



AAO KTEF Virtual Reality Center ROP Module Pediatric Ophthalmology Education Through Simulators

Faruk H. Öрге, MD, MBA

Dr. Boomer and Jill Burnstine Endowed Chair and Director

Akron Children's Hospital Vision Center

Professor of Surgery

Northeast Ohio Medical University

Professor of Biomedical Engineering

Case Western Reserve University School of Medicine

Vice President

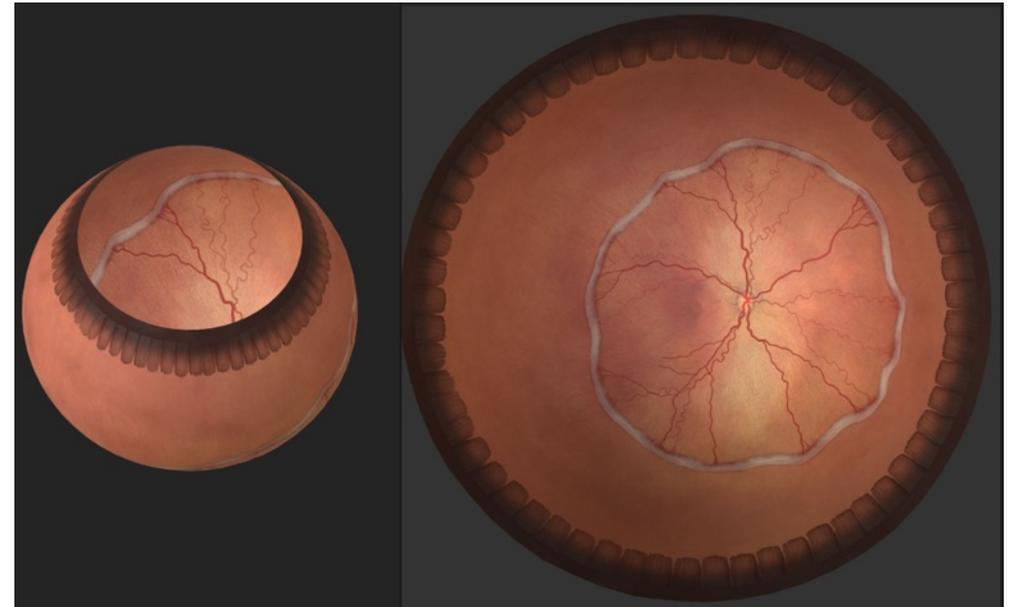
American Association for Pediatric Ophthalmology and Strabismus

Advisory Board Chair

International Pediatric Ophthalmology and Strabismus Council

Editor in Chief

KTEF POEC – AAO ONE Network



None for this talk

Relevant
Financial
Disclosure

I do have a vested interest in IPOSC's Mission:
"To work together to preserve and restore eye health and enhance visual function in children, and ocular alignment and binocularity in children and adults throughout the world."

“AAO KTEF Pediatric Ophthalmology Education Center”

About the Editors



Faruk H. Öрге, MD, MBA (Editor in Chief)
Director, Vision Center Akron Children’s Hospital
Advisory Board Chair, IPOSC
Vice President, AAPOS
AAO KTEF Editor in Chief



K. David Epley, MD (Deputy Chief Editor)
Past President, Children’s Eye Foundation and Washington Eye Foundation
Board of Directors, Washington Academy of Eye Physicians and Surgeons
Director, American Board of Ophthalmology



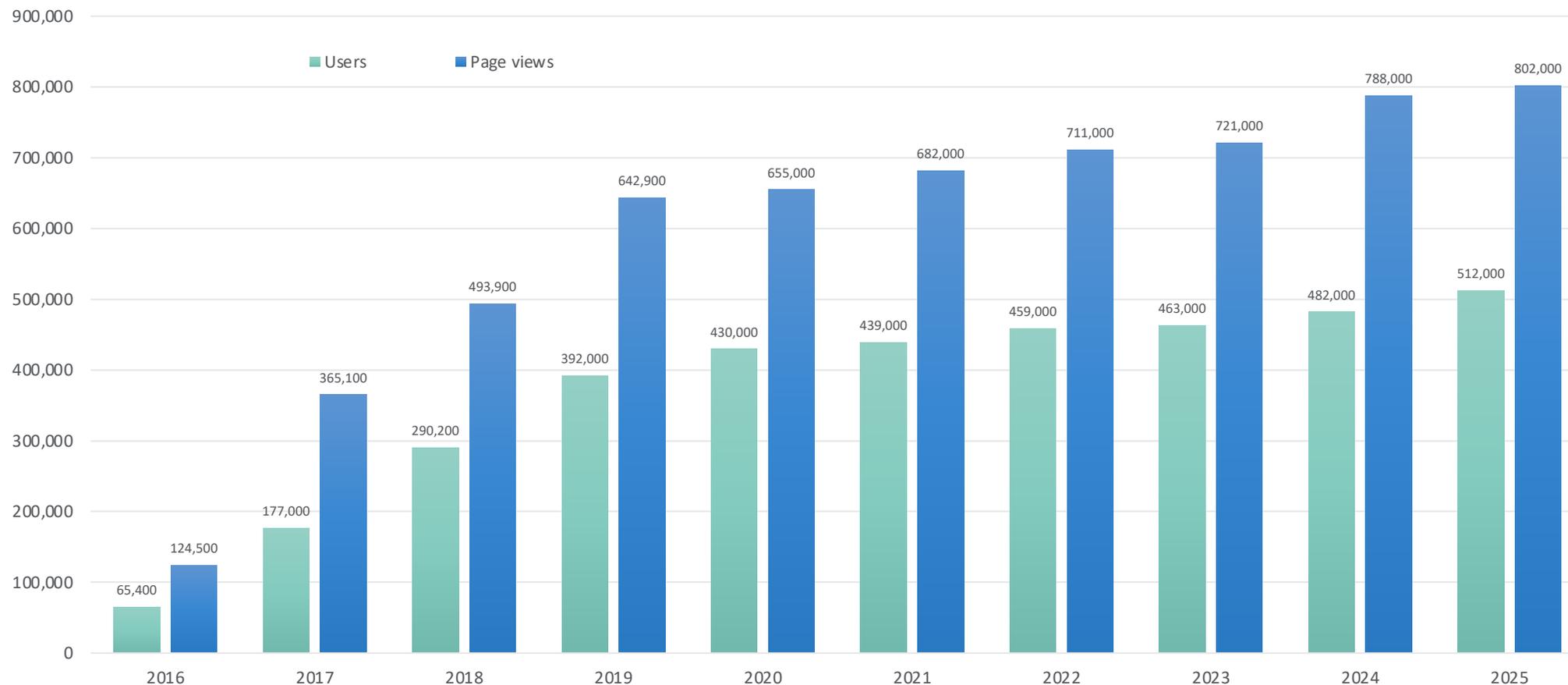
10-Year Success



- Unique interactive content and incorporation of all pediatric content on the ONE Network have produced regular annual traffic growth through 2025
- In November 2025, the center is expected to eclipse 6 million lifetime page views

10-YEAR TRAFFIC OVERVIEW	TOP 10 COUNTRIES
TOTAL VIEWS (PROJECTED): 6 MILLION	United States - 34%
TOTAL VISITORS: 3.7 MILLION	India - 11%
WORLDWIDE COVERAGE: 215 COUNTRIES	Canada - 5%
	Brazil - 5%
	United Kingdom - 4%
	Mexico - 3%
	Turkey - 3%
	Egypt - 2%
	Italy - 1%
	Spain - 1%

Page Views and Visitors



Pediatric Ophthalmology Education Center

- Pediatric Ophthalmology Education Center on the Ophthalmic News and Education (ONE[®]) Network
- Developed by more than 200 volunteer pediatric ophthalmologists, clinicians, and researchers
- Launched in November 2015
- Two innovative interactive features:
 - A case-based trainer for Retinopathy of Prematurity (ROP)
 - Strabismus Simulator

The screenshot shows the website for the Pediatric Ophthalmology Education Center, part of the American Academy of Ophthalmology's ONE Network. The top navigation bar includes links for Annual Meeting, Clinical Education, Practice Management, Member Services, Advocacy, Foundation, About, Subspecialties & More, and Eye Health. The main header features the AAO logo, the text 'AMERICAN ACADEMY OF OPHTHALMOLOGY Protecting Sight. Empowering Lives.', and 'Pediatric Ophthalmology ONE® Network'. A search bar and 'Find an Ophthalmologist' button are also present. The main content area is titled 'Knights Templar Eye Foundation Pediatric Ophthalmology Education Center'. Below this, there is a breadcrumb trail 'ONE Network / Pediatric Ophthalmology Education Center'. A featured case study titled 'What's Your Dx?' includes a photo of a child's face and text asking for the most likely reason for a discrepancy in binocular and monocular vision in a child with a history of infantile esotropia. A right-hand sidebar shows a user profile for 'Mummert, Daniel' with various account management options. At the bottom, there is a 'FILTER BY PEDIATRIC OPHTHALMOLOGY SUBTOPIC' section with a grid of categories including Amblyopia, Childhood Malignancies, Congenital Cataract, Congenital Glaucoma, Diagnostic & Screening, External/Anterior Segment, Genetic Eye Diseases, Neuro-Ophthalmology, Oculoplastics, Strabismus, Trauma, and Uveitis. A 'FUNDED WITH SUPPORT BY' section at the bottom right features the logo of the Knights Templar Eye Foundation.



