COURSE 9
Corneal Topography Review and Use in Fitting Contact Lenses

COPE Course 42491-CL
What can you use it for?

- Baseline examinations
- Screening/diagnosing pathology
- Surgical work-up and follow-up
  - Refractive Surgery
  - Corneal Transplant
- Monitor progression
- Enhanced fitting of RGPs

Types of Corneal Measurement

- Reflection
- Slit-scanning
- Scheimpflug
- OCT
Slit-Scanning

- Orbscan iiz

Scheimpflug

- Pentacam

Optical Coherence Tomography

- Visante
- Spectralis

Optical coherence tomography displays the cross-sections of the cornea, showing differences in light reflection. The images illustrate the inhomogeneous curvature of the cornea. More minification means higher reflective power and thus steeper curvature.

Placido-disk systems come in small and large-cone designs.

Color scales are used to represent corneal data.
A “round” pattern means very little corneal astigmatism is present.

An “oval” pattern means a small amount of corneal cyl.

Large bowtie means larger cyl and/or limbus-to-limbus

4 different interpretations of the data
Curvature Maps measure...curvature!

Axial data is “smooth” and “averaged”.

Axial Map assumes center of curvature is on optic axis

- Smoothes out data (sphericalized)
- Best for picking base curves
- Caution interpreting “power” in periphery

Tangential data has more precision but noisy

Tangential Map measures radius from true center of curvature

- Point-by-point, not averaged — Noisy
- Good for locating disease
- Caution interpreting “power” in periphery

Infero-nasal steepening OS>OD is evident on the axial map of a keratoconus patient.

Tangential maps of the same patient show more detail about the size and location of the cone. Note that the dioptric values differ from the axial map.
Refractive Power map gives “true” power everywhere.

Refractive Power Map

- Closer to “true” corneal power
  - Center
  - Periphery
- Useful for pre/post evaluation
  - LASIK
  - Ortho-K

Incorrect Power in Periphery with curvature maps

- Curve map shows decreasing “power” in periphery
- Must interpret this as corneal flattening
  - Not true “power”

Tangential v. Refractive

Refractive uses the local radius of curvature and ray tracing to measure the refraction and thus “true” power

Elevation Map gives corneal shape

Curvature and elevation are different!
Elevation Map

- Compares to closest-fitting sphere
  - Like a giant CL laid over top
- Shows high and low points
- Useful for
  - Disease location/extent
  - Predicting NaFl patterns

Normal WTR Cornea Comparison

CL Fitting Guidelines

- 1) Try for 10-20 microns clearance centrally in flat meridian
  - Best acuity!
- 2) Try for 20-30 microns clearance along whole steep meridian
- 3) These are for ~1.00DC
  - Adjust as needed

Topography Patterns

- Keratoconus
- PMD
- Post-PKP
- Post-LASIK
- Post-OK

Keratoconus
Contact Lens Fitting with Topography

- Corneal GPs
  - Normal corneas
  - Keratoconus, PMD
  - PKP
  - Post-LASIK, RK

Contact Lens Fitting with Topography

- Sclerals
- Corneal Reshaping (Ortho-k)
- Custom Soft Lenses