

Diagnosis and Treatment of the Irregular Cornea

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COPE approved 2 hours 73121-CL

Course Description

Devastating visual consequences may occur if corneal pathologies are undetected. Fortunately there are many available contact lens options to improve clinical outcomes for those with irregular corneas. The course will cover the diagnosis and management of the irregular cornea including lens evaluation and troubleshooting. Best practices for contact lens fitting of corneal gas permeable, custom soft, hybrid and scleral lenses will be discussed.

Course Objectives

1. Learn how to diagnose different types of corneal ectasia.
2. Identify when a patient is a candidate for a corneal GP or scleral lens.
3. Learn when corneal collagen cross-linking is indicated for a patient with keratoconus.
4. Become knowledgeable of when to use reverse geometry contact lens designs.

Outline

- I. Irregular Cornea
 - a. Conditions
 - i. Corneal ectasia
 1. Keratoconus
 2. Keratoglobus
 3. Pellucid marginal degeneration
 4. Following corneal refractive surgery
 - ii. Post-keratoplasty

- iii. Post-corneal refractive surgery
 - 1. LASIK
 - 2. PRK
 - 3. RK
- iv. Corneal opacity
 - 1. Post-trauma
 - 2. Post-infection
- v. Corneal dystrophies
 - 1. Anterior
 - 2. Stromal
- vi. Corneal degenerations
 - 1. Salzmann's nodular degeneration
 - 2. Terrien's marginal degeneration
- II. Goals with contact lens correction
 - a. Provide good vision
 - i. By masking the irregular corneal surface
 - 1. Reduces aberrations
 - a. Improves acuity
 - b. Provide good corneal health
 - c. Provide adequate comfort for all hours of wear
- III. Diagnosis
 - a. Subjective symptoms
 - b. Refractive shift
 - c. Keratometry mires
 - d. Corneal topography
- IV. Treatment
 - a. Corneal collagen cross-linking
 - b. Corneal surgery
 - c. Contact lenses
- V. Corneal GP Contact Lenses

- a. Benefits
 - i. Provides rigid optical surface
 - 1. Good optics
 - ii. Widely available
 - iii. Lower cost than many other options
 - iv. Wide range of lens design parameters available
 - b. Challenges
 - i. Poor success if corneal elevation difference is greater than 350 microns (scleral lens indicated)
 - ii. Areas of touch may lead to:
 - 1. Staining
 - 2. Scarring
 - 3. Corneal warpage
 - c. Fitting tips
 - i. Central irregularity, use smaller OAD
 - ii. Steeper irregularity, use smaller OAD
 - iii. Decentered or larger area of irregularity, use larger OAD
 - iv. Oblate or peripherally steep corneal profile, use oblate, or reverse geometry
 - v. Prolate or centrally steep corneal profile, use prolate geometry
 - vi. Peripheral curves
 - 1. Toric option
 - 2. Quadrant specific option
- VI. Piggyback (PB) Lens System
- a. Definition: Corneal GP over a soft contact lens
 - i. GP provides good vision
 - ii. Soft protects cornea
 - b. Indications
 - i. Poor comfort with GP
 - ii. Minor corneal abrasion with GP wear (temporary)

c. Challenges

- i. Extra cost
- ii. Extra hassle
 - 1. Daily disposable soft minimizes added care

d. Fitting tips

i. Approach #1:

- 1. Fit corneal GP first
- 2. Then fit a near plano soft lens underneath
 - a. Good particularly for temporary use (ie abrasion)

ii. Approach #2:

- 1. Fit soft lens first. Choosing power most advantageous
 - a. If steep corneal surface (eg. central cone)
 - i. Fit minus lens to provide flatter fitting surface
 - b. If flat cornea (eg. post-RK)
 - i. Fit plus lens to provide steeper fitting surface
- 2. Then fit GP lens to front surface of soft lens
 - a. Perform OR over PB system to arrive at final GP power
 - b. Approximately 21% of soft lens power translates to changes in GP lens power

iii. If loose or excessive edge lift with soft lens

- 1. Steepen base curve
- 2. Increase diameter
- 3. Decrease center thickness (better draping)
- 4. Custom soft lens may be necessary

iv. Soft lens with central excavation

- 1. GP sits in excavation
- 2. May improve GP lens centration

v. Oxygen considerations

- 1. Due to double barrier (GP + soft), use high O₂ materials

VII. Custom Soft Lenses

a. Indications

- i. Those who can't tolerate a corneal GP
- ii. Those with mild to moderate corneal irregularities

b. Challenges

- i. Vision may not be as good as that provided by rigid optics
- ii. Added thickness may lead to corneal hypoxia

VIII. Hybrid Lenses

a. Definition

- i. Rigid center
- ii. Soft skirt

b. Indications

- i. Those who can't tolerate a corneal GP

c. Challenges

- i. Proper lens movement

d. Empirical fitting

IX. Scleral Lenses - M

a. Indications

- i. Often the preferred option if irregularity is advanced

b. Benefits

- i. Better comfort than many corneal GPs
- ii. Better vision than many soft lens options
- iii. Very customizable

c. Challenges

- i. Some patients have difficulty with lens handling
- ii. Can be more costly than some other options
- iii. May induce hypoxia in those with poor endothelial function

d. Fitting tips

- i. Central clearance
 - 1. More if suspect progression

2. Impact of settling

- ii. Limbal clearance
- iii. Edge clearance
- iv. Solutions
- v. Care and handling