Advanced Examination of the Retina: Scleral Indentation & Retinal 3-Mirror

Meredith Whiteside, OD, FAAO
Nimesh Patel, OD, FAAO
John Shan, OD, FAAO
Disclosures

• Nothing to disclose
• The presenters of this workshop have no financial interest in any of the products used during this workshop.

• Equipment for this workshop provided by
  • Heine (BIO)
  • Haag-Streit (Slit Lamps)
  • Volk (Lenses)
Contraindications: Retinal 3-Mirror & Scleral Indentation

- Recent intraocular surgery
- Recent hyphema
- Recent or suspected penetrating injury or ruptured globe

Use caution with scleral indentation
- Patients with advanced active glaucoma
- Intraocular lenses
Retinal 3-Mirror

Purpose/Indications:

- Stereoscopic examination of the retina
- Often performed after binocular indirect ophthalmoscopy to look at specific areas on the retina
Retinal 3-Mirror

**Instrumentation:**
- 3-Mirror fundus contact lens
- Slit lamp biomicroscope
- Topical ophthalmic solutions:
  a) mydriatics & anesthetics
  b) cushioning solution(s)
Technique:

1) Patient preparation: full mydriasis; - add anesthetic immediately before procedure

2) Lens preparation: add 3-4 drops of cushioning solution
Technique (continued):

3) Slit lamp set up:
   - magnification at low or ~10x
   - beam width: 3-4 mm; light tower in straight-back position
Technique (continued):

4) Lens insertion

A) Patient looks down & doctor holds the upper lid
Technique (continued):
4) Lens insertion

B) Pt looks up, doctor grabs the lower lid

C) Doctor rocks the lens onto the pt’s eye
Technique (continued):

4) Lens insertion

D) Doctor hangs onto lids until lens is fully in contact with the eye
Technique (continued)

E) Pt looks straight ahead
5) Move slit lamp forward, keeping beam centered in the middle lens until the posterior pole is in focus
Optics of the 3-Mirror and Retinal Views: (remember APE!)

- Anterior (A) = semicircular mirror: ora serrata/pars plana & vitreous base
- Peripheral (P) = rectangular mirror: equator to ora serrata
- Equatorial (E) = trapezoidal mirror: equator
- Center Lens = central 30° of the posterior pole
Visualizing the retina

- Get a focused view through the C (central) lens to start*... then the E mirror and the P mirror. The A mirror should be last since it is the most difficult to use.

* Once the retina is in focus for any of the mirrors, it will be very close in focus for the next mirror.

- The mirror should be placed 180° from lesion of interest.
Hints for Success:

- To get a view through the A mirror, you must see a red retinal reflex before you can visualize the anterior retina. (Try tilting the lens.)

- One can extend the view of a lens by tilting the mirror:
  For a more anterior view: tilt lens toward mirror
Common Lesions Seen with Retinal 3-Mirror

Horse shoe retinal tear

Retinal hole within retinoschisis
Common Lesions Seen with Retinal 3-Mirror

Macular Edema

Retinal Tear
Technique (continued):

6) Lens removal
   - Ask the patient blink
     or
   - Doctor gently pushes the patient’s lower lid toward the orbit to break the suction
Scleral Indentation

Purpose/Indications

- Examination of the anterior portion of the retina
- Highest level of diagnostic skill in peripheral retinal evaluation
Indications

Symptoms/Signs
- Flashes and floaters
- Tobacco dusting or Shaffer’s sign
- History of blunt trauma
- High axial myopia
- Aphakia
- Any previously diagnosed peripheral retinal abnormalities – such as lesions, holes, tears.
Advantages of Scleral Depression

- More anterior you get, the less stereo you can achieve with the BIO

- Moving the scleral depressor helps in appreciating the 3-D nature of the peripheral retina.

- By indenting the sclera you increase the contrast by displacing the retinal tissues. The depressed region is usually darker, and the retinal layers become more translucent.
Instrumentation

• Dilating drops – Maximal dilation is required for best results
• Condensing lenses
• Scleral depressor
 Technique

• Wait until pupils are at maximum dilation.

• Educate patient on procedure

• Position patient properly

• Topical anesthetic can be used if needed
Indenter placement
Procedure

• Placement of the indenter

Patient looks away from indenter and indenter is placed at the tarsal crease.
Have the patient slowly look towards the indenter.

Move the indenter in the same direction of eye rotation.
Indenter placement

• Indenters may be placed on the eyelid or directly on the conjunctiva.

• Nasal indentation can be tricky using the eyelid
Viewing the indented retina

• When the optics are aligned the red reflex will darken. At this point place the condensing lens in place.

• Apply gentle tangential and not perpendicular pressure.

• Move the indenter around and view the ‘bug under the rug’

• You only have to go ½ inch from the limbus to indent the equator.
BIO(1), condensing lens(2), and depressor(3) all must be aligned in order to get the best image.
• For more anterior/peripheral views, align the plane of your body (hips) **parallel** to the quadrant of interest.

This positioning allows you to be able lean more easily and obtain more anterior views.
Examples of indentations
Cystic retinal tufts occur with preexisting tiny traction tear and chalky-white apex on flap in 20-year-old man. Same eye 6 years later shows complete avulsion of former attached flap. Still no symptoms and no posterior vitreous detachment were present.
Lattice degeneration is observed with white lines (without scleral indentation).

Lattice degeneration with massive pigmentation is caused by secondary changes in pigment epithelium (without scleral indentation).
Superior lattice degeneration is seen in snail-track form (with scleral indentation).

Lattice degeneration is shown with combined features of reddish crater and snail-track appearance (with scleral indentation).

Lattice degeneration occurs with reddish crater, without white lines (with scleral indentation).

Lattice degeneration appears with tiny atrophic hole and subclinical retinal detachment of long duration (with scleral indentation).
Large atrophic retinal hole in a lattice lesion is not associated with posterior vitreous detachment.

Retinoschisis is observed with "schisis-detachment"

Large traction retinal tear is visible

Tiny traction retinal tear with free operculum,