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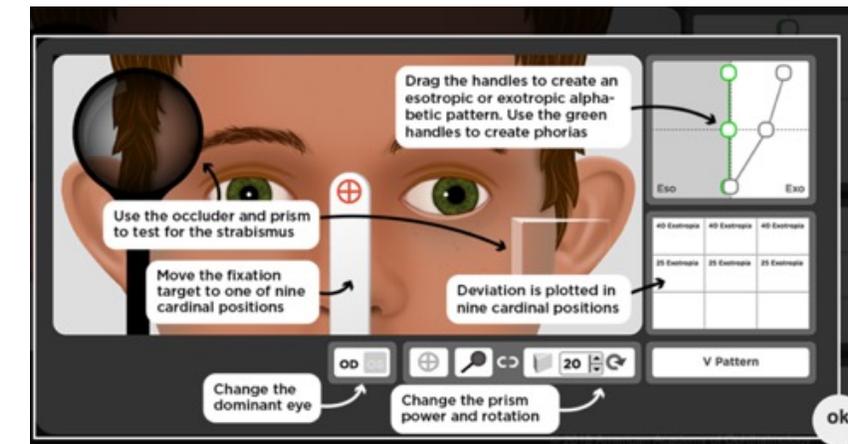
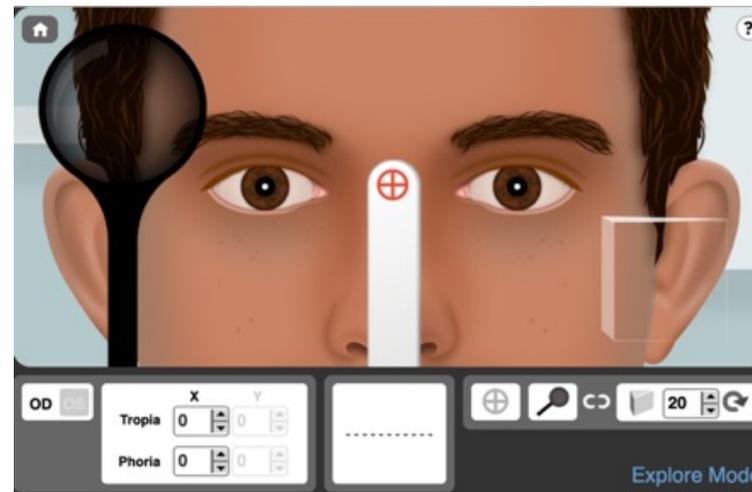
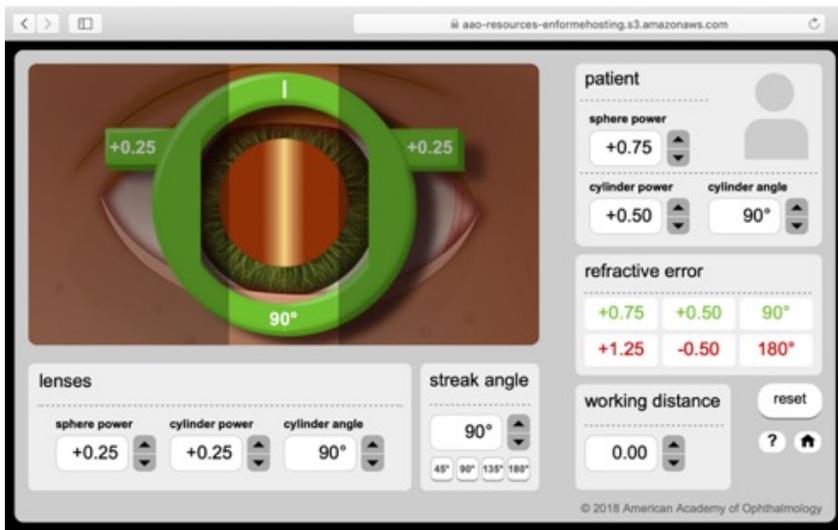
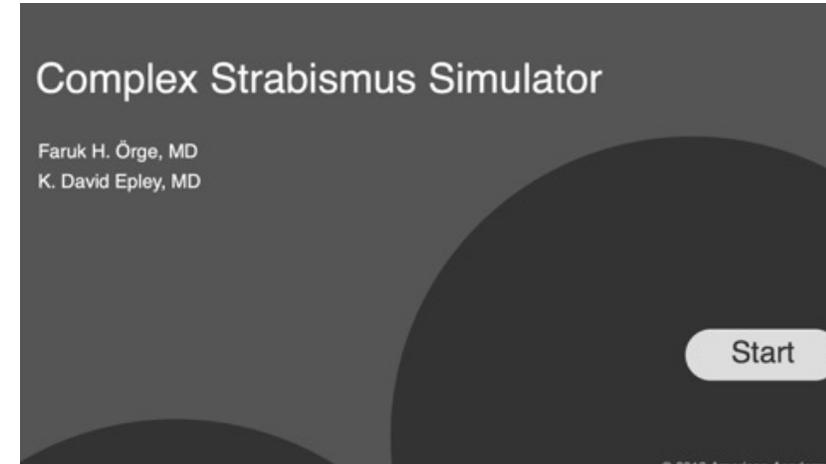
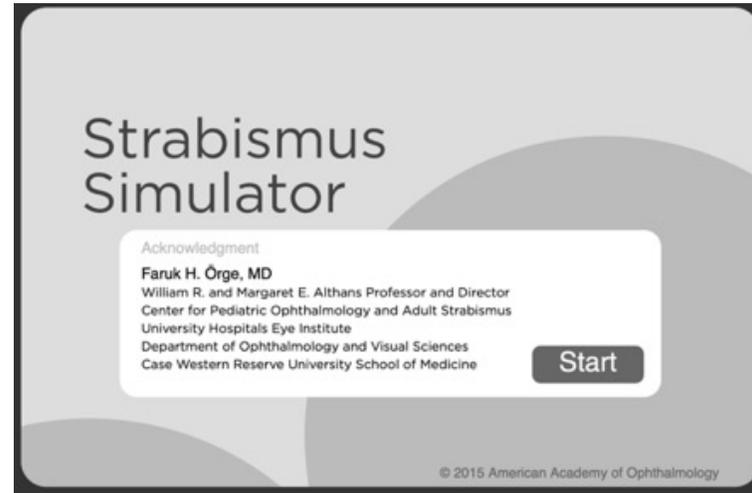
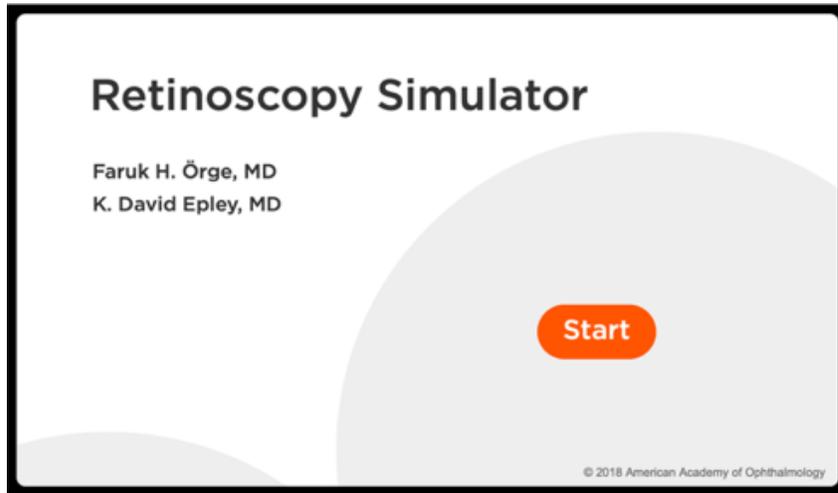
Pediatric Ophthalmology Education Center

Content through June 2025

- 102 disease chapters and multiple licensed book titles
- 700+ new surgical videos, lectures, and interviews on advances in pediatric eye care
- Simulators:
 - ROP Case-Based Training (updated 2024)
 - Strabismus Simulator (updated 2018)
 - Retinoscopy Simulator (updated 2019)
 - Complex Strabismus Simulator (updated 2022)
- Incorporation of CME activities and news articles on ONE Network (~2,000 discrete pieces)
- Quarterly IPOSC webinar series with ~2,500 annual attendees

The screenshot shows the website interface for the Pediatric Ophthalmology Education Center. At the top, the header reads "Knights Templar Eye Foundation Pediatric Ophthalmology Education Center". Below the header, there is a navigation menu with "For Ophthalmologists / Subspecialties / Pediatric Ophthalmology/Strabismus". The main content area features a large image of a child's eyes with the title "Visual Field Testing in Children With Glaucoma". To the right of this image is a copyright notice: "All content on the Academy's website is protected by copyright law and the Terms of Service. This content may not be reproduced, copied, or put into any artificial intelligence program, including large language and generative AI models, without permission from the Academy." Below the main image are three smaller featured articles: "Low-Level Red Light Therapy and Myopia Progression", "Paul Glaucoma Implant Operation", and "Unmet Needs in Myopia Care". At the bottom, there is a "Pediatric Ophthalmology/Strabismus News" section with a featured article titled "Glaucoma Development May Occur Many Years After Infantile Cataract" dated Jul 03, 2024. On the right side of the page, there are several promotional boxes: "FUNDED WITH SUPPORT BY" with the Knights Templar logo, "IN PARTNERSHIP WITH" with the APOS logo, a "Take a Self-Assessment" button, and "The Academy Store" with a book cover image.

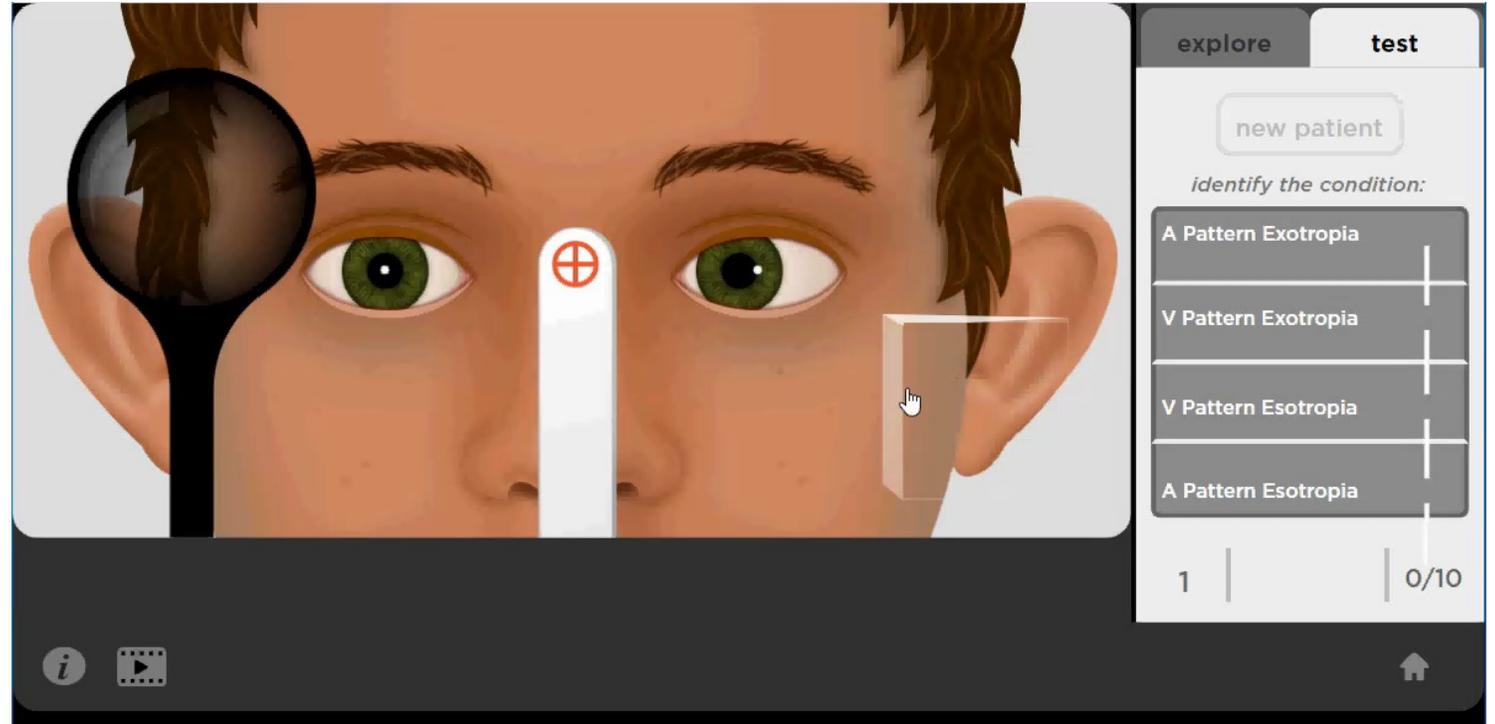
Simulators – Where Art Meets Science



Simulators and Case-Based Training



- Four simulated activities on site:
 - Retinoscopy
 - Strabismus
 - Complex Strabismus
 - ROP (Updated 2024)
- 620,000+ unique visits





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and the Future...

