Advanced Topographic Analysis

• J. Bradley Randleman, MD
  • Professor of Ophthalmology, Emory University, Atlanta GA
  • Director, Cornea & Refractive Surgery Section, Emory Eye Center
  • Editor-in-Chief, Journal of Refractive Surgery
  • www.emoryvision.com
  • jrandle@emory.edu
  • No Financial Disclosures

• William J. Dupps, MD, PhD
  • Staff, Ophthalmology, Biomedical Engineering & Transplant, Cleveland Clinic, Cleveland OH
  • Associate Editor, Journal of Cataract & Refractive Surgery
  • duppsw@ccf.org

• Marcony R. Santhiago, MD, PhD
  • Department of Ophthalmology at University of Sao Paulo, Brazil, and Federal University of Rio de Janeiro, Brazil
  • Associate Editor, Journal of Refractive Surgery
  • marconysanthiago@hotmail.com
HOW ARE ECTATIC CHANGES FIRST DETECTIBLE?

Anterior corneal curvature? Placido/Scheimpflug

Posterior corneal surface? Orbscan/Scheimpflug

Corneal thickness? Orb/OCT/Scheimpflug
    Central
    Regional/relational

Epithelial mapping? OCT/Artemis

Biomechanics measurement? ORA/Corvis
WHAT ARE WE USING?

http://www.aao.org/isrs/resources/Courtesy of Richard Duffey, M.D.

HOW WOULD YOU EVALUATE THIS TOPOGRAPHY?

Image courtesy of Renato Ambrosio, MD, PhD

PLACIDO TOPOGRAPHY (NIDEK OPD)

AVAILABLE IMAGING DEVICES
Placido Analysis

- Reflect a series of concentric circles off the cornea

- Measure the slope of the cornea and compute the curvature
PHOTOKERATOSCOPE

Videokeratography

Rabinowitz YS, Yang H, Elashoff
Videokeratography database of Normal Human Corneas.
British Journal of Ophthalmology.
1996;80:610-616.

Slide courtesy of Yaron Rabinowitz, M.D.
Important Concepts in Placido Analysis

- Identify color step scale
- Evaluate quality of scan
  - Diameter of scan
  - Centration
  - Artifactual data loss
- Identify pattern
PREOPERATIVE TOPOGRAPHIC PATTERNS

- 1) Normal/Symmetrical
- 2) Suspicious
  - Asymmetric (mild)
  - Focal Steep/Skewed axis (high)
- 3) Abnormal
  - Keratoconus (“early” “suspect” “FFKC”)
  - Pellucid marginal Corneal Degeneration

Asymmetry

Suspicious Patterns
Against-the-Rule
Superior Steep
Vertical steep

BETWEEN EYE ASYMMETRY

Against-the-Rule
KEY POINT!

• Do not “normalize” a topographic pattern by considering other patient information

• Review topography as a stand-alone entity and then include other data in your overall evaluation

SUMMARY

• Topographic analysis is critical for keratorefractive and lenticular surgery

• Certain screening parameters well established, others in evolution

• Accurate interpretation requires close scrutiny of images

• **Always** evaluate topographic pattern as stand-alone entity first, then incorporate other clinical information

• Ectatic corneal disorders are bilateral