

INSTRUCTION COURSE: MASTERING TORIC IOLs

AIOS Conference Handout

COURSE OVERVIEW

This course is designed to transition the cataract surgeon from "Toric-hesitant" to "Toric-confident." We explore the necessity of astigmatism management in modern practice, the precision required in pre-operative planning, techniques for perfect alignment, and management of complex scenarios.

Why Toric IOLs are a Must in Modern Cataract Practice

The definition of "successful" cataract surgery has evolved. It is also about achieving refractive precision.

- **The Burden of Astigmatism:**
 - Studies indicate that **30–40%** of cataract patients have pre-existing corneal astigmatism more than 1.0 D.
 - **70%** of patients have astigmatism more than 0.5 D.
 - Ignoring this astigmatism means that the patients will not have the crisp visual quality for distant vision
- **The Patient Expectation:**
 - Modern patients demand spectacle independence for distance.
 - Uncorrected astigmatism results in compromised contrast sensitivity and "ghosting" of images, even with 6/6 Snellen acuity.
 - Toric IOLs offer the single most effective method to ensure **crisp, high-quality vision**.
 - Refractive cataract surgery is the new standard of care.

TAKE HOME MESSAGE:

Toric IOLs are not "premium" lenses; they are "essential" lenses for anyone with significant regular astigmatism. Treating the sphere while ignoring the cylinder is only half a surgery. If you aren't offering Toric IOLs, you are actively choosing to leave your patient with a refractive error that was fixable.

TOPIC 2

Pre-operative Evaluation: Instruments & Candidate Selection The success of a Toric IOL is determined before the patient even enters the OR. Pre-operative reliable K readings are the key.

Essential Instrumentation

- **Optical Biometry:** (e.g., IOLMaster 700, Lenstar) – The gold standard for axial length and K readings.
- **Corneal Topography/Tomography:** (e.g., Pentacam, Sirius, Cassini) – Better to have- Overall picture becomes more clear. You must see the shape of the cornea, not just the numbers.
- **Auto Keratometry-** Easily accessible
- **Manual Keratometry:** A reliable cross-check to verify axis and magnitude.
- If finance is an issue, a reliable consistent reading from the Auto keratometer is an acceptable way to start Toric practice. But critical to rule out irregular corneas.

Candidate Selection: Who is NOT an Ideal Candidate?

- **Irregular Astigmatism:** Patients with significant corneal scars, severe EBMD, or unstable ectasia. Topography is the judge here.
- **Severe Dry Eye / Ocular Surface Disease:** The "rookie mistake." Dry eye falsifies K readings. Treat the surface aggressively before measuring.
- **Unstable Zonules:** Phacodonesis or pseudoexfoliation (risk of lens rotation post-op).
- **Pterygium:** Must be excised allowing corneal remodeling before biometry.

The "Rule of Three" for Validation

- Never rely on a single device.
- Compare Magnitude and Axis across three modalities (e.g., Biometer + Topographer + Auto K or Manual K).
- If the axis differs by >10 degrees between devices, or magnitude is very much different **do not proceed** until resolved.

TAKE HOME MESSAGE:

The Corneal Topographer is your best friend. It detects what the K-readings hide (irregularity). If the "bowtie" on the map isn't symmetrical, be cautious with Toric IOLs.

TOPIC 3

Marking, Alignment & Intra-operative Manoeuvres

Precision alignment is critical. For every 1 degree of misalignment, you lose approximately 3.3% of the astigmatic correction. A 30-degree rotation negates the effect of the Toric lens entirely.

Techniques for Pre-operative Marking

- **The Sitting Position:** Always mark the reference axis (0-180) with the patient **sitting upright** to account for cyclotorsion (which can be 2–4 degrees or more when supine).
- **Methods:**
 - *Manual:* Bubble marker, slit-lamp beam method (very accurate), or freehand with reference to vessel landmarks.
 - We prefer the slit lamp marking coupled with double verification by the Patwardhan itoric app . This is an inexpensive way of ensuring accurate reference and axis markings for the toric IOLs
 - *Image Guided Systems:* (Callisto, Verion) eliminate manual marking errors but require reliable pre-op image capture.

