

CASE REPORT: Successful Customized Refractive Lens Exchange with AT TORBI 709M in a Keratoconus Patient with A History of Penetrating Keratoplasty



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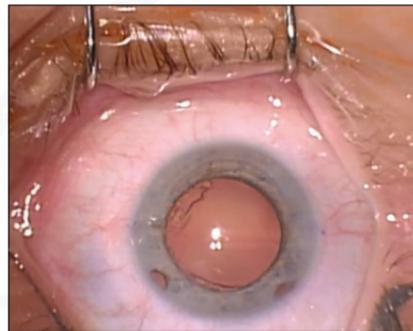
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Dr. Dimitrii Dementiev is the founder, medical director and chief surgeon at the private practice clinic and medical supply center "International Center for Ophthalmology" in Moscow, Russia. He is also ocular surgeon at the "Blue Eye - Centro di Microchirurgia Oculare", a private practice eye center in Milano, Italy.

With more than 20,000 cases in ocular surgery since 1985, Dr. Dementiev has expertise in cataract and laser refractive surgery, phakic refractive lens surgery, premium IOLs (multifocal and toric), clear lens extraction, complex keratoconus treatment, glaucoma, different types of keratoplasty including femtolaser-assisted keratoplasty and optical scanning diagnostics.

Patient History

A 34-year-old female patient with keratoconus in her left eye with a history of penetrating keratoplasty 15 years ago presented at the clinic. The spherical equivalent (SE) of her left eye was +1.0 D with a cylinder of -6.0 D at 180°. Her uncorrected distance visual acuity (UDVA) was 1.0 logMAR and reached 0.1 logMAR, when corrected (CDVA). Since visual acuity was high in the second eye, spectacle correction was uncomfortable. After discussing the treatment options with the patient, it was decided to perform a customized refractive lens exchange (CRLE) with implantation of a toric intraocular lens (tIOL).



Picture 1: Keratoconus eye prior to surgery

Customized refractive lens exchange with the AT TORBI 709M

Preoperatively the 0°-180° axis was marked under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) and mydriasis. A capsulorhexis of 5.5 mm was targeted.

The AT TORBI 709M/MP (Carl Zeiss Meditec) is a bitoric aspheric (aberration-neutral) IOL with a 4-haptic design, made of hydrophilic acrylate with a hydrophobic surface. It has an optic diameter of 6.0 mm and a total diameter of 11.0 mm. It is available with a diopter range from -10.0 to +32.0 D sphere and +1.0 to +12.0 D cylinder, both in steps of 0.5 D. The optimum lens power is calculated and ordered individually based on the exact patient need. Thanks to its extensive diopter range, AT TORBI 709M/MP offers a very precise matching cylinder to correct patients' astigmatism.

The IOL was implanted through a self-sealing clear cornea incision of 1.8 mm and aligned with the steep corneal axis (Fig. 1).

