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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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 femtosecond-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 the refraction was plano. The patient who had suffered 15 years from significantly impaired vision due to a high cylinder, was extremely happy with her visual outcome after implantation of the toric IOL.

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%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright. Phacoemulsification surgery was performed under topical anesthesia (Lidocaine 2%) at the slit lamp with the patient sitting upright.

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 shorter 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 corneal 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.

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 IOLs.

In UDVA after IOL 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.