- The KTEF education center grant has produced a leading destination for education in pediatric ophthalmology and strabismus.
- Past success has led to an exciting new program for VR simulation.

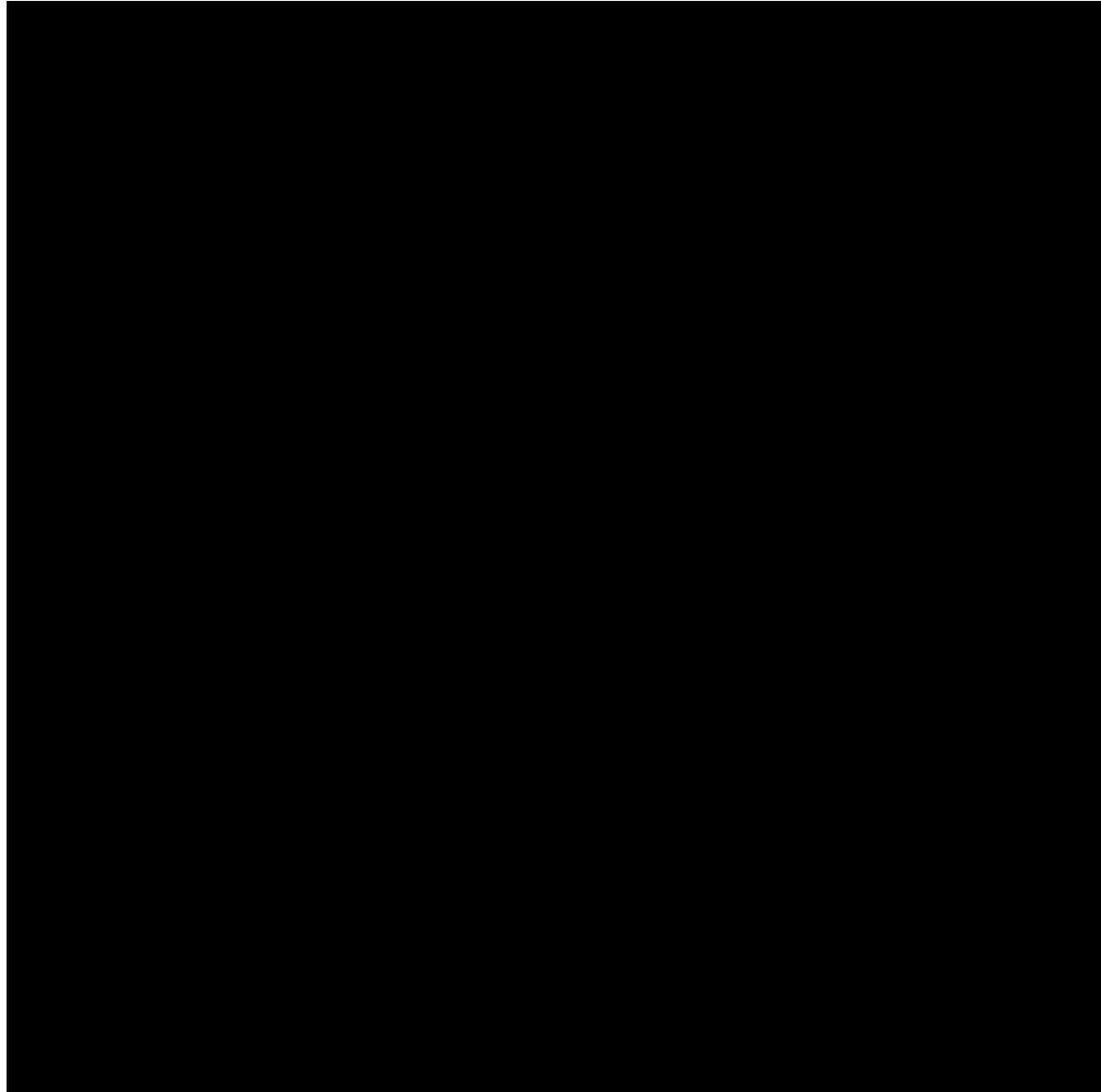


Knights Templar Eye Foundation (KTEF) VR Simulation Program



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- Simulation training
 - \$5 million multiyear sponsorship
 - Knowledge and skills assessment
 - Surgical decision-making
- Build to scale
 - VR headsets (3D) and Web (2D)
- Pediatric Ophthalmology
 - ROP Simulator
- Launch Fall 2024



AAO VR Platform: ROP Module Goals



- The goal is to disseminate the program around the world (by end of 2025 aim to establish utilization by 200+ countries)
- Access to the program will be free for ophthalmologists and residents/fellows
- **IPOSC/SIBA** will be the source of distribution for free AAO credentialing to login to the system (initial application through AAO VR site)
- The **IPOSC member societies** and **their members** will be eligible to receive



International Pediatric Ophthalmology
& Strabismus Council





Initial steps

- Initial step was to gather the needed photos, resources, information to allow the Fundamental team to understand what ROP is, how things look, all the details of the ROP screening and disease management process
- Photos from NICUs, actual NICU babies, fundus photos, ROP module from the AAO/KTEF Pediatric Ophthalmology Education Center
- Photos of indirects, lenses, specula, depressors, how we hold things
- Training a group of designers, engineers, illustrators and programmers from scratch about ROP



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Setting Goals and Priorities

Setting priorities

miro | [EXT] ROP Backlog | [Menu] [Share] [Search]

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AAO Prioritised Backlog

Themes:

Core surgical skills

- Boosting realism in the steps to core skills
- Interactable steps requiring user input
- Teaching good habits and repeat use of the procedure

Procedural accuracy

- Updating the step flow and simulation with added assessment and supporting areas in which trainees can further their learning

Educational Content

- Refining animations
- Supporting educational content to teach the trainee about the procedure
- Support, guide and inform the trainee through an educational and informative simulation

AAO Backlog:

Priority	Theme	Goal	Value	Detail	Solution size	
Top	Core surgical skills	Patient case information	User can visualise patient information and begin immersion into simulation	User will be in the NICU environment and will be able to see the core and relevant information of the patient before beginning any procedural steps	S	Central UI in style of 'Patient File' that is observed and users h disappear
Top	Core surgical skills	Using indirect ophthalmoscope	Trainee becomes accustomed to core interactions within simulated environment	User can pick up and enter into the simulated ophthalmoscope view and also exit from this view - user will enter into a 2.5X magnification view	L	Ophthalmoscope is a grabbable object that can be picked up
Top	Core surgical skills	Instilling Pupil Dilating eye drops - Animation	Normal processes are adhere to and observed by trainees so procedure remains accurate	User will observe correct eyedrop amount being added to the patient eye	L	Animation will be triggered when eyedrop bottle is selected, th user has to confirm that they are happy to procedure to next s
Top	Core surgical skills	Introducing lid speculum - UI instruction	Trainee does not witness insertion but instead can see optimal placement	Speculum is preinserted in relevant step	M	During the transition between steps we will add in the speculu
Top	Core surgical skills	Instilling topical anaesthesia eye drops - Animation	User can witness effect of correct eyedrop choice and maintains immersion for procedural accuracy during examination step	User will observe correct eyedrop amount being added to the patient eye	L	Animation will be triggered when eyedrop bottle is selected, th user has to confirm that they are happy to procedure to next s
Top	Core surgical skills	Selecting diopter lens	User can interact with diopter 28D lens as they would in real life	Diopter lens is a grabbable object that can be picked up by primary user	M	28D lens modelled on supplied images and can be picked up
Top	Core surgical skills	illuminating eye	Spatial positioning in VR that is representative of real-life	Users indirect ophthalmoscope will have light turned on at relevant times	L	Ophthalmoscope light will be on during the relevant steps, us
Top	Core surgical skills	scleral depressor to rotate and stabilise	impact / relationship between movement of the eye and view of retina	Using the scleral depressor to move eye within feasible limits	M	Ghost tracking allows eye to be 'touched' without haptics / pu
Top	Core surgical skills	exam eye (singular) and retina	Examination of singular retina to gain core skills of the procedure	Patients right eye will be exposed and will have all available retina maps applied - fl procedure (including management) will only be on the right eye	L	Users positions will be on the patients right will all UI and inst
Top	Core surgical skills	remove lid speculum - step (no animation)	Screenshot dvancing through procedure steps	Speculum will be removed at appropriate stage	S	When users have completed the examination procedure / diat

Define the scope.

The list of priorities, ranked.

Read me

AAO Backlog [External]

AAO Prioritised Backlog

Continue c

Priority	Item	Status	Category
1	Item 1	Open	Category 1
2	Item 2	Open	Category 1
3	Item 3	Open	Category 1
4	Item 4	Open	Category 1
5	Item 5	Open	Category 1
6	Item 6	Open	Category 1
7	Item 7	Open	Category 1
8	Item 8	Open	Category 1
9	Item 9	Open	Category 1
10	Item 10	Open	Category 1
11	Item 11	Open	Category 1
12	Item 12	Open	Category 1
13	Item 13	Open	Category 1
14	Item 14	Open	Category 1
15	Item 15	Open	Category 1
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99	Item 99	Open	Category 1
100	Item 100	Open	Category 1

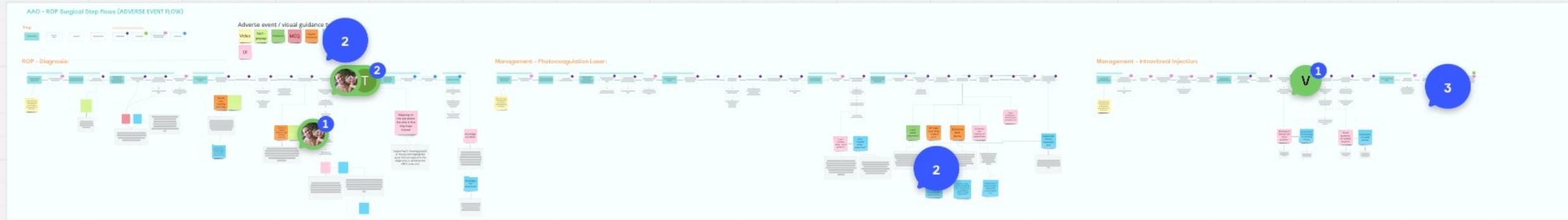


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Steps in Exam and Treatment

AAO - ROP Surgical Step flows annotated (Last updated: 09th Feb 2024)



Flow chart for steps in the process

AAO - ROP Surgical Step flows annotated (Last updated: 09th Feb 2024)

AAO - ROP Surgical Step flows (ADVERSE EVENT FLOW)

Key:



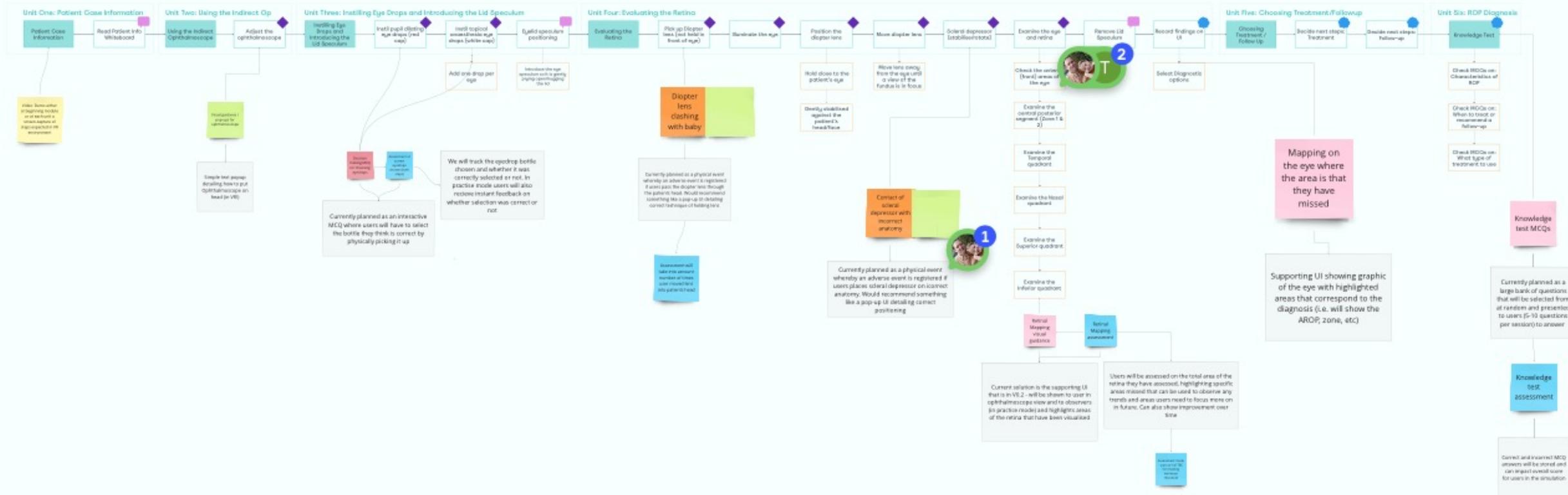
Users expected deliverables:



Adverse event / visual guidance type

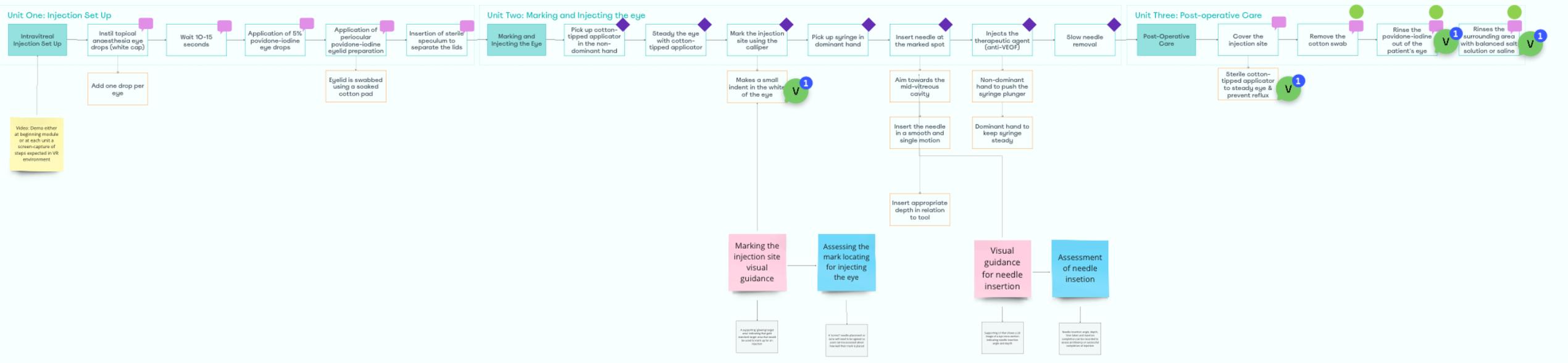


ROP - Diagnosis:



Intravitreal injection flow chart

Management - Intravitreal Injection:





Building Cases

- 30 cases developed for different stages, zones, and treatment scenarios
- Artist rendering of the different stages and zones
- Design of the look and feel of the indirect, speculum, depressor, drops, laser panel, injection paraphernalia, etc.

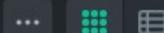


REVIEWS

MEDIA

Find Reviews By Name

Sort by Latest



> Case Overview

4 items



> Final Cases and Treatment options review

1 item



> C026 Stage 3 Zone 2 Plus disease

2 items



> C020 Stage 2 Zone 2, Mix with Stage 3

2 items



> C028 Stage 3 Zone 2 No pre plus

2 items



> C024 Stage 3 Zone 1, Pre Plus

2 items



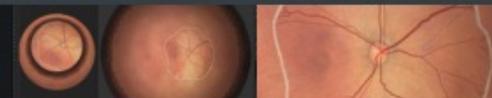
> C025 Stage 3 Zone 1 No Pre Plus

2 items



> C016 Stage 2 Zone 1 Pre Plus

2 items

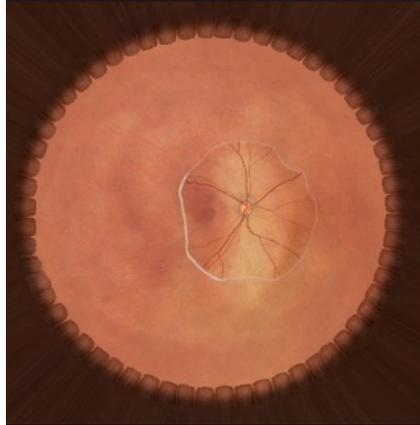


> C018 Stage 2 Zone 1, Mix with Stage 3

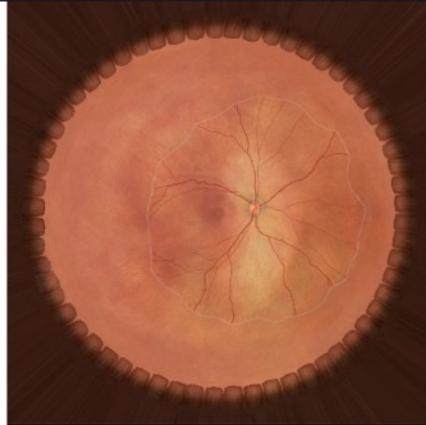
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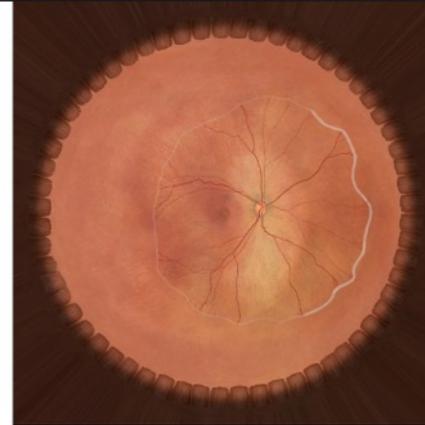