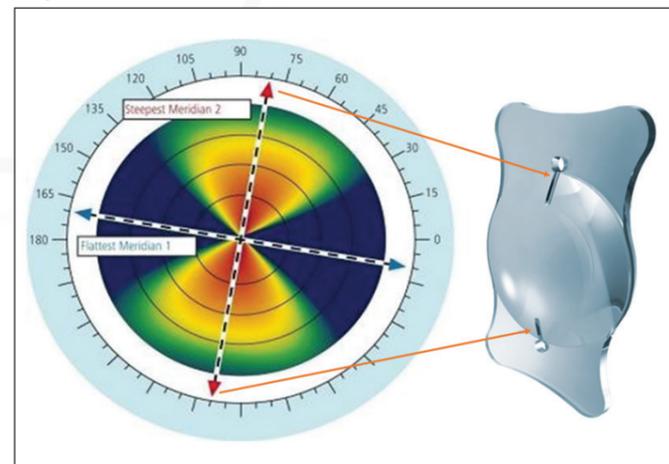


Figure 1. Alignment of the IOL marks of the AT TORBI 709M/MP to the steep axis

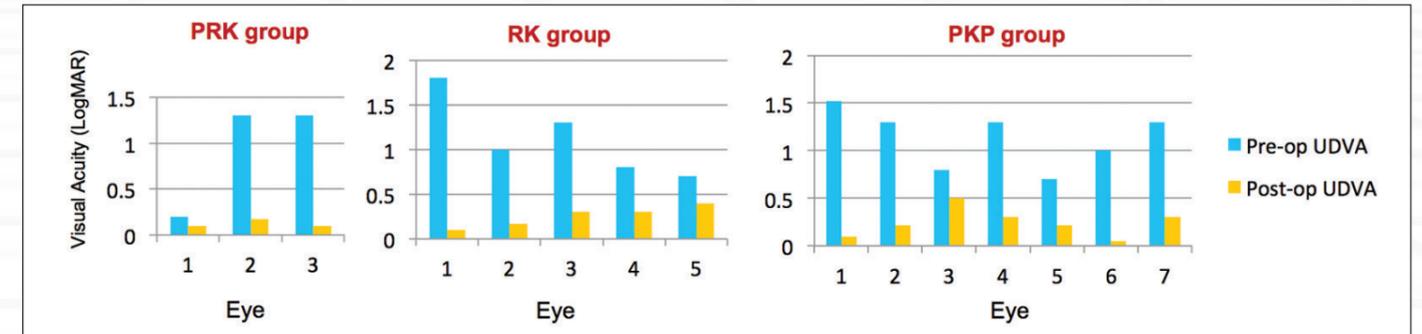


Figure 2. Uncorrected distance visual acuity before and after toric IOL implantation in eyes with previous corneal surgery (UDVA uncorrected distance visual acuity; PKP penetrating keratoplasty; RK radial keratotomy; PRK photorefractive keratectomy)

Visual outcome of the post-PKP patient

At the last follow-up after 20 months, both UDVA and CDVA were 0.05 logMAR and the refraction was plano. The patient who had suffered 15 years from significantly impaired vision due to the high cylinder, was extremely happy with her visual outcome after implantation of the toric IOL.

Experience with toric IOL implantation in patients with a history of corneal surgery

Radial Keratotomy is known to induce progressive hyperopia and hyperopic astigmatism - often found a decade after surgery - due to a flattening of the central cornea. Postoperative astigmatism in the range from 1.0 to 15.0 D is also one of the major limitations of PKP. Photorefractive keratectomy often results in a postoperative astigmatism between 1.0 and 3.0 D. Various options are available to reduce this surgery-induced postoperative astigmatism, such as glasses or contact lenses, selective suture manipulation, laser procedures (PRK, LASIK, LASEK), phakic IOLs, add-on IOLs or a refractive lens exchange with tIOLs. At our clinic, we prefer the customized refractive lens exchange as a surgical solution for hyperopia, mixed irregular and high astigmatism as well as for residual myopia in patients with previous corneal surgery. We performed a study in 13 eyes of 12 patients with a mean age of 41.5±6.4 years and a mean interval between corneal and toric IOL surgery of 11.5±8.0 years. The change

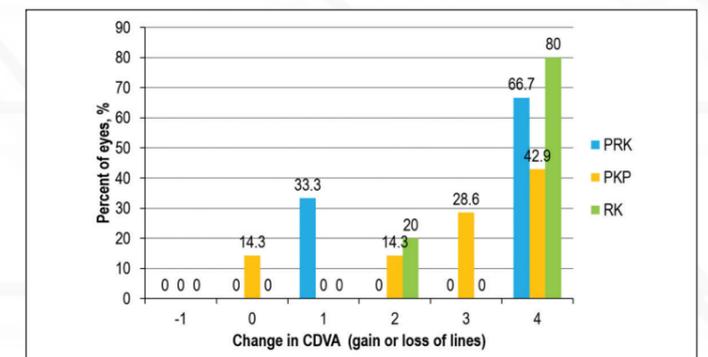


Figure 3. Percentage of eyes with gain or loss of visual acuity lines after toric IOL implantation (CDVA corrected distance visual acuity; PRK photorefractive keratectomy; PKP penetrating keratoplasty; RK radial keratotomy)

in UDVA after tIOL implantation is shown in Figure 2. The levels of UDVA and SEQ remained constant during the follow-up period.

CDVA improved in all eyes. None of the eyes lost a line after IOL surgery. Except for one PKP eye, all eyes gained 1-4 lines of visual acuity, with the majority of cases gaining 4 lines.

Conclusion

Customized refractive lens exchange with the toric AT TORBI 709M/MP IOL has proven to be an effective, safe, predictable and stable solution for correction of high levels of induced corneal astigmatism in eyes that underwent corneal transplantation and corneal refractive procedures.