

## **Getting a Better View of the Fundus**

### **(2 Hour Workshop)**

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### **Abstract**

With all of the fundus lenses available today for biomicroscopy, which one is the best for you? Considering factors such as image quality, magnification and field of view, it is important to understand the benefits of each lens. In this hands-on workshop, attendees will become familiar with various options of lenses for biomicroscopy and their uses in clinical practice. Patient preparation, procedure and interpretation of the fundus examination will be covered. Participants will have the opportunity to gain experience with a variety of non-contact and contact fundus lenses. Attendees will be provided with dilated subjects for this workshop. Standards of care are addressed and clinical pearls provided.

### **Learning Objectives**

At the conclusion of this workshop, attendees will:

1. Enhance fundus examination skills with the use of fundus lenses.
2. Gain familiarity with various types of non-contact fundus lenses.
3. Gain familiarity with various types of contact fundus lenses.
4. Recognize the clinical situations in which a particular fundus lens is more useful.
5. Understand ways to maximize a particular view of the retina.
6. Become familiar with the disinfection of fundus contact lenses using the glutaraldehyde high-level disinfection system.

### **Outline**

#### **I. Introduction**

- A. Description of the various types of fundus lenses available and the clinical situations in which particular lenses would be beneficial

#### **II. Procedures**

- A. Attendees will be divided into small groups of 2-4, each assigned to a slit lamp with a teaching tube, and a dilated patient

1. The benefit of teaching tubes and/or video recording and display of procedures will be available for group analysis and interpretation

2. Each attendee will have a hands-on experience with a variety of non-contact and contact fundus lenses, featured below, and will be able to compare their views with that of a traditional 60D, 78D, and/or 90D lens.

1. Manufacturer's lens specifications:

| <b>Lens</b> | <b>Magnification</b> | <b>Field of View<br/>(Static/Dynamic)</b> | <b>View</b> | <b>Other</b>  |
|-------------|----------------------|---|-------------|---|
| Volk 60D    | 1.15x                | 68°/81°                                   | indirect    | 13mm working distance; high mag ideal for detailed ONH and macula |
| Volk 78D    | .93x                 | 81°/97°                                   | indirect    | 8mm working distance; good compromise b/w FOV and mag             |
| Volk 90D    | .76x                 | 74°/89°                                   | indirect    | 7mm working distance; ideal for small pupil examination           |

### III. Station 1: Non-contact Fundus Lenses

- A. Manufacturer's Featured Lens Specifications:

| <b>Lens</b>              | <b>Magnification</b> | <b>Field of View<br/>(Static/Dynamic)</b> | <b>View</b> | <b>Other</b>   |
|--------------------------|----------------------|---|-------------|--|
| Volk SuperPupil® XL      | .45x                 | 103°/124°                                 | indirect    | Optimal small pupil capability through a pupil as small as 1 - 2mm     |
| Volk Super Vitreofundus® | .57x                 | 103°/124°                                 | indirect    | Wide field, pan retinal examination and small pupil capability (3-4mm) |
| Volk Digital Wide Field® | .72x                 | 103°/124°                                 | indirect    | High resolution with a wide field of view (past vortex)                |
| Volk Digital 1.0x        | 1.0x                 | 60°/72°                                   | indirect    | Ideal for optic disc measurements and                                  |

| Imaging Lens®                          |       |           |          | slit lamp photos   |
|--|-------|-----------|----------|--|
| Volk Digital High Mag®                 | 1.30x | 57°/70°   | indirect | High resolution, high magnification imaging of the central retina    |
| Ocular Instruments Osher MaxField® 78D | .77x  | 98°/155°  | indirect | Wider field of view compared to a classic 78D lens                   |
| Ocular Instruments MaxField® 120D      | .50x  | 120°/173° | indirect | Wide field, pan retinal examination and small pupil capability (2mm) |

**B. Purpose and Indications**

1. Perform a standard dilated fundus examination using a pre-corneal lens that enhances your magnification, resolution, and/or field of view
  - a) Use a particular pre-corneal lens in order to optimize your view of an area in question
  - b) Maximize your fundus examination through an undilated pupil for situations that do not allow for pupillary dilation

**C. Instrumentation and Procedure**

1. Slit Lamp
2. Teaching tube and/or video recording and display of procedure
3. One of the above pre-corneal fundus lenses
4. Patient with complete pupillary dilation
5. Patient with undilated pupil (for comparison)

**D. Interpretation**

1. The image provided in each of the above lenses is inverted and laterally reversed

**E. Clinical Pearls**

1. Patient's gaze can be altered in order to maximize view of given area
2. Each lens has its own unique working distance to allow for maximal performance

