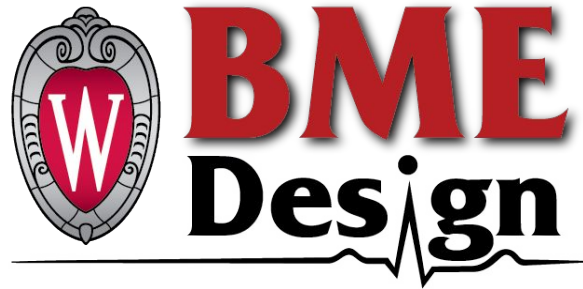




DEPARTMENT OF

Biomedical Engineering

UNIVERSITY OF WISCONSIN-MADISON



Team Lookin' Good

BME 200/300 Section 301-8

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Client: Dr. Aparna Ramasubramanian

Advisor: Dr. Jonathan Soucy

October 2nd, 2026



Problem Statement

To design and fabricate a biocompatible, low-cost, natural-appearing iris conformer for immediate placement after surgical removal of the eye.



Background:

- Retinoblastoma is the most common primary intraocular malignancy of childhood, requiring enucleation for many patients [1]
- Following enucleation surgery, an orbital implant is placed
 - Temporary clear plastic conformer shell is inserted for 6-8 weeks
- Appearance-related outcomes measurably influence long-term quality of life

Competing Designs:



Figure 1: Natural Iris Conformers from Stryker Corporation [2]

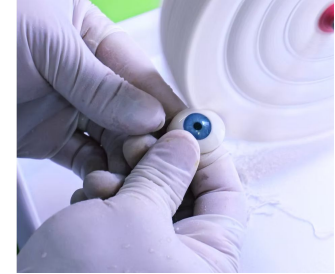


Figure 2: Natural Iris Conformer from Insight Oculars [3]

Current Methods:



Figure 3: Clear Conformer from Gulden Ophthalmics [4]



Product Design Specifications of Iris Conformer

Client Requirements:

- Immediate placement after enucleation
- 3 different sizes to accommodate youth age-range: 22mm - 25mm
- Biologically safe for patient
 - pH 6.8-8.2 [5]
- Small slits for ointment application
- Match that of contralateral eye
- Last 6-8 weeks
- 1 gram [6]
- Comfortable to wear in eye socket
- Affordable - targeted for low-income countries
- ISO 10993-1 and ISO 10993-5 [5],[7]



Design 3 Chosen from Matrix

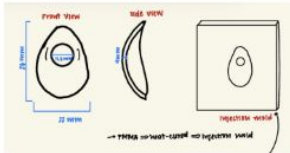
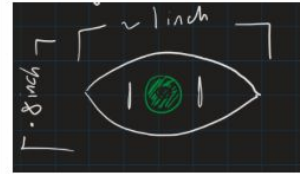
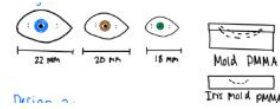
		Design 1: Medical-grade silicone using injectable mold, Iris painted		Design 2: 3D printed PMMA, Iris based on patient/software		Design 3: Molded using PMMA, Iris molded first then filled over	
							
Design Criteria		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Safety	35	5/5	35	4/5	28	5/5	35
Ergonomics	25	4/5	20	3/5	15	4/5	20
Realism	20	5/5	20	4/5	16	4/5	16
Ease of Manufacturing	15	2/5	6	3/5	9	3/5	9
Cost	5	2/5	2	3/5	3	4/5	4
Total	100	83		71		84	

