Optometry (2011) 82, 751-756

Toric soft contact lens fit in a postoperative LASIK keratoectasia patient with high and irregular astigmatism

David P. Roncone, O.D.

Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, Ohio.

KEYWORDS
Keratoectasia;
Laser-assisted in situ keratomileusis;
Irregular astigmatism;
Toric soft contact lens

Abstract

BACKGROUND: Keratoectasia is a rare but well-known complication after laser-assisted in situ keratomileusis (LASIK). Patients with this condition can have high and irregular astigmatism. When the treatment of the high astigmatic correction cannot be accomplished surgically or when the keratoectasia patient rejects surgical enhancement, optical correction with devices such as soft or rigid gas-permeable contact lenses may be pursued. In fact, toric soft contact lenses are a good first option for fitting postoperative keratoectasia patients.

CASE REPORT: A 58-year-old white male presented for an examination with a complaint of decreased distance vision in the right eye (OD) after having traditional LASIK for myopia with astigmatism in both eyes (OU) in 1999 and limbal relaxing incision enhancement OD in 2003. Refraction showed high mixed astigmatism OD (+1.75 -5.75×075). Slit lamp examination found irregularity of the cornea, evidenced by an inferior cone with pigmented Fleischer ring OD. Video keratometry had keratometry readings of 43.50 at 160, 39.87 at 070, elevated shape measure (0.40), elevated corneal irregularity measure (3.96), an inferior cone on the elevation map, and asymmetric bowtie with elongation inferonasally on the axial map, which confirmed the diagnosis of postoperative keratoectasia. Because new surgical treatments at that time for corneal ectasia were in their infancy and not approved by the U.S. Food and Drug Administration, the patient opted for a trial toric soft contact lens fitting, which improved his corrected distance visual acuity to 20/25.

CONCLUSION: This case report confirms that toric soft contact lenses are a good first choice in fitting patients with high and irregular astigmatism from postoperative LASIK corneal ectasia. It also confirms that excellent vision and comfort with toric soft contact lenses is possible in these patients.
Optometry 2011;82:751-756

Keratoectasia is a rare but well-known complication after laser-assisted in situ keratomileusis (LASIK).[1-4] Patients with this condition can demonstrate high and irregular astigmatism. When either the treatment of the high astigmatic correction cannot be accomplished surgically or when the keratoectasia patient rejects surgical enhancement, optical correction with devices such as soft or rigid gas-permeable (RGP) contact lenses may be pursued. As in other documented reports,[5-7] this case report discusses a keratoectasia patient with high and irregular astigmatism who was fitted with a toric soft contact lens for the right eye. His manifest refraction was +1.75 -5.75×075 in the right eye (OD), and his video keratometry reading was 43.50 at 160, 39.87 at 070 OD. The patient was trial fitted in a hydroxyethylmethacrylate (HEMA)-material

Disclosure: The author has no financial or other relationships that might lead to a conflict of interest.

* Corresponding author: David P. Roncone, O.D., Louis Stokes Cleveland Veterans Affairs Medical Center, East Liverpool CBOC, 15655 State Route 170, Suite A, East Liverpool, OH 43920.
E-mail: davidproncone@hotmail.com

1529-1839/$ - see front matter Published by Elsevier Inc. on behalf of the American Optometric Association.
doi:10.1016/j.optm.2011.06.011

(methafilcon B), prism-ballast, front-surface lathe cut and back-surface cast molded, back-surface toric, high water content ionic hydrogel polymer (group 4) soft contact lens with 55% water content and a Dk (permeability) of 18. This Cooper Frequency 55 Toric XR (methafilcon B; Cooper Vision, Fairport, New York) soft contact lens had an 8.7 base curve, a 14.4 overall diameter, and a power of +1.75 -5.75×075. This lens resulted in a good fit with a corrected visual acuity of 20/25, confirming that toric soft contact lenses can yield successful results and are a good first choice in fitting postoperative keratoectasia patients.

Case report

A 58-year-old white male presented for examination on April 29, 2004, with the goal of improving decreased distance vision OD, especially for golfing. The patient had traditional LASIK in both eyes (OU) for myopia with astigmatism in 1999 and limbal relaxing incision enhancement OD on August 29, 2003. He had a history of soft contact lens wear for 20 years before his LASIK surgery. Although he does not remember the brand of lenses, he wore them on a daily wear schedule with a wear time of 14 hours per day. He had no history of eye injury, trauma, or amblyopia. He reported no dryness, glare, or halo. His medical history was remarkable for benign hypertension and hyperlipidemia. His systemic surgical history was unremarkable. Family ocular history was unremarkable for all disorders, including keratoconus. Family medical history was pertinent for hypertension (father), cancer (mother), and heart disorder (father). Systemic medications included 10 mg of amlodipine besylate, 145 mg of fenofibrate, and 10 mg of ezetimibe.