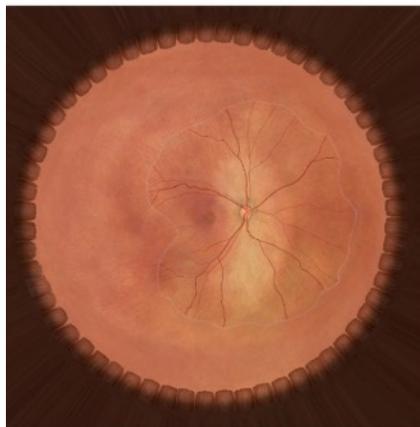
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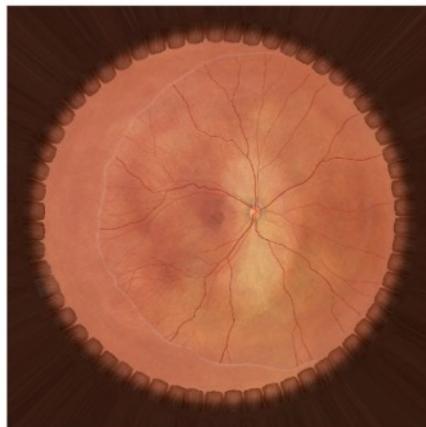
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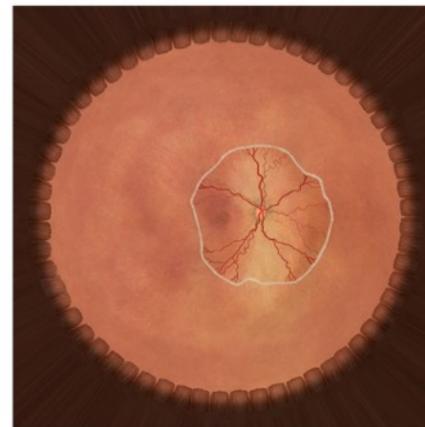
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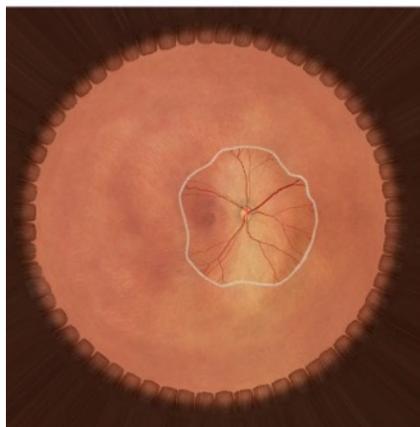
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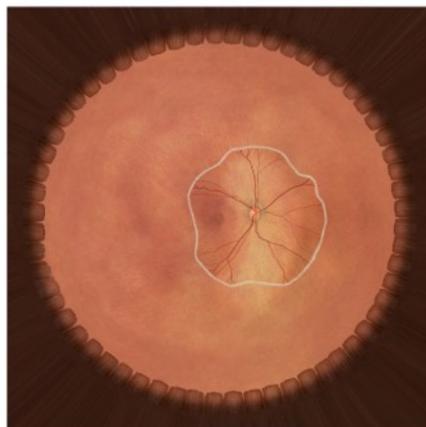
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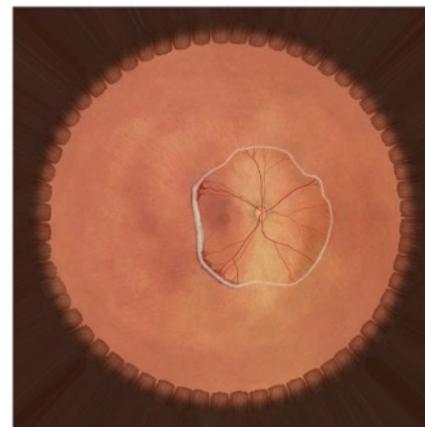
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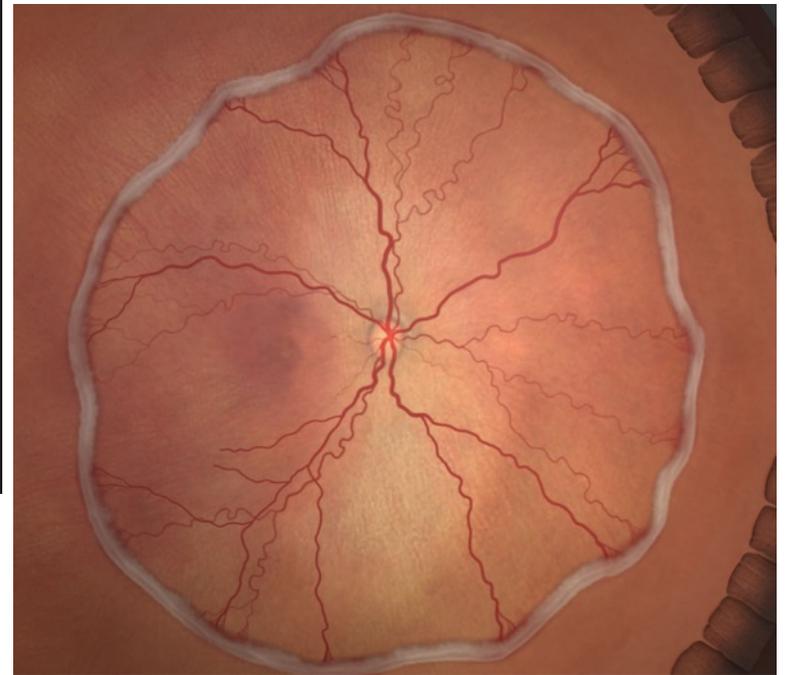
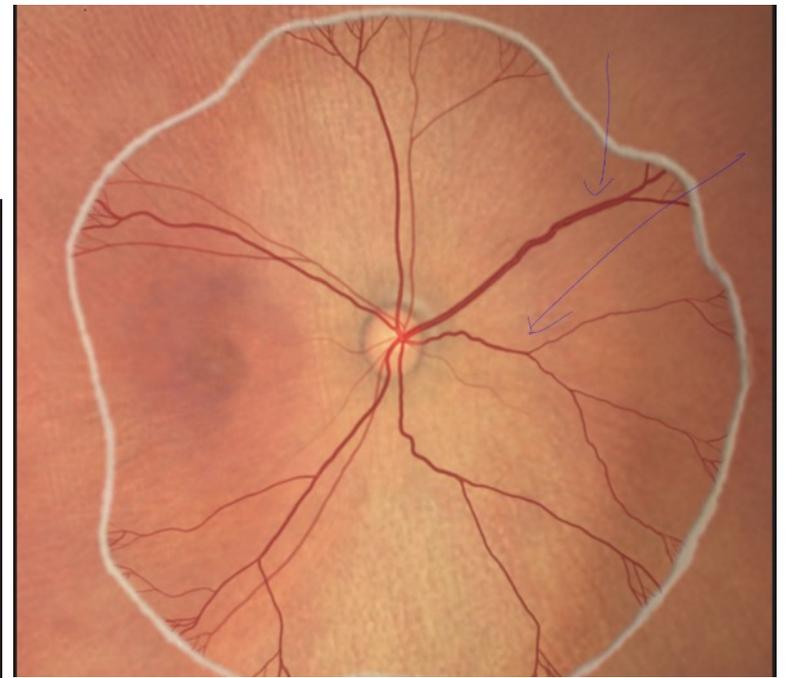
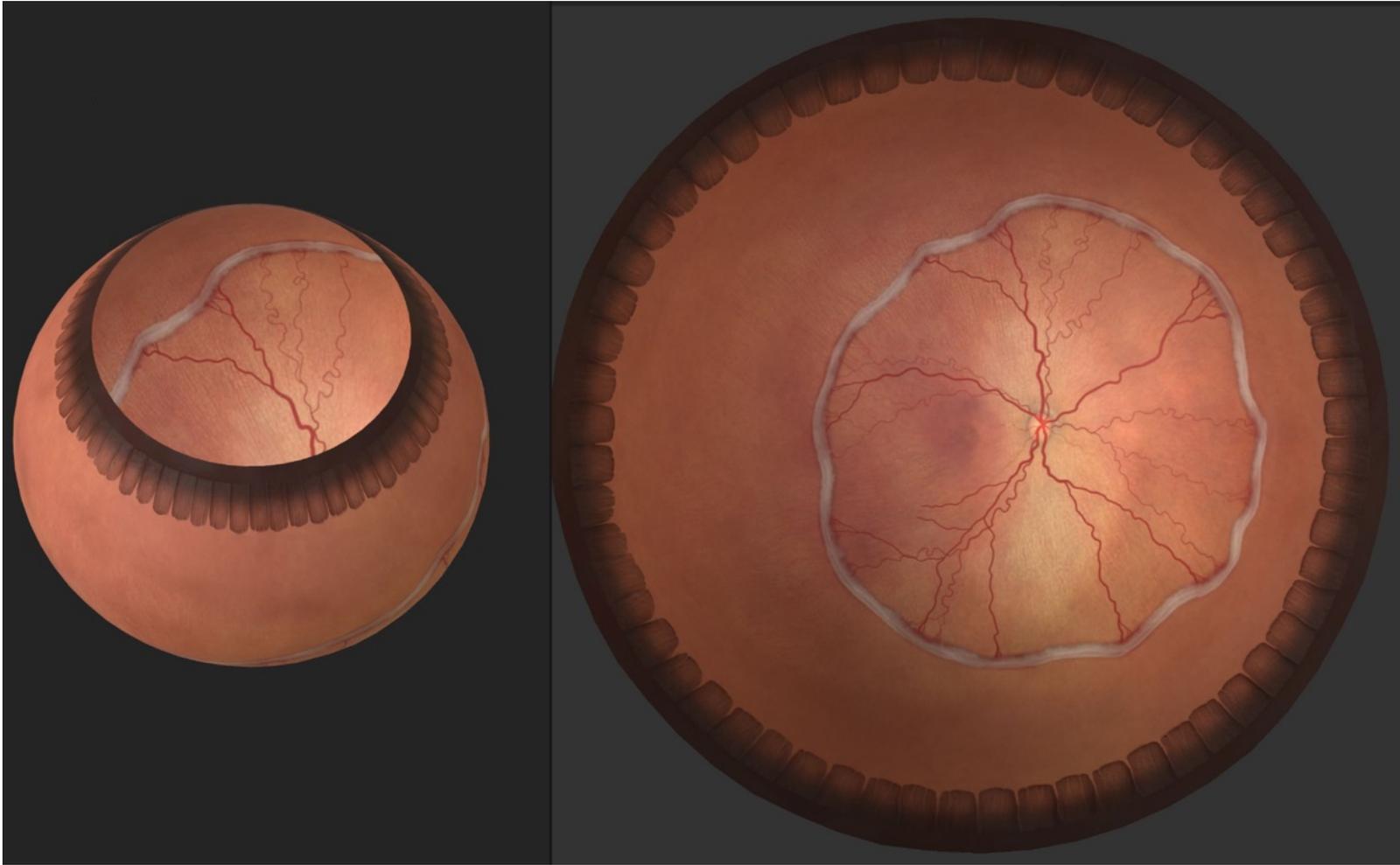
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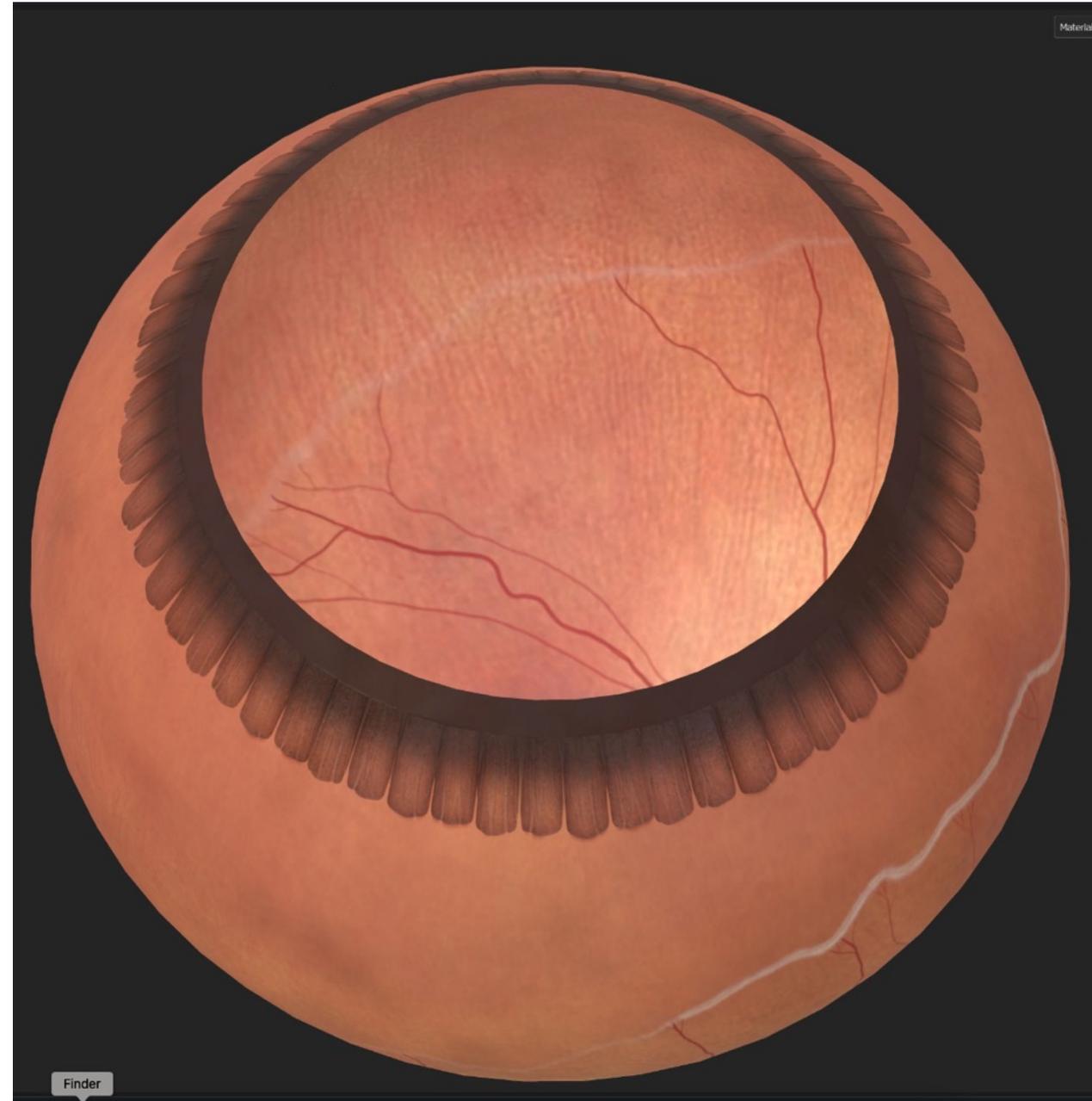
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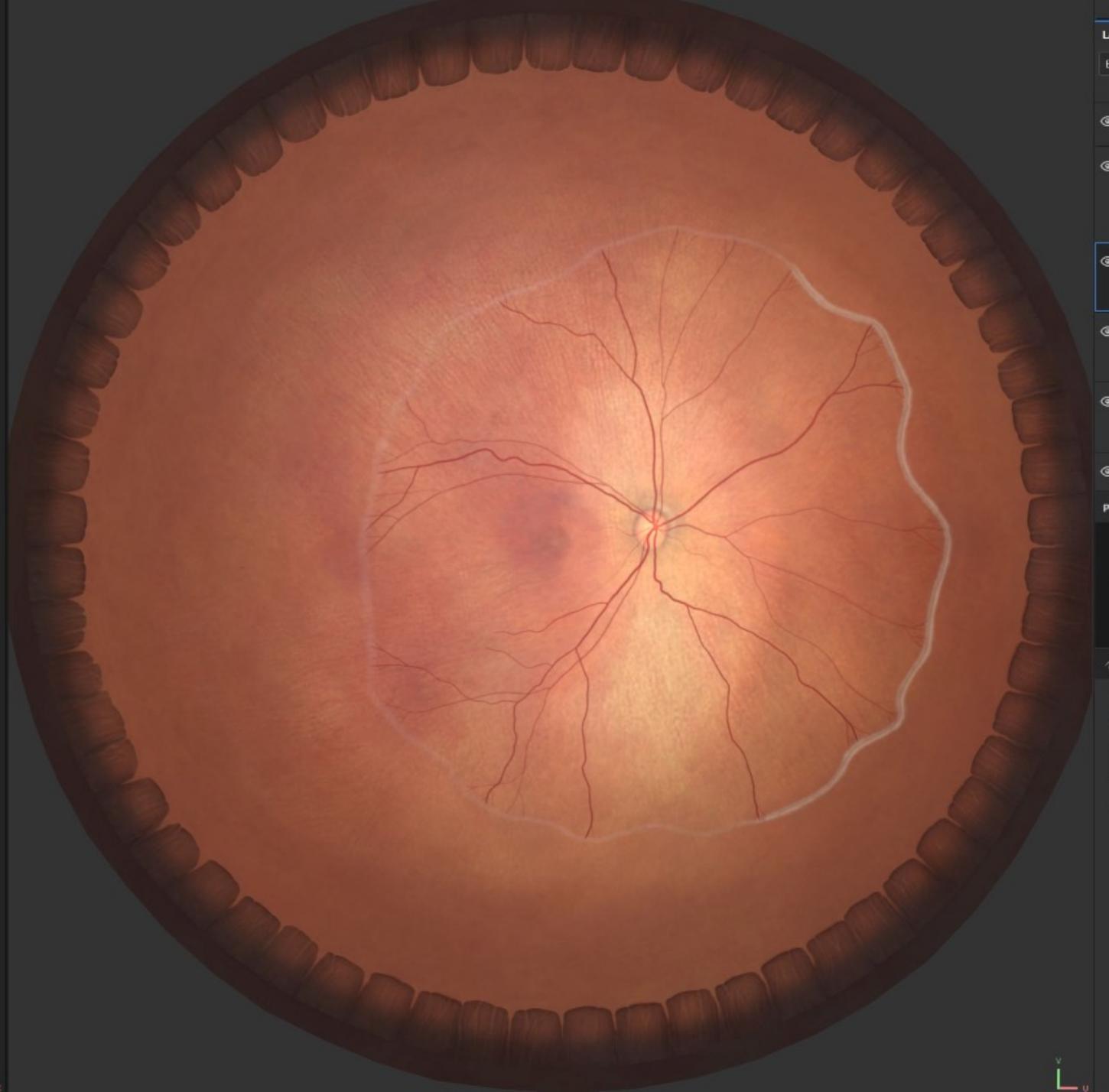
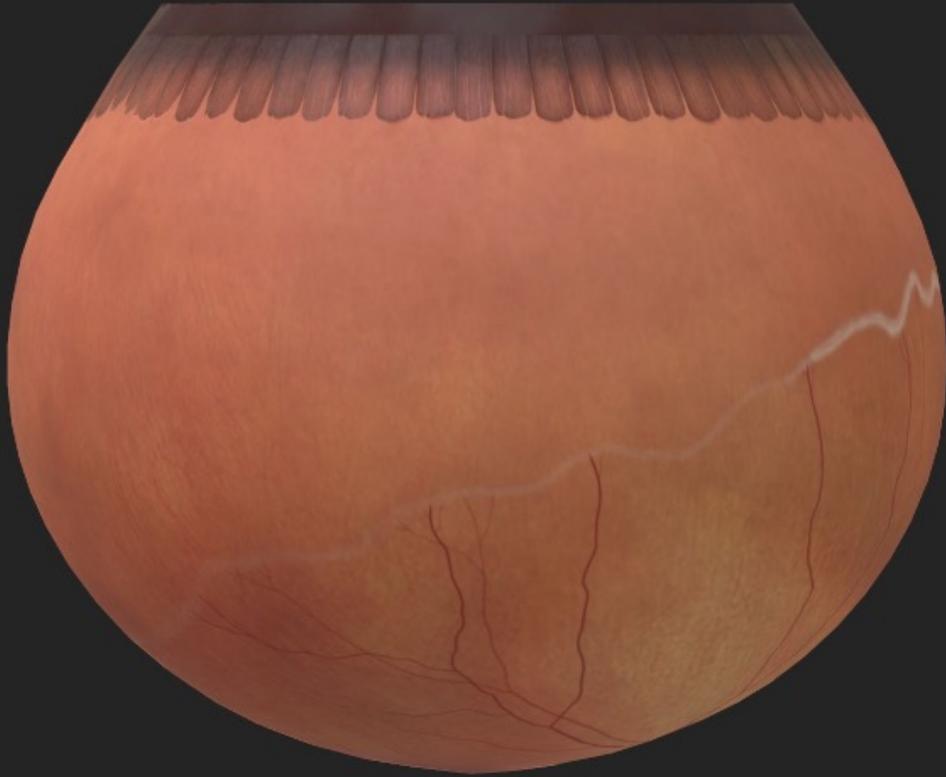


