

Scleral Lenses: Taking it to the Next Level Advanced Scleral Lens Workshop

Abstract:

This two-hour presentation is an interactive workshop where practitioners will learn advanced topics for fitting scleral lenses on patients with irregular corneas, post-surgical status or ocular surface disease. A short lecture reviewing the principles of advanced scleral lens fitting will be presented. Video demonstrations that include advanced design principles, imaging the sclera with scleral topographers, and assessing the lenses under the slit lamp will be dispersed throughout the workshop. Instructors, who are Fellows of the Scleral Lens Education Society, will facilitate the workshop experience utilizing representative scleral lens designs.

Course Learning Objectives:

To provide participants with knowledge and training of scleral contact lens fitting and management of a wide range of medical conditions. Practitioners will be exposed to various advanced fitting applications and technology used in scleral lens customization. Guidelines and problem-solving tips that practitioners can utilize in a clinical environment will be discussed.

Outline:

I. History of Scleral Contact Lenses

- A. Blown glass lenses
- B. Molded plastic lenses
- C. Modern gas permeable lenses

II. Scleral Lens Terminology, Design and Indications

A. Size classifications

- a. Mini scleral lens: up to 6mm larger than patient's HVID
- b. Large scleral lens: greater than 6mm larger than patient's HVID

B. Lens designs and parameters

- a. Scleral lens geometry
 - i. Optical zone
 - ii. Transition zone
 - iii. Landing zone
- b. Importance of scleral lens sagittal depth
 - i. Base curve radius vs overall diameter

C. Scleral lens indications

- a. Regular cornea patients
 - i. Presbyopes
 - ii. High refractive error
- b. Irregular cornea patients
 - i. Primary and secondary corneal ectasias
 - ii. Post-surgical/refractive
- c. Ocular surface disease

III. The 1-2-3s of Fitting

- a. Completely bridge over the cornea and limbus

- i. Photographs illustrating corneal clearance
 - 1. Excessive corneal clearance
 - 2. Adequate corneal clearance
 - a. Around 200um to minimize corneal hypoxia
 - 3. Corneal touch
- ii. Tips to achieve adequate corneal clearance
 - 1. Compare to scleral lens center thickness
 - 2. Account for scleral lens settling
 - 3. Ideal to assess fit after 30 minutes of in office wear
- iii. Photographs illustrating limbal clearance
 - 1. Excessive limbal clearance
 - a. Limbal microcystic edema
 - 2. Adequate limbal clearance
 - a. Around 60um to minimize corneal hypoxia
 - b. Difficult to assess when less than 40um thick
 - 3. Limbal touch
 - a. Compression ring or limbal staining
- iv. Tips to achieve adequate limbal clearance

b. Provide an adequate “landing” on the sclera

- i. Photographs illustrating scleral landing
 - 1. Scleral impingement
 - a. Arcuate edge staining on conjunctiva

2. Haptic compression
 - a. Blanching of conjunctival blood vessels
 - b. Rebound injection post scleral lens removal
 3. Edge lift
 - a. May cause late forming bubbles
 - b. May increase rate of chamber debris
 4. Adequate haptic alignment
- ii. Tips to achieve adequate haptic alignment
 1. Heel vs toe effect
 2. Toric haptics, especially if scleral lens OAD is greater than 15.0mm
 3. Account for scleral lens settling
 4. New scleral mapping technologies
- c. Ensure adequate tear flow under the lens
 - i. Tear exchange limited to 0.2% per minute
 - ii. Takes more than eight hours to replenish the bowl under a scleral lens
 - iii. Tear exchange may be hindered by excessive or inadequate corneal clearance

IV. Case histories

Several photographic histories will be presented and will be selected from a large collection of cases including

1. Cases of patients with various ocular conditions, such as:

i. Corneal ectasia

1. Keratoconus
2. Pellucid marginal degeneration
3. Post-LASIK ectasia
4. Keratoglobus

ii. Post-surgical

1. Post-PKP

2. Post-RK

iii. Corneal scarring

1. Infection
2. Trauma
3. Chemical burn

iv. Ocular surface disease

1. Exposure keratopathy
2. Sjogren's Syndrome
3. Stevens Johnson Syndrome
4. Grave's Disease

V.

A. Cleaning and disinfection of scleral lenses

B. Selection of base curve/vault

C. Insertion with plunger vs finger techniques

- a. Demonstrate patient positioning
 - b. Suction vs non-suction
 - c. Exposure to various scleral lens insertion tools that may benefit patients
- D. Assessing scleral lens fit in free space, slit lamp and anterior segment OCT
 - a. Bubble formation
 - b. Vault and fluorescein evaluation
 - c. Assessing peripheral fit (landing)
 - d. Assessing tear flow
- E. Removal technique
 - a. Plunger
 - i. Importance of slightly decentered plunger placement
 - b. Hands/finger
- F. Solutions
 - a. Insertion solutions
 - i. Non-preserved 0.9% sodium chloride solution vials
 - ii. Non-preserved saline solution
 - iii. Preservative free artificial tears
 - b. Disinfection solutions
 - i. Hydrogen peroxide solutions
 - ii. Scleral lens compatible RGP cleaning solutions

Additional cleaners

VI.

1. Advanced Lens Designs

a. Toric haptics

- i. When to utilize
- ii. Clinically significant amount of scleral toricity
- iii. How much toricity to start with?
- iv. Percent of population that need toric haptics

b. Quadrant specific haptics

- i. When to utilize
- ii. Percent of population that need quadrant specific haptics

c. Multifocal scleral lenses

d. Front surface eccentricity

e. Notching

- i. When to utilize
- ii. How to notch
 1. Without imaging technology
 2. With imaging technology

f. Vaulting

- i. When to utilize
- ii. How to vault
 1. Without imaging technology
 2. With imaging technology

g. Truncation

2. Advanced Imaging Technology

- a. Demonstrations of various new scleral technologies
 - i. Scleral mapping technologies
 - 1. sMap3d
 - 2. Eaglet Eye ESP
 - 3. Pentacam CSP
 - ii. Scleral evaluation technologies
 - 1. Anterior Segment OCT
 - iii. Corneal impression molding technologies
 - 1. Eyepoint PRO
- 3. New gas permeable material and treatments
 - a. Hyper-Dk materials (200 Dk)
 - i. Optimum infinite
 - ii. Acuity 200
- 4. Surface Treatments
 - a. Tangible Science Hydra-PEG
- 5. Optics
 - a. Multifocals
 - b. Decentration of optics
 - c. Wavefront guided scleral lenses
- 6. Video demonstrations
 - a. Application/removal
 - b. Anterior segment camera
 - i. Demonstrate the fit scleral lenses with various design parameters

1. Excessive clearance
2. Minimal clearance
3. Spherical peripheral curve
4. Toric peripheral curve

c. Slit lamp techniques

d. OCT

e. Pentacam

f. sMap3D

g. EyePrint Pro