

Toric IOLs in Eyes With Keratoconus

Patients with mild ectasia may benefit from a toric IOL that allows them to be free of contact lenses postoperatively.

BY BARRY A. SCHECHTER, MD

Cataract surgery has evolved into a refractive procedure, and patients have high expectations for good UCVA after surgery. Patients with keratoconus who are successful in achieving good-quality BCVA with rigid or scleral contact lenses often approach cataract surgery with the same expectations as their peers, despite the fact that they present considerably greater challenges for their surgeons.

Typically, surgeons have shied away from recommending any premium technology for patients with keratoconus. The conventional wisdom has been that toric IOLs and other premium technologies should not be offered to patients with ocular pathologies that could limit their visual potential.

In the right candidate, however, cataract surgery with a toric IOL presents an opportunity to greatly improve UCVA in a keratoconic eye and attempts to preserve the patient's former level of corrected visual function. As patients age, they may find it increasingly difficult to tolerate contact lenses, and because LASIK should not be performed on these eyes, toric IOLs may fill this potential gap in optimizing acuity in keratoconic eyes.

I have implanted toric IOLs in a series of 12 patients with mild or forme fruste keratoconus to reduce astigmatism and improve UCVA postoperatively. In 90% of these cases, the patients now see well enough that they do not require contact lenses. The series includes one patient with 20/20 UCVA, but most are in the 20/30 to 20/40 range, meaning that they have very functional vision without contact lens use. This change often represents a significant improvement in the patient's quality of life.

PATIENT SELECTION

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I choose patients who are older than 50 years of age, who have had stable topography for several years, and who have realistic expectations. On topography, the astigmatism should not be highly irregular, and the major axis of astigmatism should be identifiable. If the axes of cylinder on topography, keratometry, and manual refraction are all within a few degrees of one another, there is a good chance of success. Wildly varying axes at differing optical zones may be a sign of instability, or they can make it very difficult to determine the correct axis for positioning the lens.

Patients younger than 45 should be avoided because younger eyes may still undergo significant astigmatic shifts. By the time patients reach their 50s, the cumulative lifetime effects of ultraviolet light exposure often provide some natural cross-linking that helps to stabilize keratoconic progression.

Informed consent should be carefully worded to include the chance of limitations. These patients are incurring out-of-pocket expenses, which may increase their expectations. I typically underpromise, telling patients that there may be no major improvement in their UCVA after surgery. I explain that the astigmatism may shift when the cataract incisions are made, but in their mild keratoconic state, they may find that their vision can still be improved with contact lenses or glasses after surgery.

SURGICAL APPROACH

Precise preoperative measurements and surgical technique are extremely important. I carefully mark the