Figure 4: Design Matrix



Final Design - Design 3 Details

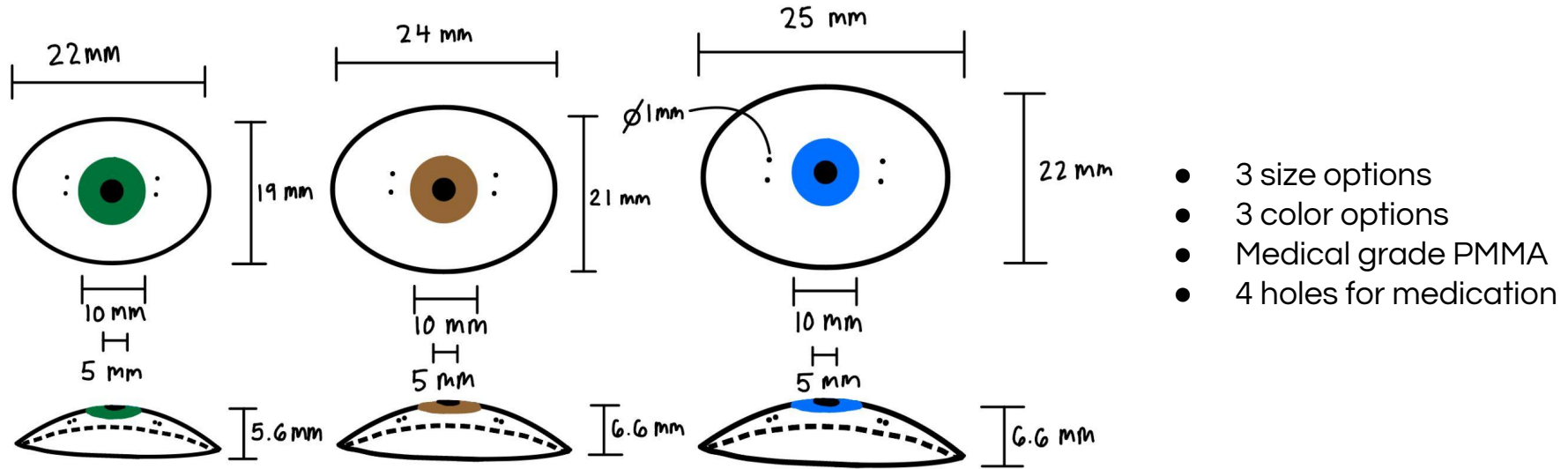


Figure 5: Iris Conformers



Final Design - Design 3 Fabrication Process

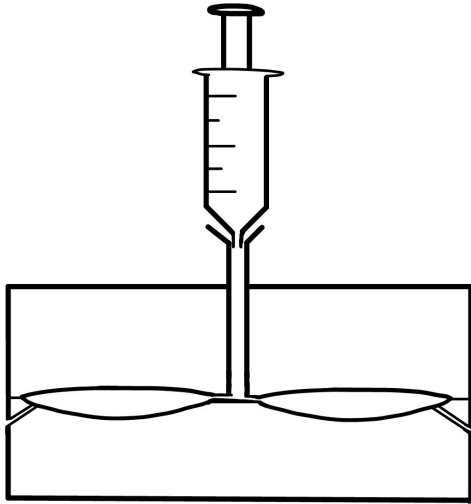


Figure 6: Mold for Sclera

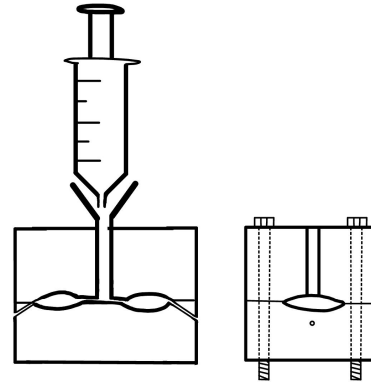
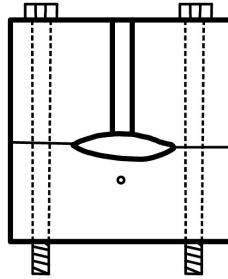


Figure 7: Mold for Iris

- High temperature silicone for mold (Smooth-On Mold Max 60)
- Iris/pupil mold (black and color PMMA)
- Sclera Mold (white PMMA)
- Iris and Sclera bonded with more silicone
- Gamma radiation sterilization



Future Testing of Fabricated Prototype

- Biocompatibility testing
- Preliminary testing on pig cadavers
- Long term goal: clinical trial for children with enucleation surgery

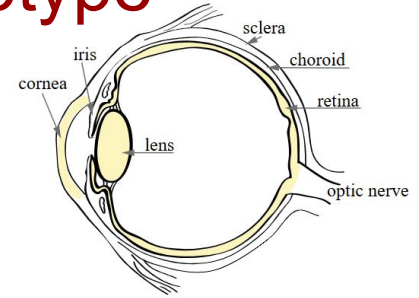


Figure 8 : Porcine Eye Diagram [8]

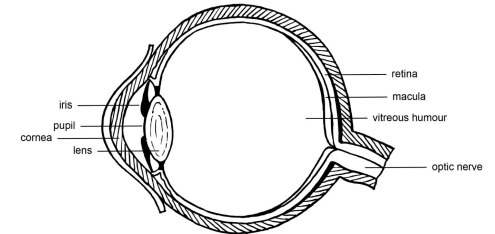


Figure 9 : Human Eye Diagram [9]

Speaker: Zoey



Future Work: Materials, Fabrication, and Testing

October

- Finalizing/Ordering Materials
- Communicating with Molding Services

November

- Materials Testing
- Prototyping
- Different Sizes
- Pig Cadaver Testing

December

- Design Final Prototypes for Each Size
- Final Report and Presentation



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- Dr. John Puccinelli



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Thank You!
Questions?