T_C018_S2_Z1_MixS3



3-D modeling





LAYER:

Base cc



PROPE



GRAY



Release/Review

Timeline for intermediate and final release

- After each release, review of the status of the simulation
 - What's accurate
 - What needs adjustment
 - Glitches
 - Text review and revision
 - Gaming/testing process



AAO VR Platform: ROP Module - Desktop



FUNDAMENTAL VR
AAO VR Support

Home Getting started Simulation Overview AAO Resources Feedback

AAO Pediatric VR Program

Onboarding, Support & Resources Center

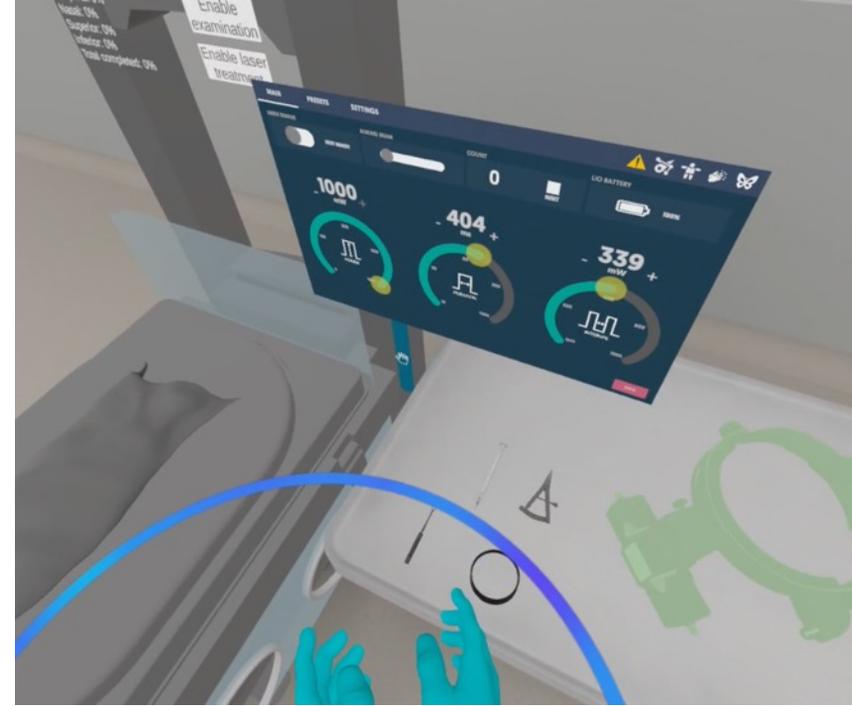
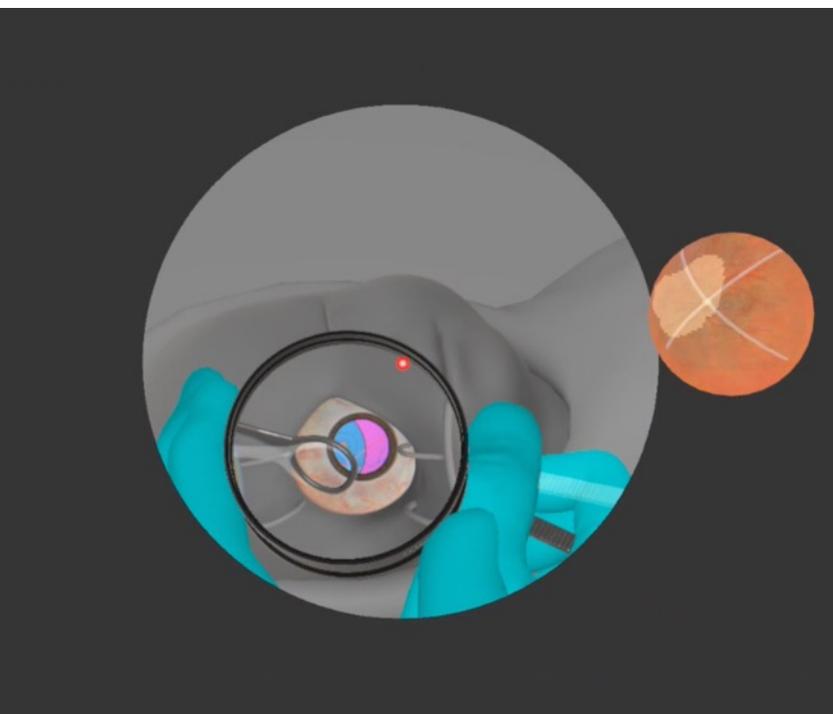


Welcome to the AAO Retinopathy of Prematurity (ROP) virtual reality (VR) experience.

