Mastering the Retina Exam – tips and tricks

Suber S. Huang, MD, MBA, FASRS
President/CEO Retina Center of Ohio
Voluntary Assistant Clinical Professor, Bascom Palmer Eye Institute, University of Miami
Inaugural Philip F. and Elizabeth G. Searle – Suber Huang, MD Professor and Vice-Chair, Case Western Reserve University
Past President, American Society of Retina Specialists
Past Chair, National Eye Health Education Program, National Eye Institute, National Institutes of Health
Founder, Future Vision Foundation

ORBIS Cybersight Virtual Presentation
July 2, 2021
Mastering the Retina
5 tips to improve your exam

- Dilate the pupil
- Use perfect technique
- Choose and care for your equipment
- Know what you are looking for
- Learning for life
Different Types of Lenses

Diverging (Bi-concave)

Rays fan out

Condensing (Bi-convex)

Rays focus to a point

A biconvex (condensing lens) is best for viewing the retina
Formation of an Image Using a Lens

Light In
Light passes through the biconvex lens, cornea, and crystalline lens to illuminate the inside of the eye.

Image Out
Light reflects off the surface of the retina and passes out of the eye. The light is then focused by the biconvex lens to form an image in space between the observer and the biconvex lens.

A biconvex lens forms an inverted virtual image between the observer and the lens.
Types of Images

Direct Image

Image appears upright when using a direct lens

Indirect Image

Image appears inverted and backwards when using an indirect lens

An indirect lens forms an inverted and backwards image.
Selecting the Right Lens Design

A double aspheric lens increases depth of focus and reduces distortion. Lenses may have an optimum orientation.
Clear Images Depend on Many Factors

**Doctor**
- Correct working distance
- Steady hand on lens and patient
- Exam pattern

**Illumination**
- Intensity
- Spot/slit size
- Ambient light

**Lens**
- Double aspheric
- AR coated
- Appropriate FOV and magnification

**Patient**
- Patient cooperation
- Stable gaze/fixation
- Smooth corneal surface
- Pupillary dilation
- Clear media

Every factor contributes to improving image quality
Indirect ophthalmoscopy is the best technique to examine the peripheral retina.
**Different Types of Retinal Exams**

**Slit Lamp Exam**
- Patient seated with chin and forehead against supports
- View anterior segment, vitreous, & posterior segment
- Detailed binocular view of posterior pole
- Patient can be dilated or undilated

**Binocular Indirect Ophthalmoscopy**
- Used to view the peripheral retina
  - Gaze direction
  - Scleral depression
- Patient laying down or seated
- Patient is dilated

The slit lamp is used to view the anterior segment and posterior pole. The BIO is used to examine the peripheral retina.
The slit lamp can be used to examine the macula and posterior retina.
Choose the Right Working Distance

Too Close  |  Too Far  |  Correct Distance
---|---|---
Peripheral retina not illuminated  |  Loss of field of view  |  Full field image

The right working distance provides the widest and clearest field of view.
Performing a BIO Exam

Perform a clockwise exam in both eyes

Find Working Distance

Start with the lens close to the eye and move back to find the best working distance.
Performing a BIO Exam

Direct the patient’s gaze in a systematic clockwise direction

Systematic peripheral exam of the retina avoids “skipped” areas.
Examine posterior retina last.
Live Examinations
Peripheral retinal exam using binocular indirect ophthalmoscope (BIO) and 28D lens

Proliferative diabetic retinopathy with peripheral retinal photocoagulation
Slit Lamp Stereo Biomicroscopy with 90 Diopter Lens
Binocular Indirect Ophthalmoscopy with 360-degree Scleral Depression
Scleral Depression Exam of the Peripheral Retina

Normal peripheral retina

Scleral buckle and peripheral laser retinopexy
Which Lens to Use
Slit Lamp Lens Comparison

As diopter increases, field of view increases and magnification decreases.

<table>
<thead>
<tr>
<th>Magnification</th>
<th>Field of View (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75x</td>
<td>75</td>
</tr>
<tr>
<td>1.00x</td>
<td>100</td>
</tr>
<tr>
<td>1.25x</td>
<td>125</td>
</tr>
</tbody>
</table>

*Digital widefield
As diopter power decreases, field of view decreases and magnification increases.
Importance of Anti-Reflective Coatings

Without Anti-Reflective Coating

- HIGH Reflections
- Significant glare

With Anti-Reflective Coating

- LOW Reflections
- No glare

Anti-reflective coating minimizes reflections and glare.
Taking Care of Your Lenses

Dirty, Scratched Lens

Clean, Good Condition Lens

A clean lens is essential for a crisp, detailed image.
My Lenses
<table>
<thead>
<tr>
<th>Commonly Encountered Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small Pupils</strong></td>
</tr>
<tr>
<td>Use a lens with a high field of view like the 90D or Digital Wide Field or a specially designed small pupil lens.</td>
</tr>
<tr>
<td><strong>Cleaning</strong></td>
</tr>
<tr>
<td>Rinse lens with warm water and gentle dish soap (Dawn or Fairy). Wipe the lens in a clockwise direction (to avoid loosening ring) with a lint free cloth to keep lenses clean. Do not use a microfiber cloth. It picks up dirt over time and scratches the AR coating.</td>
</tr>
<tr>
<td><strong>Directionality</strong></td>
</tr>
<tr>
<td>Look for a silver marking on BIO lens rings (which is the patient side) or for Volk lenses, the tip of the “V” points toward the patient.</td>
</tr>
<tr>
<td><strong>Glare</strong></td>
</tr>
<tr>
<td>Tilt the lens surface slightly to reduce reflections and/or angle the light source. Ensure working distance is correct.</td>
</tr>
<tr>
<td><strong>High Magnification</strong></td>
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<tr>
<td>Any lens movements are exaggerated when under higher magnification. The key is to practice with lenses like 20D and 90D to get the technique down, which can then make the transition to other lenses easy. Ensure working distance is correct.</td>
</tr>
<tr>
<td><strong>Blinking/Photophobic</strong></td>
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<tr>
<td>Use the diffuser setting on the slit lamp/BIO headset. Start with the periphery and view the macula last. Ask the patient to look at the fixation lights.</td>
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</table>
Know what to look for

Learning for Life
Peripheral retina
Lattice Degeneration

By Norman Byer
From Dr. Norman E. Byer's "The Peripheral Retina in Profile"
Uploaded on Nov 9, 2012.
Last modified by Suber S. Huang, MD, MBA, FASRS on Feb 10, 2013.
Reviewed by Chayal Patel

Rating

Appears in
Miscellaneous

Condition/keywords
lattice degeneration, retinal hole, subretinal fluid, white lattice lines

Description
This 16-year-old girl has lattice degeneration and also this large oval retinal hole with a surrounding narrow zone of subretinal fluid. This lesion illustrates how large the atrophic holes of lattice degeneration may be.
imagebank.asrs.org

- The world’s largest most comprehensive open access resource for retinal imaging
- Over 2.5 million page views since its inception
- Used in 184 countries worldwide
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Thank you