Examination found uncorrected visual acuities of 20/80 OD and 20/30 in the left eye (OS). Manifest refraction and cycloplegic refraction found identical readings of +1.75 -5.75×075 OD and +1.00 -0.50×100 OS, with 20/20 distance visual acuities in each eye. A +2.50-diopter (D) near add was also determined. Ocular dominance testing found dominance in the right eye. Pupils under mesopic conditions were 6.0 mm round OU, without afferent pupillary defect. Extraocular muscles, confrontation fields, and cover test results were unremarkable in both eyes. Slit lamp biomicroscopy had clear findings for the lids, lashes, conjunctiva, sclera, and iris. The cornea of the right eye had an inferior cone with a Fleischer-pigmented ring and an inferonasal limbal relaxing incision clear of debri and epithelial cells. The cornea of the left eye was unremarkable. Anterior chambers were deep (grade IV angles by Van Herick classification) and quiet OU. Tear film testing was normal with tear break up times greater than 10 seconds in each eye and tear meniscus values of 0.25 mm OU. Intraocular pressures by applanation were 12 mmHg OU (at 2:50 PM). Dilated fundus examination findings were unremarkable. Ultrasound pachymetry readings were 518 μm OD and 519 μm OS. Video keratometry readings were 43.50 at 160, 39.87 at 070 OD and 42.00 at 012, 41.00 at 102 OS. Video keratometry of the right eye was performed using the Humphrey system, Atlas version A10.1 (Carl Zeiss, Inc., Dublin, California) (*see* Figure 1).

In the right eye, an elevated shape and corneal irregularity measure were noted, with readings of 0.40 and 3.96, respectively, which were positive for keratoectasia. An inferior cone was noted on the elevation map. The axial map showed asymmetric bowtie with elongation inferonasally.

The following diagnoses were made: (1) postoperative LASIK keratoectasia OD, (2) mixed high and irregular astigmatism OD, (3) compound hyperopic astigmatism OS, and (4) presbyopia.

After examination, the patient was educated on possible options for correction. At the time of this examination in 2004, the only surgical procedure for keratoectasia was penetrating keratoplasty, which was usually pursued when patients had poor corrected visual acuities and a lifestyle complaint. Photorefractive keratectomy, LASIK/laser-assisted subepithelial keratomileusis (wavefront-guided and traditional) were contraindicated at that time because of the risk of weakening an already biomechanically unstable cornea with more stromal laser ablation. Although Intacs® corneal implants (Addition Technology, Des Plaines, Illinois) and corneal collagen cross-linking were being attempted in 2004, few surgeons were performing these keratoectasia experimental procedures. Corneal modeling by conductive keratoplasty had not been attempted at that time, either. Thus, because the patient deferred penetrating keratoplasty, the patient's options included glasses, soft contact lens, and RGP contact lens. The patient opted to pursue soft toric contact lens fitting OD because of his past successful experience with soft contact lens wear. He was educated that a toric soft contact lens would be fitted by trial with the possibility of poor vision and poor centration because of his high irregular astigmatism.

A HEMA-material (methafilcon B), prism-ballast, 1-month disposable Cooper Frequency 55 Toric XR soft contact lens was ordered with parameters of 8.7 base curve, 14.4 overall diameter, and power +1.75 -5.75×075. This lens is a front-surface lathe cut and back-surface cast molded, back-surface toric lens. It is classified as a high water content ionic hydrogel polymer (Group 4) contact lens with 55% water content and a Dk of 18. It has a thick 0.26-mm center thickness and a high 0.48 N elastic modulus, making the lens stiff.

On May 16, 2004, the patient returned for a toric soft contact lens fitting with uncorrected entrance visual acuities of 20/80 OD and 20/20 OS. The patient inserted the Cooper lens without difficulty and reported good comfort. Corrected visual acuity with this lens was 20/25. Spherocylindrical overrefraction yielded +1.00 diopter sphere (DS), with a visual acuity of 20/20. The lens revealed good centration and comfort. No rotation was noted. The patient removed the lens successfully in 1 attempt. He was advised to use Opti-Free® Express (Alcon, Forth Worth, Texas) as