

Ten pearls to help surgeons achieve successful toric IOL placements

UPMC practitioners share some tips they employ in their practice.

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Toric IOLs currently represent 7% of all cataract surgeries being performed in the U.S. Because corneal astigmatism is corrected close to the nodal point of the eye, patients have generally been pleased with the outcome. However, it is imperative that the IOL be placed in the correct axis to ensure optimal results. We present several pearls in this article that have helped us have success with our toric IOL placements.

1. Biometry

It is imperative to ensure that the preoperative keratometry values used for IOL calculations are accurate. In addition to the keratometry values obtained with an optical biometer, it is important to validate these values with some form of topography, such as with the Oculus Pentacam, the Zeiss Atlas, the i-Optics Cassini or the Haag-Streit Lenstar T-Cone. This helps ensure that the keratometry values are consistent and that there is no irregular astigmatism. If there is significant irregular astigmatism, a toric IOL will not result in “crisp” postoperative vision.



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2. IOL calculation

A recent study showed that accurate prediction of residual astigmatism was achieved with the Barrett toric IOL calculator in combination with Lenstar LS 900 (Haag-Streit) keratometry. The Barrett toric calculator uses the effective lens position together with a mathematical model for the posterior cornea to calculate the required cylinder power and axis of a toric IOL.

3. Contact lens wear

Long-term contact lens wear can induce corneal warpage and give inaccurate keratometry values. For soft contact lens wearers, we recommend at least a 1-week contact lens holiday. Toric and rigid gas permeable contact lenses require at least a 3-week contact lens holiday, and some even recommend a 1-week contact lens holiday for every decade of RGP contact lens wear.

4. Preoperative marking

Patients should be sitting upright and viewing a distance target to avoid any cyclorotation and have at least two marked reference points. In our practice when a slit lamp is available, we mark the patient at the 3, 6 and 9 o'clock positions at the slit lamp. If not, we use the Whitehouse Gravity Axis Marker to mark the cornea at the 3, 6 and 9 o'clock positions.

5. Intraoperative marking

When marking the intended axis of toric IOL placement, the eye should be in primary position. When placing the metal toric IOL marker at the intended axis of IOL placement, it is our preference not to use any ink. At the intended axis of IOL placement, there is a linear corneal indentation from the metal marker, and at this stage, we use a fine-tip ink marker to place a small amount of ink within the indentation. We have found that this provides a much more precise placement of axis marking when compared with pre-inking the metal marker. Also, this allows an opportunity for the surgeon to re-indent the cornea if the axis is incorrect before the final marking.

6. Incisions

For toric IOLs, surgically induced astigmatism is a factor for determining the IOL power and placement. Therefore, it is important to place one's incision precisely at the axis that was used in the preoperative planning for optimal results.

7. Dilation

Adequate dilation is helpful when placing a toric IOL. Before beginning the case, one should assess whether there is adequate dilation, and in our practice, we have a low threshold for using phenylephrine 10% or a Malyugin ring (MicroSurgical Technology) when necessary.

8. Toric IOL placement

When placing a toric IOL, we have found that "walking" the IOL down to a position where it is seated against the posterior capsule with viscoelastic displaced on top, approximately 5° away from the intended axis placement, is helpful. We then begin irrigation and aspiration in the posterior chamber while continuing to hold the IOL seated against the posterior capsule with the aspirator. This prevents the IOL from spinning and allows for efficient viscoelastic removal. The lens can then be dialed

into position with the instrument of your choice. Remember to keep the eye in primary position to accurately assess the axis of placement.

9. Wound closure

Watertight closure of all wounds is imperative after toric IOL placement. If there is a small leak postoperatively, we prefer to use ReSure sealant (Ocular Therapeutix) for wound closure because this has no impact on corneal astigmatism. If there is still a wound leak, then a suture must be placed. Anterior chamber stability after toric IOL placement is critical to prevent any unwanted IOL rotation in the early postoperative period.

10. Postoperative surprise

If the refractive results at postop week 1 are not consistent with expectations, we routinely refract and dilate our patients to assess the toric IOL axis position relative to intraoperative placement. If the patient still has significant astigmatism that is uncorrected or if the toric IOL has shifted, it is recommended to take the patient back to the operating room soon before the capsule fibroses down and makes IOL rotation more difficult. The Berdahl & Hardten astigmatism fix calculator is a great tool that can help you determine how to rotate the toric IOL to give the lowest amount of residual astigmatism.

Visit UPMCPhysicianResources.com/Ocular to learn more about the services provided at the UPMC Eye Center. You can also submit clinical questions or read the most recent questions asked of the UPMC Eye Center's ophthalmology experts.

- **Reference:**

- Abulafia A, et al. *J Cataract Refract Surg*.2015;doi:10.1016/j.jcrs.2014.08.036.

- **For more information:**

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