

Brooke Messer, OD, FAAO, FSLS
936 Mulberry Lane
West Fargo, ND 58078
(701) 290-7474
drbmesser@gmail.com

10 Things You Didn't Know About Keratoconus

The course educates attendees on updated understandings of keratoconus to improve ability to diagnose when the patient presentation does not fit the classic description of steep keratometry, thin pachymetry and decreased best-corrected visual acuity.

Objectives:

1. Educate that keratoconus can be diagnosed early in the disease process
2. Review management of surgical interventions, like corneal transplant and crosslinking.
3. Review new technologies that assist in keratoconus diagnosis

10 Things You Didn't Know About Keratoconus

I. Introduction (3 min)

A. Revisiting the definition of keratoconus

1. Long-standing clinical definition may still make sense in many cases
2. Could leave some cases undiagnosed

B. But given today's evolving standard of care, is it time to update the definition?

II. Did you know these 10 things about keratoconus?

A. Keratometry measurements don't have to be steep to have keratoconus (5 min)

1. Currently, keratoconus diagnosis often triggered by high keratometry findings
 - a. Normal corneas can develop keratoconus with trauma
 - 1) Eye rubbing
 - 2) Injury
 - 3) Pillow-diving
3. Mild cases have historically gone undiagnosed
 - a. Broadening use of tomography has assisted in diagnosis
 - b. Posterior corneal bowing is an earlier finding

B. Cornea doesn't have to be thin to have keratoconus (4 min)

1. Many cases of keratoconus have an average corneal thickness
2. Manual pachymetry can be misleading
 - a. Single corneal point data is insufficient for diagnosis
 - b. Have to know location of apex to identify thinning point

C. Don't need bilateral findings to refer for treatment of cross-linking (4 min)

1. Keratoconus is still considered a bilateral and asymmetric condition
2. More progressed side is often associated with more aggressive eye rubbing
3. Discuss treating both eyes as corneal fibers are at risk for change in both eyes

D. You don't have to need decreased visual acuity to diagnose keratoconus (4 min)

1. Depending on location of apex, central cornea may be minimally affected

E. Prevalence of keratoconus is no longer 1:2000 (3 min)

1. In 1986, the prevalence of keratoconus was estimated at 1:2000
2. In 2017, the prevalence of keratoconus was re-estimated to 1:375
 - a. Interests in refractive procedures screens more patients
 - b. Advancements in instrumentation and their use in primary care clinics

F. You don't have to be young to develop keratoconus (4 min)

1. Diagnosis in age 40 and later is more common than previously thought
2. Environmental risk factors will always play a role, regardless of age
 - a. Previous assumption was no need to crosslink after mid-40s
 - b. More recent information shows progression can occur into the 50s

G. The anterior cornea is not always irregular in keratoconus (5 min)

1. Posterior corneal change occurs before anterior corneal change
 - a. What if minimal access to tomography?
 - 1) Poor vision quality despite adequate visual acuity
 - 2) Retinoscopy shows tear-drop or scissoring on retro-illumination
2. Thickness of epithelium in keratoconus
 - a. Thins over apex of cornea, thickens at base of to mask anterior bowing
 - b. AS-OCT and epithelial thickness mapping over corneal apex

- c. Global Consensus Delphi Panel (2015) findings on early diagnosis by posterior float
 - 1) Hence, keratoconus can occur with normal anterior curvature
- H. We know some specifics in the genetics of keratoconus (4 min)
 - 1. Over 70 genes and 2,300 variants play a role
 - a. Some carry a heavier impact
 - b. Genetic testing is available to assess risk for keratoconus development
 - 1) Assist in clinical decision making
 - a) When to refer for corneal cross-linking in young patients
- I. Patients with keratoconus need more than just optical rehabilitations (5 min)
 - 1. They often need additional clinical managements
 - a. Long-standing definition of keratoconus includes atopy and allergy
 - 2. Providers should also be watching for floppy eyelid syndrome
 - a. Refer for sleep study due to association with sleep apnea
 - 3. Dry eyes may be common or possibly more prevalent than general population
 - a. Makes contact lens wear less tolerable
 - b. Increases likelihood of eye-rubbing
- J. Penetrating keratoplasty is not the only surgical option (6 min)
 - 1. Penetrating keratoplasty (PKP)
 - a. When is it appropriate to consider?
 - 1) Poor vision with GP lenses
 - 2) Post-operative drop regimen is important and lengthy
 - b. Long term outcomes and management
 - 1) Long steroid taper
 - 2) Irregular astigmatism will likely warrant GP contact lenses
 - 2. Deep anterior lamellar keratoplasty (DALK)
 - a. Description of procedure
 - b. Pros
 - 1) Graft availability not dependent on endothelial cell quality
 - 2) Lower rejection risk
 - c. Cons
 - 1) Difficult technique
 - 2) Perforation of Descemet's membrane requires switch to PKP
 - 3. Corneal cross-linking should be considered in many cases
 - a. When is it NOT OK to crosslink?
 - b. Description of procedure: Epithelium-off vs epithelium-on
 - c. Long-term outcomes
 - d. Complications: Slow healing, haze, endothelial cell loss
 - e. When to resume contact lens use or finalize glasses prescription
 - 4. Corneal transplants in the day and age of corneal-crosslinking
 - a. Decreasing rates of full-thickness transplants
- III. Summary (3 min)
 - A. Keratoconus management and corresponding treatment timings have changed
 - B. We are better at detecting and treating early to save vision
 - C. Crosslinking is effective and safe
- IV. Close