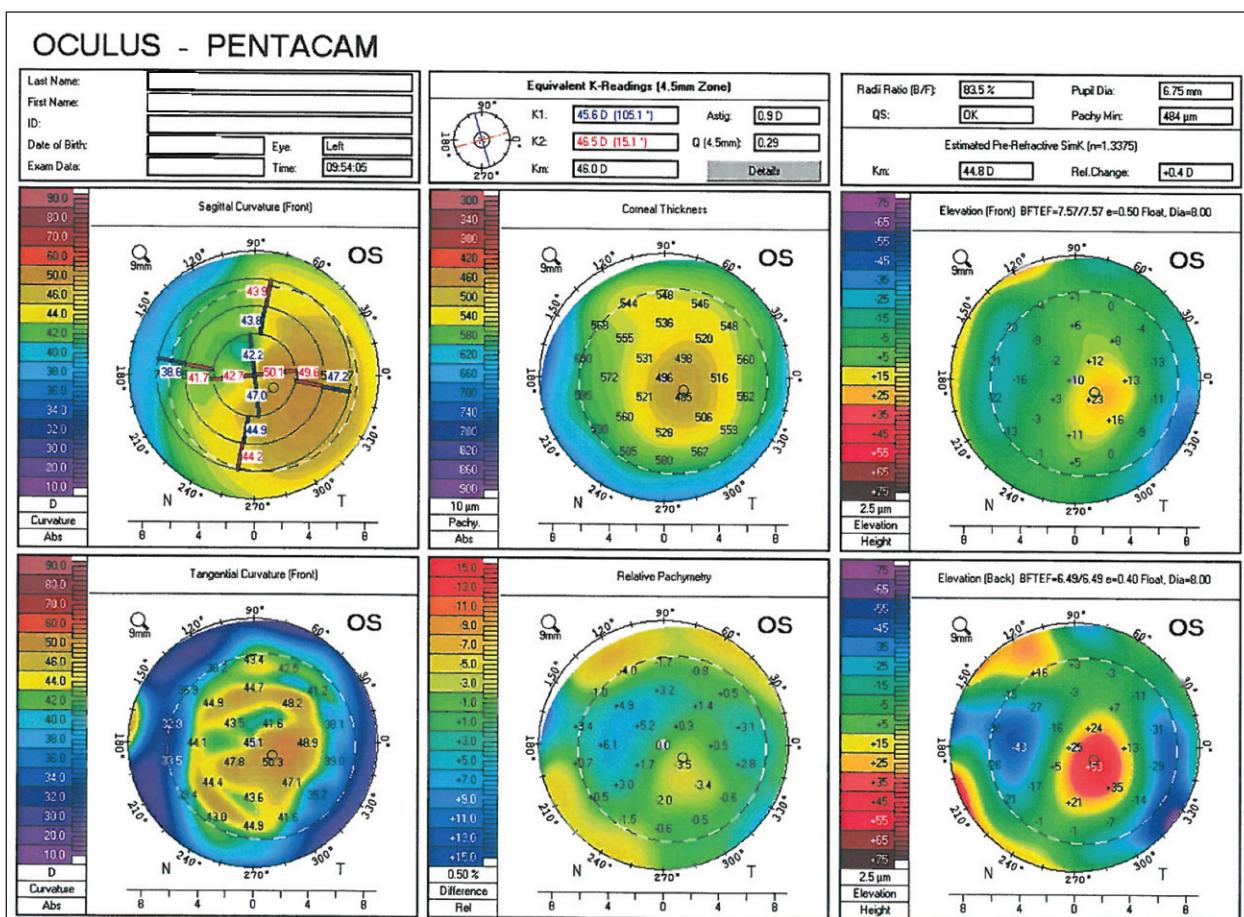


Figure 1. In the left eye of a patient with a mild inferotemporal cone, keratometry (K) readings in IOLMaster (Carl Zeiss Meditec), refraction, and Pentacam Comprehensive Eye Scanner (Oculus Optikgeräte) all agreed on the axis of astigmatism.

axis of astigmatism and the major incision at the slit lamp. I perform standard IOL power calculations with the SRK-T or Hoffer Q formulas, and I use the Abbott Medical Optics or Alcon toric calculator, depending on whether I am implanting a Tecnis Toric (Abbott Medical Optics) or AcrySof Toric (Alcon) IOL.

I prefer the posterior haptic tilt and clear optics of the Tecnis Toric, but I use the AcrySof Toric if I need a higher-powered toric lens or if the patient already has a lens with a yellow chromophore in the fellow eye. Patients with mild keratoconus often exhibit the condition in only one eye, so I prefer to use the same model of IOL in both eyes so that they do not perceive a difference.

A continuous capsulorhexis that overlaps the IOL optic is crucial to help ensure postoperative IOL stability. I use a 5.5-mm radial keratotomy marker on the cornea to help guide me in making the capsulotomy so that the edge of the capsulorhexis will overlap the optic for 360°. I do not use intraoperative keratometry, aberrometry, or the femtosecond laser for these eyes.

CASE No. 1

A 63-year-old man with bilateral keratoconus was referred to me for a cataract evaluation due to poor visual acuity. His ophthalmic history was significant for a branch retinal artery occlusion in the right eye.

An ocular examination revealed 2+ nuclear sclerotic cataracts and a partial Fleischer ring. The fundus examination was unremarkable except for attenuated arterioles.

The patient's refraction was -2.25 +3.00 × 10 in the right eye with a BCVA of 20/100 and -2.00 +2.00 × 15 in the left eye with a BCVA of 20/40. Due to the limited visual potential of the right eye, surgery with a toric IOL was contemplated for his left eye only.

In the left eye, IOLMaster K readings were 44.23 at 96° and 47.07 at 6°, with 2.84 D of cylinder at 6°. This matched up fairly well with K readings from the Pentacam in the left eye. Topography with the Pentacam showed a relatively mild inferotemporal cone (Figure 1).

We discussed the fact that astigmatism secondary to keratoconus is usually irregular and that it may not be completely corrected by a toric IOL implant. I explained that

