

**Course title:**

Keratoconus: Which Lens Works Best?

**Course speaker:**

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**Course category:**

Contact Lenses

**Course description:**

This course will review contact lens designs and when each modality is suited for various stages of keratoconus. It will review corneal gas permeable lenses, custom soft and hybrid designs, as well as scleral lenses.

**Course Objectives:**

1. Understanding corneal topography and how that can influence lens design selection.
2. Discuss some contact lens designs are superior to others based on cornea shape and severity of keratoconus.
3. Understand contact lens fitting techniques of each design.

**Course Outline**

- I. Introduction (3 minutes = 3/50)
  - A. Keratoconus (KC)
    1. Definition
    2. Diagnosis
    3. Management
      - a. Corneal cross-linking (CXL)
      - b. Contact lenses (CL)
- II. Contact Lenses for KC
  - A. Many design options (1 minute = 4/50)
    1. Soft lenses
    2. Custom soft lenses
    3. Corneal gas permeable (GP) lenses
    4. Hybrid contact lenses
    5. Scleral contact lenses
  - B. Design selection (5 minutes = 9/50)
    1. Previous patient experience with CL
    2. Patient lifestyle
    3. Refractive needs and vision demands
    4. Corneal shape and keratoconus severity
  - C. Safe CL fitting considerations for patients with keratoconus (8 minutes = 17/50)
    1. Protecting the epithelium of the corneal apex
      - a. Epithelium is thinnest at apex
    2. Mid-peripheral corneal bearing and tear exchange
      - a. Potential for neovascularization
      - b. Assessing for surface staining and all-day lens comfort
    3. Limbal health during CL wear
      - a. Long-term corneal consequences
    4. CL impact on conjunctival and scleral surface
      - a. Surface hypertrophy with tight lens edges
      - b. Irritation of pinguecula with poor fitting CL

- c. Dry eye and allergy stimulation with poor fitting lens
- III. Understanding lens designs and how they impact ocular surface health
  - A. Soft lenses (1 minute = 18/50)
    - 1. Best candidates
      - a. Good refraction through glasses
      - b. Previous soft contact lens experience
    - 2. Fitting is similar to non-KC eyes
    - 3. Consider one extra over-refraction to fine tune best vision
      - a. Corneal shape over size of pupil may call for more or less spherical and astigmatism compared to glasses.
  - B. Custom soft lens (3 minutes = 21/50)
    - 1. Design
      - a. Base Curve
      - b. Diameter
      - c. Material
    - 2. Best Candidates
      - a. Good refraction through glasses
      - b. Good experience with soft contact lenses
      - c. More irregular astigmatism compared to candidates for disposable soft lenses
    - 3. Fitting techniques
      - a. Assessment of lens movement
      - b. Rotational stability
      - c. Over-refraction
  - C. Corneal GP lenses (6 minutes = 27/50)
    - 1. Design
      - a. Base Curve (BC)
      - b. Peripheral curve system
      - c. Material
    - 2. Best Candidates
      - a. KC patients with central cones
      - b. Mild-moderate corneal curvatures
      - c. Allergy considerations
        - 1) Giant papillary conjunctivitis
        - 2) Eye rubbing
    - 3. Fitting techniques
      - a. BC selection – Based on keratometry readings at apex
      - b. Diameter selection – Based on cone size and corneal diameter
      - c. Mid-peripheral curves – Mediate junction between steeper central cornea and more regular peripheral shape
      - d. Over-refraction
    - 4. Assessment techniques
      - a. Assess corneal apex
        - 1) Tear exchange
        - 2) Bearing
        - 3) Movement
      - b. Assess mid-periphery and edge
        - 1) Bearing and binding
        - 2) Excessive lift creating too much movement
        - 3) Edge profile and alignment to cornea
  - D. Hybrid lenses (7 minutes = 34/50)

1. Design
    - a. Center GP
    - b. Peripheral skirt
    - c. Optics
  2. Best candidates
    - a. Centered cone
    - b. Various designs based on corneal severity
    - c. Dexterity of patient for lens removal
  3. Fitting techniques
    - a. Apical alignment
    - b. Lens movement
  4. Assessment techniques
    - a. Lens centering
    - b. Movement
    - c. Over-refraction
- E. Scleral lenses (14 minutes = 48/50)
1. Design
    - a. Many curvatures
      - 1) BC
      - 2) Mid-periphery
      - 3) Limbal zone
      - 4) Landing curves
  2. Best candidates
    - a. Many patient candidates
    - b. Previous soft vs corneal GP lens experience
    - c. Patient dexterity
    - d. Severity of KC
  3. Fitting techniques
    - a. Sagittal depth
    - b. Midperipheral and limbal relationship
    - c. Alignment of haptics to scleral surface
    - d. Lens diameter
  4. Advanced techniques
    - a. Instrumentation
      - 1) Anterior segment OCT
      - 2) Scleral profilometry
      - 3) Higher-order aberration measurements
      - 4) Impression-based fitting
      - 5) Anterior segment imaging
  5. Assessment techniques
    - a. Vault
    - b. Limbus
    - c. Lens movement
    - d. Over-refraction
- F. Summary (1 minute = 49/50)
1. Corneal shape plays an important role
  2. Usually patients are a candidate for multiple designs
- G. Close and Questions (1 minute = 50/50)

