Pediatric Eye Exam using Lenses
ORBIS 2021

Donny W. Suh, M.D., FAAP, MBA, FACS
Chief and Professor
Gavin Herbert Eye Institute
University of California at Irvine
Paul Singh, MD

- President: The Eye Centers of Racine and Kenosha
- Surgical Instructor
  - The Chicago Medical School

- The importance of gonioscopy and pearls for evaluating the Optic nerve via slit lamp bimicroscopy.
Suber S. Huang, MD, MBA, FASRS

- CEO, Retina Center of Ohio
- Voluntary Assistant Professor Bascom Palmer Eye Institute, University of Miami
- Past-President, American Society of Retina Specialists
- Editor in Chief, ASRS Retina Image Bank

- Examining the Eye: Tips and Tricks of the Retina Exam
Thank You!

I have no financial interest to disclose.
Thank You for your Partnership with ORBIS
Question

• I am _____
  1. General Ophthalmologist
  2. Optometrists
  3. Pediatric Ophthalmologist
  4. Orthoptists/Ophthalmic Technicians
  5. Doctor in training (resident / fellows)
  6. Others
Question

• I use Indirect Ophthalmoscope on a Regular Basis
  1. Yes
  2. Am Learning
  3. No
Question

- My favorite lenses to look at the fundus is
  1. 20D
  2. 28D
  3. 30D
  4. 14D
  5. Other
Question

• My favorite lenses to look at the optic nerve with slit lamp is

1. 90D
2. 78D
3. Super VitreoFundus
4. SuperField
5. Other ______
History of Indirect Ophthalmoscope

• 1945 Binocular indirect headband ophthalmoscope

• Improvement:
  – adjustable interpupillary distance, portable power packs, adjustable mirrors, dust sealed optics, and red-free and cobalt blue filters.
Video Indirect Ophthalmoscope
Rule #1
Right Hand to Left Eye
Left Hand to Right Eye
Tips for Peds Patients

• Raise the Chair: Poor Ergonomics
  – Same eye level
Tips for Peds Patients

• Lower the intensity of the Light
• A larger aperture light spot is used for a fully dilated pupil and intermediate and smaller apertures for a smaller or undilated pupil.
Tips for Peds Patients

- Diffuse light filters and yellow filters make the illumination less bright and comfortable to the patient
Lenses
Diopters

- $D = \frac{1}{f}$  Focal length in meters
<table>
<thead>
<tr>
<th>BIO Lenses</th>
<th>Field of View</th>
<th>Image Mag.</th>
<th>Working Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macula Plus® 5.5</td>
<td>36° / 43°</td>
<td>5.50x</td>
<td>80mm</td>
</tr>
<tr>
<td>14D Large</td>
<td>36° / 47°</td>
<td>4.30x</td>
<td>75mm</td>
</tr>
<tr>
<td>15D Large</td>
<td>36° / 47°</td>
<td>4.11x</td>
<td>72mm</td>
</tr>
<tr>
<td>20D Large</td>
<td>46° / 60°</td>
<td>3.13x</td>
<td>50mm</td>
</tr>
<tr>
<td>Pan Retinal® 2.2</td>
<td>50° / 70°</td>
<td>2.08x</td>
<td>40mm</td>
</tr>
<tr>
<td>25D Large</td>
<td>52° / 68°</td>
<td>2.54x</td>
<td>38mm</td>
</tr>
<tr>
<td>28D Large</td>
<td>53° / 69°</td>
<td>2.27x</td>
<td>33mm</td>
</tr>
<tr>
<td>30D Small</td>
<td>46° / 60°</td>
<td>2.10x</td>
<td>30mm</td>
</tr>
<tr>
<td>30D Large</td>
<td>58° / 75°</td>
<td>2.15x</td>
<td>30mm</td>
</tr>
<tr>
<td>40D Large</td>
<td>69° / 90°</td>
<td>1.67x</td>
<td>20mm</td>
</tr>
</tbody>
</table>
Lens Power

• **Lower the diopter number**, the lower the field of view and higher the magnification.

• **Higher the diopter number**, wider field of view and lower magnification.
To Examine Anterior Segment or Cornea

- Move the lens to increase the working distance and move in closer
Different Lenses Functions

• Each lens has a unique optical profile which serves a purpose in allowing you to see varying fields of view at various magnifications.
Different Lenses Functions

• Wide field lens
  – Help you scan a larger area quickly
  – Ideal for general diagnosis and as a first pass retinal exam.

• Higher magnification lenses (lower D)
  – To examine optic nerve head, macula or noticed something during a wide field exam that you want to examine more closely.
Right Side of Lens

• Bottom of the letters point towards the patient and the top towards the examiner.
How to Clean Lens?

- Rinsing the lens with warm soapy water.
- Then dried by using a lint free soft cotton cloth in a clockwise direction to avoid loosening the lens ring.
- **DO NOT USE** a microfiber cloth as over time these tend to collect dirt and dust which can damage the antireflective coating on the lens!
Small Baby Pupils with Poor Dilation

• 28D or 30D or 40D lens for patients with small pupils.
• Use smaller aperture size light beam
• Use Narrow ‘mirror angle’
Ideal BIO Lens for NICU patients

• 28 D, 30D or 40D.
• The 40D is great for small pupils but also provides a wider field of view (90 degrees) allowing for quicker scans.
• 28D or 30D is an excellent alternative if you want more magnification than the 40D.
• Both the 30D & 40D have smaller rings and closer working distance making lens manipulation easier when holding a child steady.
20 D or 28D if greater working distance is needed with higher Magnification
Personal Preference
ROP exams

• 28D for examining ROP.
• 20D to look at more in details
• 15D provide nice magnified viewing of the posterior pole.
• Single-use versions available and often used and recommended to mitigate infection risk in premature babies.
• Wear Gloves after washing hands
ROP Laser

- BIO lens safe for laser
- 28D or 30D are preferred for ROP Tx.
- If you prefer to use an autoclave, only the autoclavable lenses should be used
- One may choose to use single use 20D or 28D lenses for LIO procedures.
How to Improve Image?

- Ring size and working distance not a good fit for your hands.
- For small hands, consider 25D, 28D, and 30D
- These lenses have shorter working distances allowing you to stabilize your fingers on the patient.
Poor View of Periphery

• Every lens has a unique working distance
• If you are away from the right working distance, images get clipped
• If you are too close, the peripheral view appears dark and unclear.
• Hold the BIO lens close to the eye and then move away until they are able to fill the lens with the entire field.
Thank You!

Donny W. Suh
20D vs Pan Retinal Lens

- Pan Retinal lens provide 22% greater field of view while still providing a good balance of magnification.
- Pan Retinal 2.2 also has a closer working distance (10 mm less than the 20D)