

## **Keratoconus Surgical Options - Where Do They Fit In?**

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### Course Description:

This course will discuss a comprehensive approach to the surgical management of keratoconus. This includes stabilizing the cornea with corneal crosslinking, and improving corneal topography with corneal inlays, excimer laser treatments (PRK), and modern corneal transplantation. In addition, uncorrected visual acuity can be further improved with excimer laser and lens based surgical procedures.

### Outline:

1. KC1...2...3...: Paradigm Shift in KC Management in the US
  - a. KC 1: Stabilize the cornea
    - i. CXL
    - ii. Stop progression
      1. Prevent advanced disease
  - b. KC 2: Surgical improvement of topography
    - i. Excimer laser
    - ii. Corneal inlays
    - iii. Corneal transplant
  - c. KC 3: Visually Rehabilitation
    - i. Specialty contact lenses
    - ii. Spectacle correction
    - iii. Surgical interventions
      1. Excimer laser
      2. Phakic IOL
      3. Pseudophakic IOL
2. Surgical Interventions
  - a. Corneal Stabilization
    - i. CXL
      1. Epi-Off CXL
        - a. Minor Kmax change
        - b. Hersh et al 2017
          - i. 1.6D and 1 Line BCSVA
  - b. Corneal Tissue Reshaping
    - i. Topography guided PRK
      1. Excimer laser
        - a. How procedure is performed
        - b. Transepithelial PRK vs PRK after epithelial removal

- c. Focal reshaping resulting in large Kmax flattening
    - d. Micron level tissue removal
      - i. Greenstein et al 2021 (pending)
        - 1. 4.5D and 2 Line BCSVA
  - ii. ICRS
    - 1. How do Intacs work
      - a. Elevation of cornea over segment with flattening inside of the segment
    - 2. Small Kmax change, large K change
      - a. Hersh et al 2019
        - i. 2.5 D and 1 Line BCSVA
    - 3. Synthetic material
      - a. Biocompatibility issues possible
        - i. Nguyen et al 2017
          - 1. 2.5% medical complications
  - iii. CTAK
    - 1. Corneal tissue implantation
      - a. Biocompatibility
      - b. Freedom of shape
        - i. Jacob et al 2017
        - ii. Van Dijk et al 2019
        - iii. Jin et al 2019
        - iv. Greenstein et al 2021 (pending)
          - 1. 20D and 6 lines BSCVA
    - iv. Corneal Transplantation
      - 1. Lamellar keratoplasty (DALK)
      - 2. Penetrating Keratoplasty (PKP)
        - a. If endothelial dysfunction
  - c. Surgical Vision rehabilitation
    - i. Lens Based procedures
      - 1. Phakic IOL
      - 2. Visian ® ICL™
        - a. Sulcus based lens
        - b. “off label” for keratoconus and ectasia
    - ii. Cataract Surgery/Refractive lens exchange
      - 1. Pseudophakic IOL
        - a. Toric for regular astigmatism
        - b. Algorithm for cataract managements
- 3. Clinical Cases
  - a. Show comprehensive surgical management of patients with keratoconus

## Course Learning Objectives

1. Understand what procedures are used to stabilize the keratoconic cornea
2. Understand what procedures are used to improve corneal topography in patients with keratoconus
3. Understand what procedures are used to improve visual acuity after stability and improved corneal topography is achieved
4. Understand how to match these procedures with patient goals
5. Understand what changes can be expected with these procedures
6. Understand the possible complications of these procedures