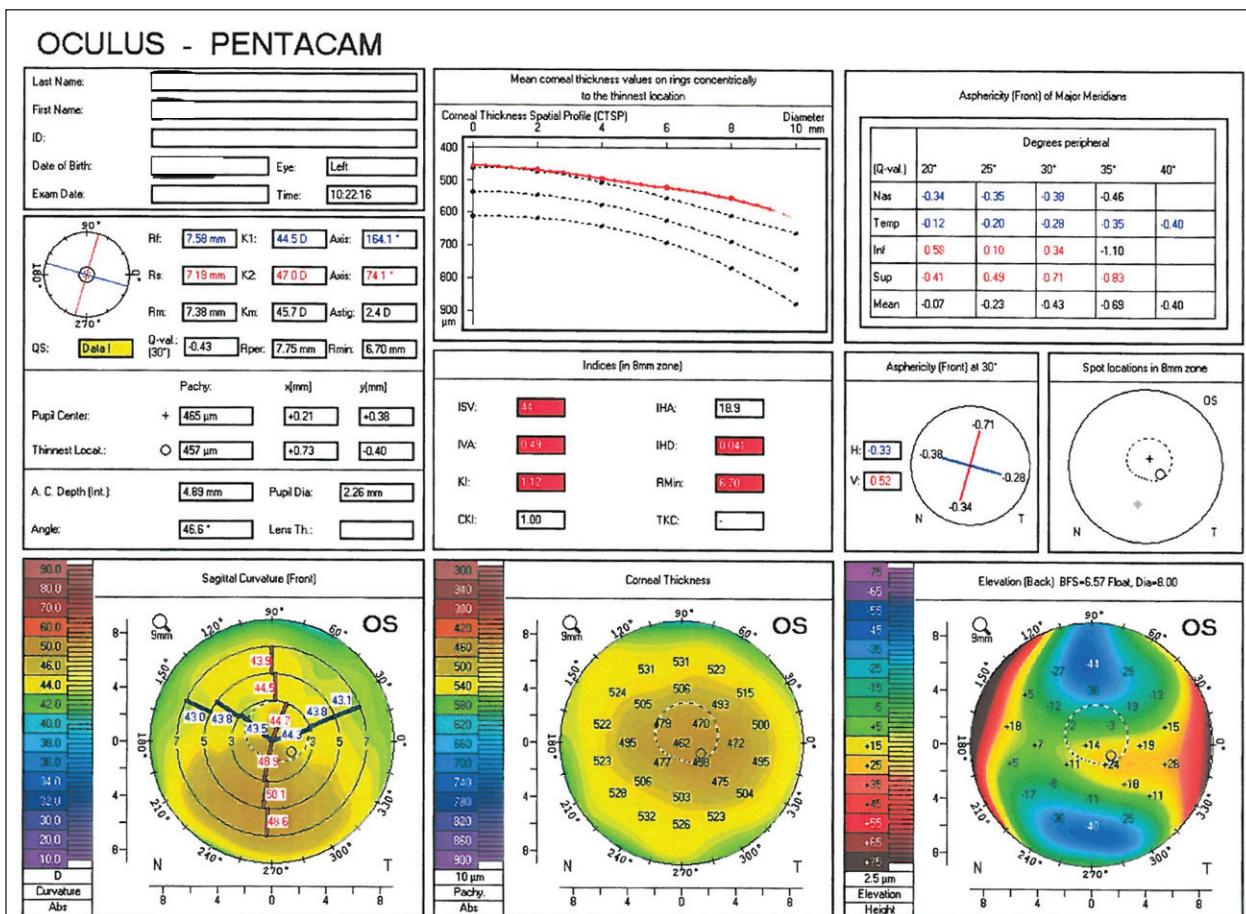


Figure 2. An eye with 2.50 D of cylinder at 74° and a fairly regular inferior cone achieved a postoperative UCVA of 20/30 with a toric IOL.

he might still require glasses or contact lenses to achieve optimal BCVA.

After consulting the Abbott Medical Optics toric calculator, I implanted a ZCT300 Tecnis Toric IOL. Postoperatively, the patient was very pleased with the outcome. At the 3-month postoperative visit, his UCVA was 20/25 with a refraction of -0.25 +0.25 × 105.

CASE No. 2

A 64-year-old man was referred for cataract surgery after complaining of experiencing severe glare when driving particularly at dusk or dawn. His BCVA was 20/200 in the right eye and 20/60 in the left. Refractions were -4.25 +2.25 × 67 in the right eye and -3.50 +2.75 × 13 in the left. Brightness acuity testing showed glare sensitivity of 20/400 in each eye. He had 2+ nuclear sclerotic cataracts with posterior subcapsular changes and mild scattered macular drusen.

We discussed elective cataract surgery with a toric IOL and the limitations of this approach. Because there was apical scarring in his right eye, we decided to use a toric IOL only in the left eye.

Pentacam K readings at the 4.5-mm optical zone disclosed 2.50 D of cylinder at 74° with an inferior cone that demonstrated a fairly regular pattern of astigmatism (Figure 2). This coincided well with IOLMaster K readings of 44.58 at 164° and 46.75 at 74°, for a total cylinder reading of 2.17 D at 75°. The Alcon Toric calculator suggested an Alcon SN6 lens.

Uncomplicated surgery was performed. The final postoperative refraction was -0.25 D sphere with UCVA of 20/30.

As these two cases illustrate, even patients with mild keratoconus can benefit from toric IOLs to reduce their astigmatism and provide improved postoperative UCVA without a contact lens. ■

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