

Toric IOLs Versus LRIs Versus Bioptics

Balancing the pros and cons of astigmatism-correcting techniques.

BY KEVIN M. MILLER, MD

Every method for correcting astigmatism at the time of cataract or refractive lens exchange surgery has advantages and disadvantages. The ideal approach, if there is one, corrects all astigmatism with one procedure and does not require a secondary intervention. In most cases, limbal relaxing incisions (LRIs) or toric IOLs can correct astigmatism. Individuals who have residual cylinder after surgery or those whose cylinder is too great to correct by either of these methods alone or in combination may achieve the best result from postoperative keratorefractive surgery (bioptics).

LRIs

The name of this procedure is somewhat misleading, because LRIs are usually placed on the peripheral cornea just inside the limbus, rather than on the limbus itself. The technique is easy to learn and perform, thanks in part to the availability of many nomograms, all of which produce approximately the same result.

Whereas toric IOLs are placed behind the cornea and may induce distortion, LRIs offer the advantage of correcting astigmatism at the source, the cornea. They predictably correct up to 3.00D of cylinder and will not rotate, as an IOL may.

Moreover, LRIs can correct symmetric and asymmetric bowtie corneal astigmatism (Figures 1 and 2). For example, the technique can address astigmatism that is steeper on one side of the

cornea than the other as well as floppy bowties where the axis changes continuously across the entrance pupil.

On the con side, LRIs are often longer and thus less predictable than simple cataract incisions, because wound healing is more of a factor. Additionally, large LRIs may gape and be difficult to hydrate after phacoemulsification.

TORIC IOLs

Because toric lenses can be implanted through a standard phaco incision, patients recover more quickly than after LRIs, and the wound architecture may be more resilient to ocular trauma. Unlike astigmatic keratotomies, toric IOLs do not induce irregular astigmatism, and they can correct high amounts of astigmatism at the IOL plane. Currently, the highest power of toric IOL available is 3.50D (STAAR Toric IOL; STAAR Surgical Company, Monrovia, CA).

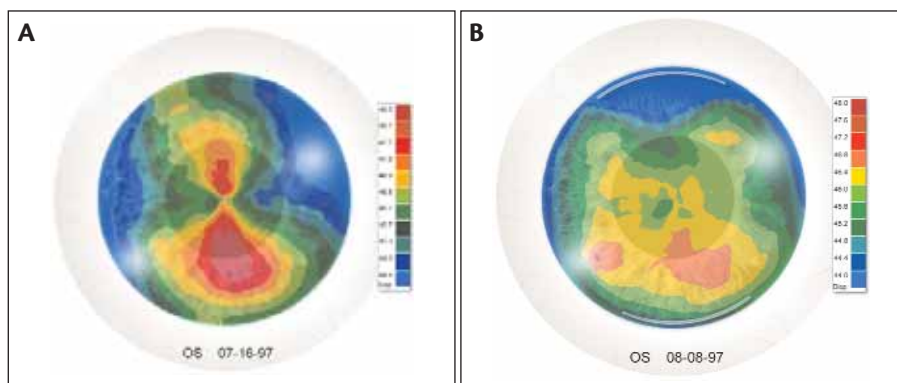


Figure 1. This patient had 2.00D of symmetric bowtie corneal astigmatism (A). Note the change in topography after the placement of paired 2-clock-hour LRIs in the steep meridian (B).

A major drawback of the STAAR Toric IOL is its tendency to rotate off axis. This problem was more common (up to 10%) in the shorter TF model and is less likely with the longer TL model.

According to unpublished clinical trials, the Acrysof Toric IOL (Alcon Laboratories, Inc., Fort Worth, TX) is rotationally stable in the eye and will only be off axis if placed so during surgery.

