

Corneal Tomography: Basics to Beyond

Chief Instructor: Dr. Urvija Choudhary

1. Understanding Tomography – Dr. Sumeet Lahane

- Topography vs Tomography – reflection vs elevation imaging
- Scheimpflug principle and OCT-based tomography
- Axial vs Tangential curvature maps
- Anterior & Posterior elevation concepts
- Pachymetry distribution and thickness progression
- Belin–Ambrosio enhanced ectasia display
- Normal corneal architecture and physiologic asymmetry

2. Red Flags, Biomechanics & Epithelial Mapping – Dr. Urvija Choudhary

- Posterior elevation >15–20 microns as early red flag
- Displaced thinnest point and abnormal pachymetric progression
- Reduced ARTmax and abnormal BAD-D
- Integration with Corneal Biomechanics (Corvis ST / ORA parameters)
- Tomographic–Biomechanical Index (TBI)
- Epithelial thinning over cone with surrounding compensatory thickening
- Tri-modal screening: Tomography + Biomechanics + Epithelial mapping
- Safer refractive screening algorithm and when to defer surgery

3. Tomography Guided Treatment Planning – Dr. Arushi Garg

- ABCD classification for keratoconus staging
- Cross-linking planning based on cone location & thickness
- ICRS planning using tomographic cone mapping
- TG-PRK and combined CXL protocols
- Monitoring progression using posterior elevation & pachymetry trends

4. Beyond Ectasia – Dr. Himanshu Matalia

- Total corneal refractive power for cataract planning

- Posterior astigmatism in toric IOL selection
- Post-keratoplasty graft-host mapping
- Ocular surface distortions (pterygium, scars)
- Tomography in trauma and irregular corneas

5. Troubleshooting Artifacts – Dr. Aarti Agrawal

- Tear film instability causing false steepening
- Contact lens warpage considerations
- Poor fixation and decentered scans
- Repeat 3 scans before diagnosis
- Always correlate with slit-lamp findings

6. AI, Bowman's Layer & Collagen Architecture – Dr. Pooja Khamar

- AI-based early ectasia detection models
- Pattern recognition beyond conventional indices
- Bowman's layer imaging with ultra-high resolution OCT
- Collagen lamellar disorganization in keratoconus
- Future technologies: Brillouin microscopy & stiffness mapping
- Predictive personalized corneal medicine

Five Golden Take-Home Messages

- Posterior changes precede anterior changes
- Biomechanical weakening precedes morphological change
- Epithelium can mask early ectasia
- No single index is diagnostic
- When in doubt – protect the cornea