This educational and learning tool will:

- Provide you with a comprehensive overview and understanding of ROP
- Teach you the correct diagnosis technique and procedure workflow
- Explain the correct use of diagnostical and surgical instruments
- How to recognize the anatomical landmarks in ROP
- Describe possible adverse events and complications.

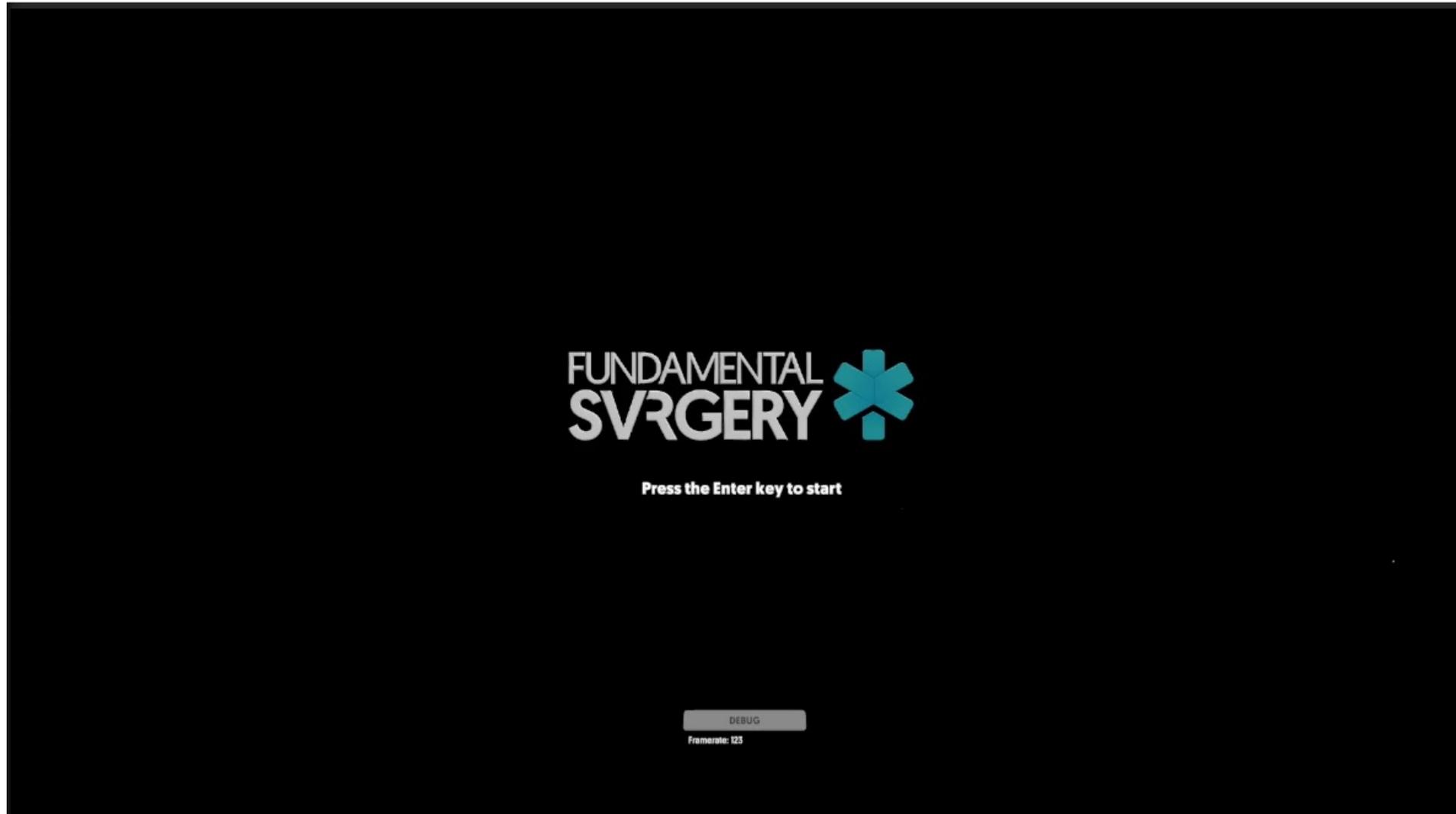


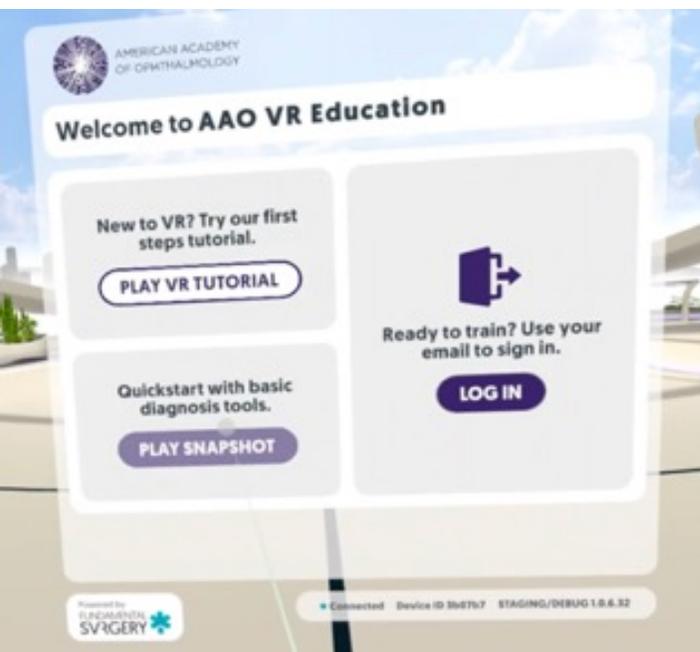


AAO VR Platform: ROP Module - Desktop

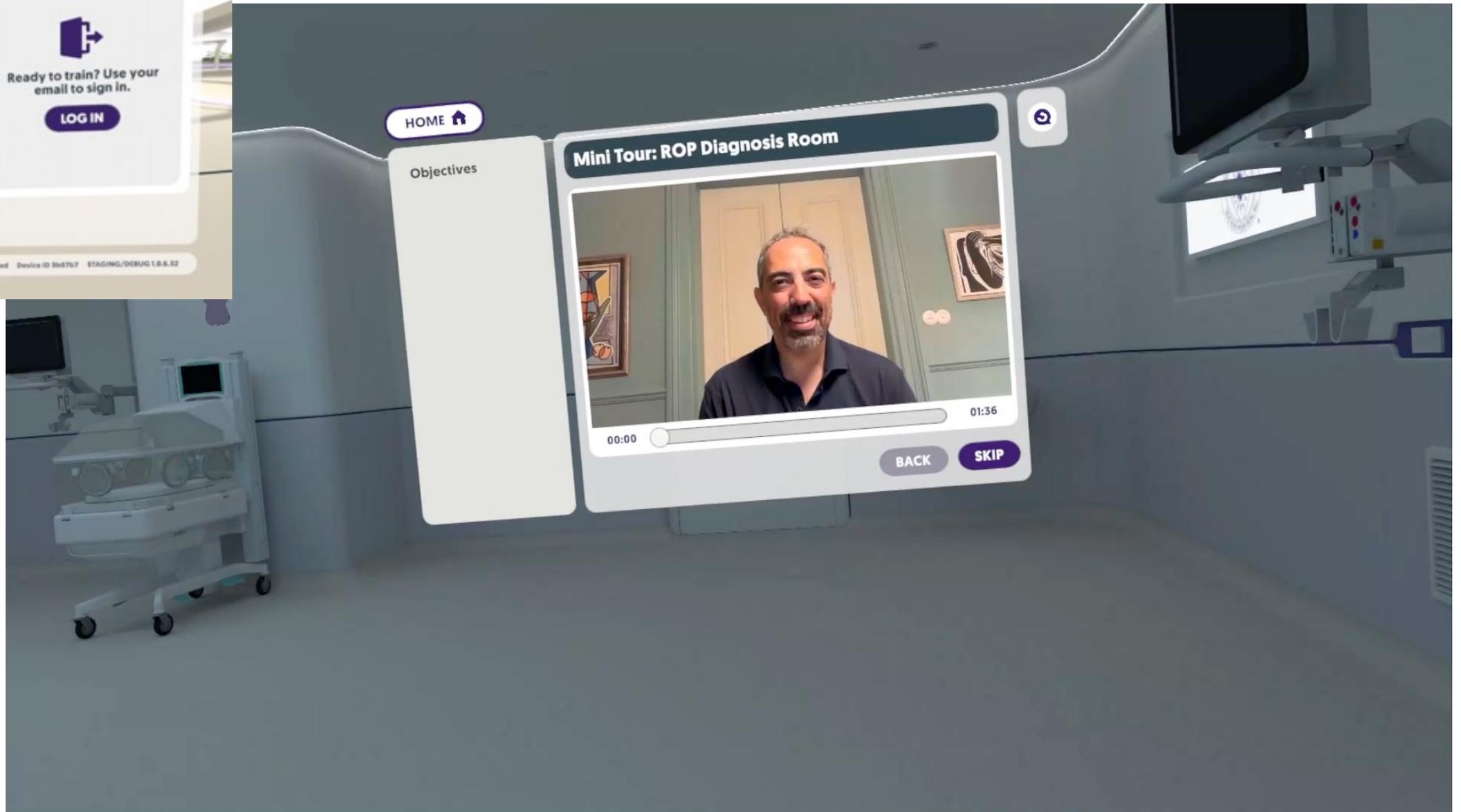


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AAO VR Platform: ROP Module - Minitour



AAO VR Platform: ROP Module – Tutorial



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AAO VR
Platform: ROP
Module –
Screen
Sharing