As mentioned earlier, correcting astigmatism with lenses at the IOL plane versus the cornea produces distortion. If the lens is not placed precisely on the axis of postoperative cylinder, the resulting astigmatism will have a new, usually oblique angle. Patients may have trouble adapting to the new refractive error, especially if they require spectacle correction. Finally, unlike LRIs, toric IOLs are not effective at correcting asymmetric bowtie corneal astigmatism.

BIOPTICS

The term *bioptics* refers to the combination of two surgical approaches to correcting astigmatism. For instance, one may perform keratorefractive surgery (LASIK, LASEK, PRK) several weeks after implanting a toric IOL for high astigmatism. This particular combination, however, is not my first choice, because most patients prefer to undergo one rather than two surgeries. LRIs or a toric lens can successfully address up to 3.00D of cylinder. For astigmatism of up to 5.00D, I favor the technique popularized by James Gills, MD, of Tarpon Springs, Florida. He combines the implantation of a toric IOL with the placement of LRIs. Bioptics may be the most reasonable strategy for patients who have more than 5.00D of corneal astigmatism.

With bioptics, it is advisable to leave a residual myopic spherical equivalent refractive error, because LASIK, LASEK, and PRK are most successful for the treatment of compound myopic astigmatism rather than mixed astigmatism. Surgeons should make every attempt to maximize the cylindrical correction with a toric IOL before the subsequent excimer laser procedure.

Alcon Laboratories, Inc., plans to introduce toric IOLs with powers as great as 5.00D soon. The availability of these new lenses should significantly reduce the need for excimer laser procedures after astigmatic cataract surgery.

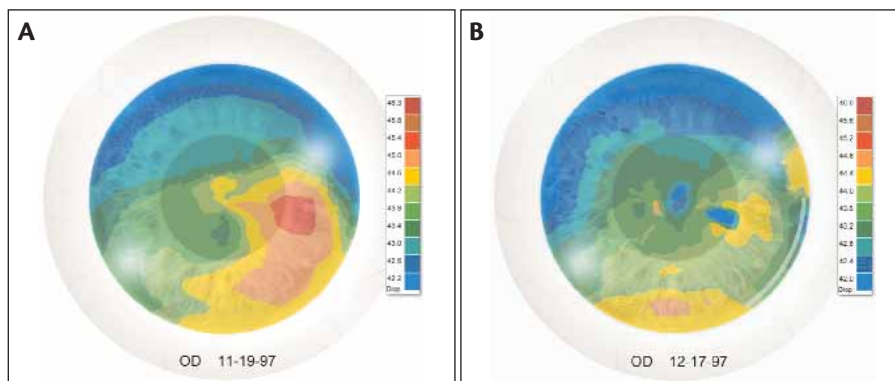


Figure 2. This patient had 1.00D of asymmetric bowtie corneal astigmatism (A). Postoperative topography shows improvement after a single 2-clock-hour LRI was placed in the steep meridian (B).

MY APPROACH

I tend to be practical about correcting corneal astigmatism at the time of cataract surgery and have always treated up to 1.50D of corneal astigmatism with LRIs. If Alcon Laboratories, Inc., successfully obtains premium pricing for the Acrysof Toric IOL and ophthalmologists are allowed to apply a refractive surcharge for the additional work associated with its implantation, then this lens may be an economically sound option for correcting low levels of astigmatism.

For up to 3.00D of corneal astigmatism, I implant a toric IOL. I combine LRIs and toric IOLs for higher amounts of corneal astigmatism. I reserve bioptics for eyes with more than 5.00D of astigmatism, but I plan to abandon this technique when higher-powered toric IOLs become commercially available.

FINAL THOUGHTS

The introduction of presbyopia-correcting IOLs radically changed the landscape of cataract surgery. Now, it is incumbent on cataract surgeons to achieve excellent postoperative refractive results. In essence, performing precise biometry and neutralizing astigmatism are paramount to satisfying patients and helping them attain independence from spectacles.

Ophthalmologists who have not given much consideration to the surgical correction of astigmatism in the past will be increasingly called upon to do so in the future.

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