial script in hopes of gaining more clarity of preference. The team also further investigated packaging and injection molding options.

Individual:

- Jenna:
  - Met with Dr. Turng about injection molding opportunities at WID
  - Requested a packaging quote from a packaging supplier
  - Added another market size slide to ShaRx tank presentation
- Eva:

- ➢ Met with IRB consultant, Stephanie Metzgar, to talk about new IRB for administering eye drops into participant's eyes and ask questions about other tests
- ➢ Submitted change request for survey for the preference testing → was approved a couple days later
  - ■ Printed off updated forms for our next testing session Friday
- ➢ Called retirement community to schedule additional preference testing session on Friday
- ➢ Met with George from ShaRx Tank last Friday to prep for Harrow meeting

❖ Tevis:

- ➢ Met with Tom Turng to discuss injection molding capabilities on campus and next steps for manufacturing
- ➢ Attended testing session at Oakwood community
- ➢ Acquired a quote for final product with Xometry injection molding

❖ Tommy:

- ➢ Attended initial preference testing session
- ➢ Altered slides for ShaRx Tank presentation
- ➢ Took precise measurements of the large eye drop bottles

❖ Kasia:

- ➢ Met with George who was Eva's contact from the ShaRx Tank board meeting to prep for future meeting with Mark Baum, CEO of Harrow Ophthalmics
- ➢ Met with IRB consultant, Stephanie Metzgar, to verify IRB status and expectations
- ➢ Made change to preference test survey and submitted to IRB

❖ Anabelle:

- ➢ Met with Stephanie Metzger, to talk about making adjustments to preference testing IRB protocol and learn information about future single drop IRB protocol.