Practical Tips for Intra-operative Alignment

- **Parallax Error:** The surgeon's view must be strictly perpendicular to the eye.
- **Gross Alignment First:** Rotate the IOL to within 10–15 degrees of the target axis *before* removing all OVD.
- **Final Alignment:**
 - Remove OVD from behind the lens first critical
 - Hydrate wounds *before* the final nudge to ensure chamber stability.
 - Tap the optic gently to rotate into the final position.
 - Sizing and contraction of the CCC is critical to ensure lens stability

TAKE HOME MESSAGE:

Cyclotorsion is real. Never mark a patient lying down. Gross alignment under OVD, fine alignment under irrigation/hydro-implantation, and final check with a stable chamber are the keys to stability.

TOPIC 4: CRISIS MANAGEMENT

Toric IOLs in Intra-operative Complications

When the routine case goes wrong, decision-making must shift immediately.

Scenario A: Posterior Capsule (PC) Tear

- **Small, Central/Paracentral Tear:**
 - If the rhexis is intact and strong: You can place the Toric IOL in the bag *if* you can convert the posterior tear into a continuous posterior capsulorhexis (PCCC).

- *Alternative:* Reverse Optic capture (optics out of the bag above the CCC and the haptics in the bag.) Possible only if the CCC is central and not bigger than 5 mm.
- Large/Unstable Tear: if the situation is not conducive to reverse optic capture **ABORT TORIC**. Do not put a single-piece acrylic Toric in the sulcus (chafing, rotation, pigment dispersion).
- Switch to a 3-piece monofocal IOL and plan for LRI or post-op refractive finish.

Scenario B: Anterior Capsular Tear (Run-out)

- **Risk:** Asymmetric capsular contraction can rotate or tilt the IOL post-operatively.
- **Management:**
 - If the tear does not extend to the equator, a Toric IOL *can* still be implanted.
 - Orient the haptics **90 degrees away** from the vector of the tear if possible to minimize decentration forces.
 - Counsel the patient regarding potential rotation and need for re-positioning.

TAKE HOME MESSAGE:

Stability is paramount. A well-aligned Toric IOL in the sulcus (without optic capture) is a ticking time bomb for rotation. If the bag isn't perfect, it is often safer to abandon the Toric and correct astigmatism on the cornea or with glasses later.

TOPIC 5

Toric IOLs in Complex Conditions

Using Toric IOLs in "abnormal" corneas requires advanced planning and realistic patient expectations.

Post-Keratoplasty (PK)

- **The Challenge:** High, often irregular astigmatism.
- **The Criteria:** The central 3mm of the cornea must have **regular** (orthogonal) astigmatism.
- **The Strategy:** Wait for refractive stability (usually after all sutures are out). Undercorrect rather than overcorrect.

Keratoconus

- **Mild to Moderate (Stable):** Toric IOLs can be life-changing.
- **The Rule:** Ensure the visual axis passes through a relatively regular area of the cornea.

- **Caveat:** Standard Toric calculators may overestimate the required power due to the posterior corneal astigmatism in keratoconus. Use specialized formulas (e.g., Kane Keratoconus formula).
- **Contraindication:** Progressive ectasia or central apical scarring.

Pterygium

- Do not implant a Toric IOL with an active pterygium present. Excision + localized smoothness must be achieved first. Cataract surgery with IOL implantation can be planned after 3 months of pterygium Excision.

TAKE HOME MESSAGE:

If the central cornea is regular, a Toric IOL works wonders. If it is irregular, a Toric IOL may worsen visual quality by inducing higher-order aberrations. Always under-promise and thoroughly counsel these patients.

CONCLUSION

- Toric IOLs are the **standard of care** for astigmatism correction.
- **Good pre-operative evaluation is critical for success.**
- **Marking** must account for cyclotorsion.
- **Surgical technique** must prioritize long-term rotational stability.

"The aim is not just to remove the cataract, but to restore the vision the patient deserves."