

Keratoconus: Research of the Past and Clinical Indications for the Future

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- I. Keratoconus research then and now
 - a. Epidemiology X 30 years
 - i. Incidence & Prevalence
 - ii. Influence of technology
 - iii. Influence of race/geography
 - b. Collaborative Longitudinal Evaluation of Keratoconus (CLEK)
 - i. 8 year observational/15 clinics
 - ii. 1209 patients
 1. Study Cohort
 2. Criteria
 - iii. Natural progression of keratoconus
 - iv. Keratoconus asymmetry
 - v. Vision correction over time
 - vi. Lens type
 - vii. Risk Factors
 1. Atopy
 2. Eye Rubbing
 - viii. Inheritance of keratoconus
- II. Pediatric Keratoconus
 1. Keratonus (Kc) –
 - a. Incidence
 - b. Onset
 2. Kc Signs –
 - a. Refraction (early)

- b. Corneal topography (early)
- c. Visual acuity
- d. Corneal thickness
- e. Vogt striae
- f. Fleisher ring
- g. Rizzuti (late)
- h. Munson (late)
- i. Scarring

3. Kc Pathophysiology –

- a. Anterior stromal disease location and scarring
- b. Posterior scar - hydrops

4. Pediatric Crosslinking –

- a. Dresden protocol
- b. Crosslinking below FDA approved age range
- c. Crosslinking while eye is still growing
- d. Crosslinking on diagnosis or on progression

5. Crosslinking –

III. Understanding Keratoconus Progression

a. Keratoconus: Background and Management Challenges

i. Clinical Challenge

- 1. Detection at an early stage
- 2. Stage classification
- 3. Risk of future progression
- 4. Determination of stable/progressive

b. Clinical Management:

- i. Visual Rehabilitation
 - ii. Arrest Progression
 - iii. Controversies: the different approaches to CXL
- c. Retrospective Digital Computer Analysis Of Keratoconus Evolution (REDCAKE)
 - Project: Baseline Findings
 - i. Graphical stage classification
 - ii. Elevation profiles
- d. Determining the Best Tomography-Based Parameters to Track Progression
 - i. Desirable characteristics
 - 1. Monotonicity
 - 2. Consistency
 - 3. Repeatability
 - ii. Appropriate parameters to evaluate progression
- e. Is it Possible to Forecast Keratoconus Progression?
- f. Definitions of Keratoconus Progression: Impact On Clinical Practice
 - i. Habitual criteria, alternative criteria and ABCD Progression Display
 - ii. Stratified approach to progression
- g. Future Goals: Towards Data Driven Decisions and Sustainability

IV. Technology

- a. Lens Designs
 - i. Short term- Limbal clearance
 - 1. Cannot be judged adequately with slit lamp evaluation- must use OCT
 - 2. Judging the location of the limbus using OCT
 - 3. Poor limbal clearance- OCT images
 - 4. Optimal limbal clearance- OCT images
 - ii. Long term- fit customization
 - 1. Impression-based

2. Scleral topography

3. Trial lenses

b. Wavefront-guided technology

i. Diagnostic

ii. Treatment of HOA's

c. Materials

i. Dk

ii. Wettability

d. Coatings

e. Solutions

i. Education component of harmful practices (solutions)

ii. Tailored solutions for sclerals