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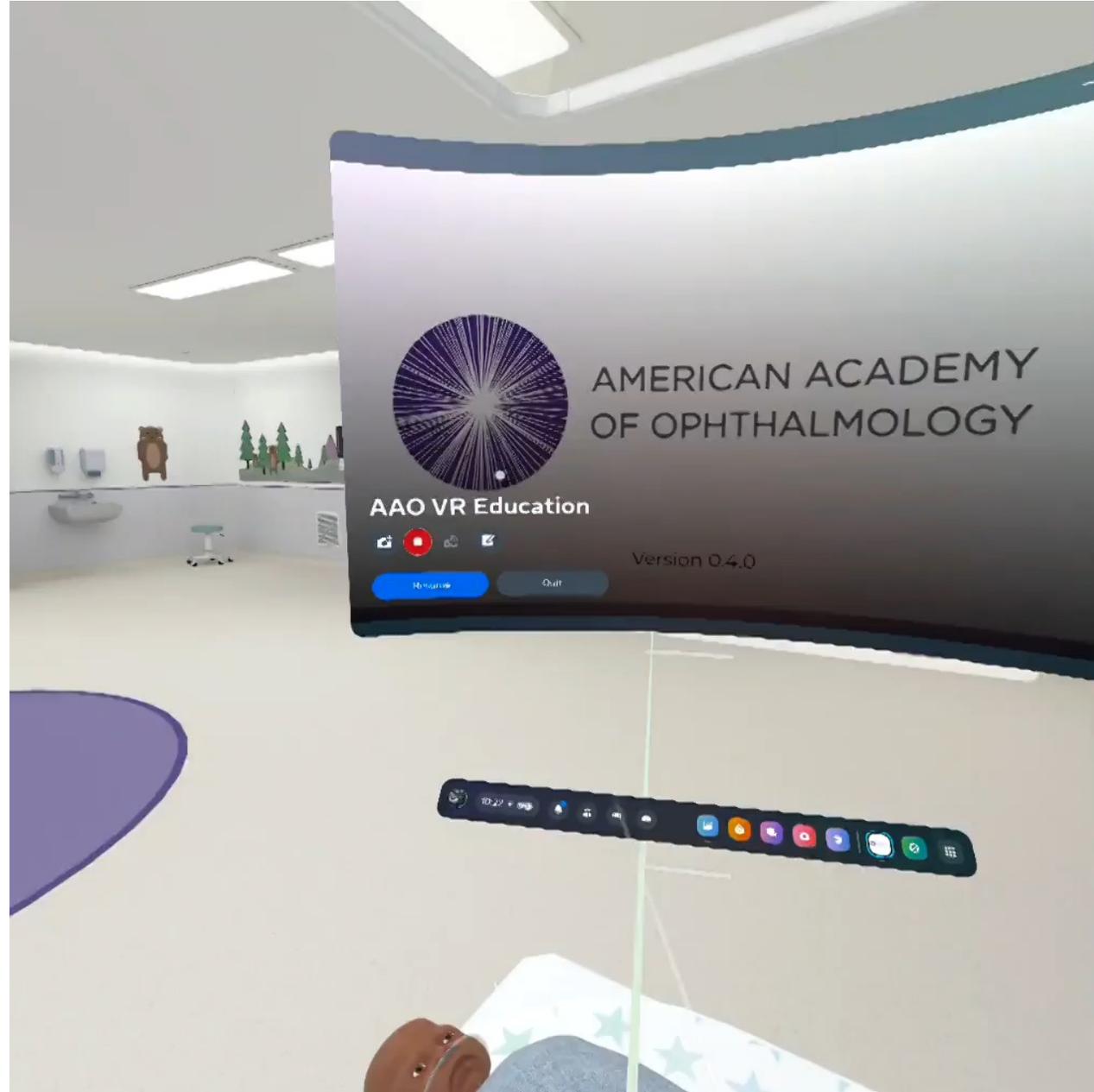
AAO VR Platform: ROP Module – Bed Height



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AAO VR
Platform:
ROP Module
– Indirect



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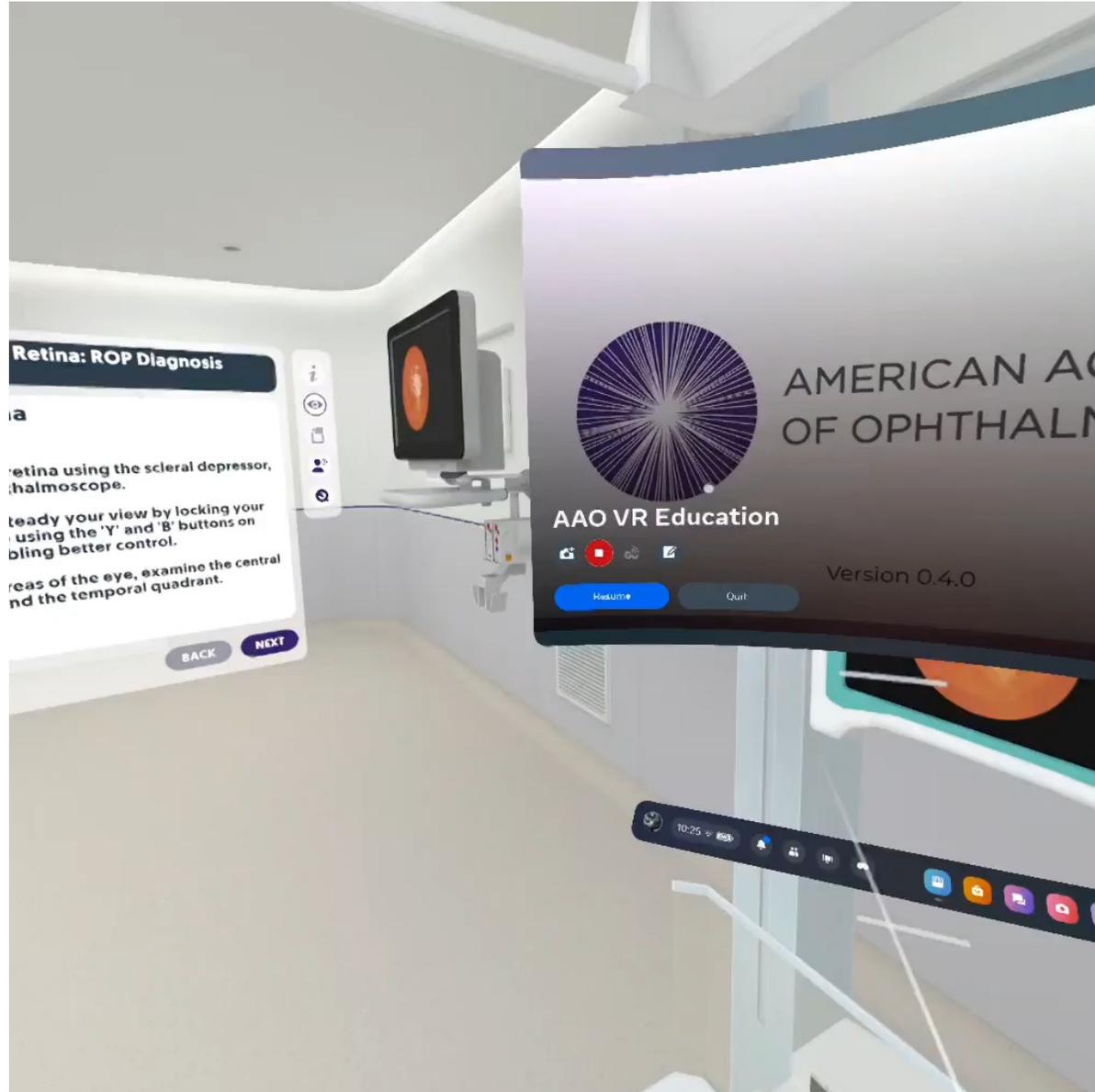
AAO VR
Platform: ROP
Module –
Indirect
lens



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AAO VR Platform: ROP Module – Scleral depressor



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AAO VR Platform: ROP Module – Locking tools



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AAO VR Platform: ROP Module – Diagnosis



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AAO VR
Platform:
ROP Module
Laser
console



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AAO VR
Platform: ROP
Module
Lasering



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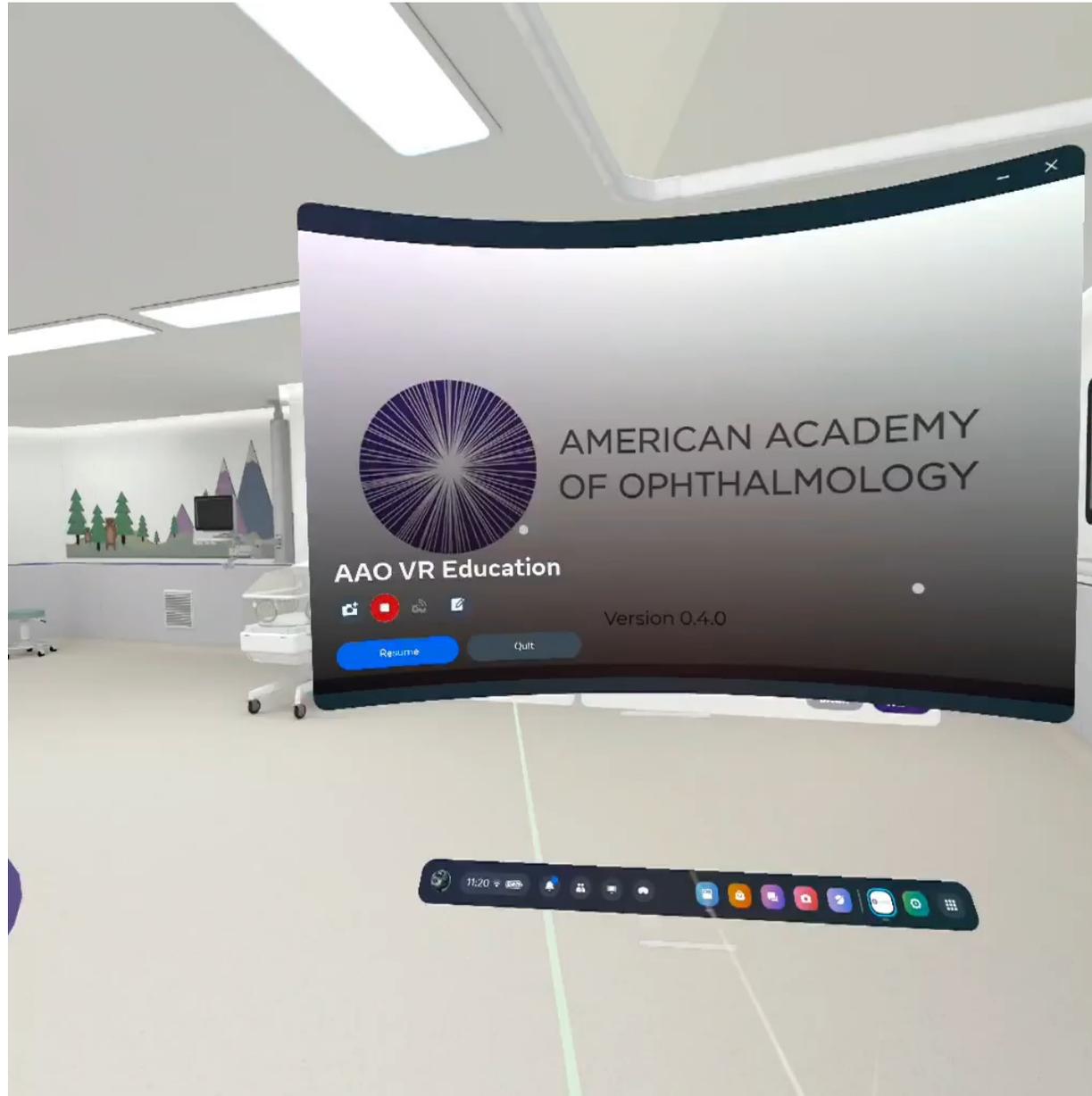
AAO VR Platform: ROP Module Caliper



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AAO VR
Platform: ROP
Module
IV Injection



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AAO VR Platform: What's Next?



- Other pediatric retina pathologies
- We will be incorporating the Strabismus and the refraction simulators into the platform
- Virtual eye clinic
- Strabismus surgery
- Gonioscopy and angle surgeries
- Adult retina module
- ...



Thank you...



<https://www.aao.org/pediatric-ophthalmology-strabismus>



<https://aao.fundamentalvr.com/home>