**IV. Station 2: Contact Fundus Lenses**

**A. Manufacturer's Featured Lens Specifications**

| <b>Lens</b>   | <b>Magnification</b> | <b>Field of View<br/>(Static/Dynamic)</b>  | <b>View</b> | <b>Other</b>  |
|---|----------------------|--|-------------|---|
| Volk Fundus<br>20mm (with<br>flange)                  | 1.44x                | 25°/30°  | direct      | Flange helps provide<br>stability of lens on<br>cornea  |
| Ocular<br>Instruments<br>Yannuzzi<br>Fundus Lens      | .93x                 | 36°  | direct      | Flange helps provide<br>stability of lens on<br>cornea  |
| Ocular<br>Instruments<br>Fundus<br>Diagnostic<br>Lens | .93x                 | 36°  | direct      | The flat front surface<br>of this contact lens<br>provides a direct<br>image of the<br>posterior pole                         |
| Central lens of<br>3-mirror <sup>1</sup>              | 1.06x<br><br>1.08x   | 3 mirrors:<br><br>(Volk 60°/66°/76°)<br><br>(Ocular<br>Instruments<br>59°/67°/73°) | direct      | 15mm contact<br>diameter; No flange<br>option is ideal for<br>use on infants or<br>patients with narrow<br>palpebral fissures |
| Volk High<br>Resolution<br>Centralis®                 | 1.08x                | 74°/88°  | indirect    | High magnification<br>and resolution of<br>posterior pole   |
| Volk Equator<br>Plus®                                 | 0.44x                | 114°/137°  | indirect    | Lens of choice in<br>eyes with poor<br>dilation (can be used<br>in pupils as small as<br>3mm)                                 |
| Volk High<br>Resolution<br>Wide Field                 | 0.5x                 | 160°/165°  | indirect    | Extreme peripheral<br>retinal examination   |

<sup>1</sup> Additional lenses available for fundus viewing on 3-mirror (position lens opposite from where you need to examine –e.g., to view lesion located in between the equator and ora serrata in the superior retina, position the rectangular lens inferiorly on the eye):

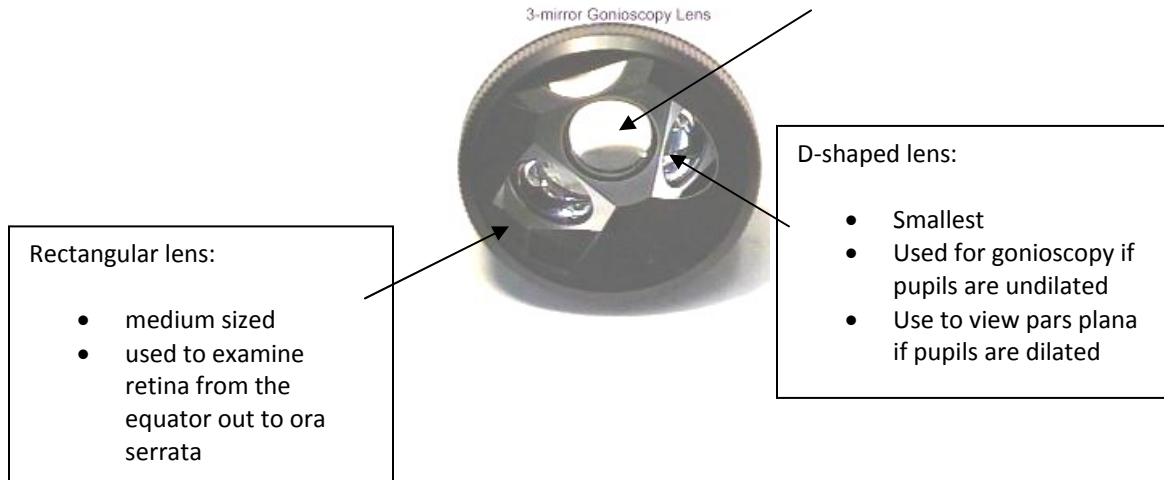
**Trapezoid-shaped lens:**

- Largest
- used to examine retina adjacent to the posterior pole out to approximately equator
- requires dilation

4

**Central lens:**

- Direct, magnified view of posterior pole (approx. central 30-36°)
- High minus lens: -64D



#### B. Purpose and Indications

1. Use a particular contact fundus lens in order to optimize your view of an area in question
2. Clinical uses:
  - a) Enhancing view of macula
    - 1) Edema in diabetic, ARMD, or POHS
    - 2) Epiretinal membrane
    - 3) Macular hole
    - 4) Cystoid macular edema
3. Dilated fundus examination in an uncooperative or photophobic patient
4. To obtain a more magnified view of a peripheral retinal lesion noted during BIO

#### C. Contraindications

1. Severe corneal trauma
2. Penetrating ocular injury
3. Severe anterior segment infection
4. Hyphema

#### D. Instrumentation

1. Slit Lamp
2. Teaching tube and/or video recording and display of procedure
3. One of above contact fundus lenses
4. Patient with complete pupillary dilation
5. Patient with undilated pupil (for comparison)
6. Buffering solution such as Goniosol , Refresh Celluvisc, or Genteal Gel
7. Anesthetic

8. Glutaraldehyde for high level disinfection

E. Set Up

1. Prepare disinfected lens by cleaning of debris and fingerprints (soap and water, or an RGP cleansing solution can be used)
2. Place 2-3 drops of buffering solution into lens well
  - a) Lenses without a flange may require less or no buffering solution
3. Anesthetize patient's cornea(s)

F. Procedure

1. Instruct patient to look up
2. Obtain lower lid control (may not be necessary if using a lens without a flange)
3. Insert the lower portion of the lens/flange into the patient's inferior cul-de-sac
4. Push the lens downward and rotate the lens onto the cornea. Upper lid control can be obtained if necessary.
5. Instruct the patient to look at your fixation target (knob, ear, etc)
6. Pull back on the slit lamp joystick in order to obtain a focus on the desired target.
7. Lens removal
  - a) Carefully break suction between lens and tear interface
  - b) Lenses without a flange will have less or no suction and lens can be gently pulled directly away from the eye
8. Lavage if necessary based on buffering solution used
9. Disinfection of used lens with glutaraldehyde high-level disinfection

G. Interpretation

1. Direct view: view seen is how it appears anatomically
2. Indirect view: view is inverted and laterally reversed

H. Clinical Pearls

1. Patient's gaze can be altered in order to maximize view of given area