

Treatment of Stable Keratoconus by Cataract Surgery with Toric IOL Implantation

Jaime Levy, Anry Pitchkhadze, Tova Lifshitz

ABSTRACT

We present the case of a 73-year-old patient who underwent successful phacoemulsification and toric intraocular lens (IOL) implantation to correct high stable astigmatism due to keratoconus and cataract. Preoperative refraction was $-3.25 - 4.0 \times 98^\circ$. A toric IOL (Acrysof SN60T6) with a spherical power of 16.5 D and a cylinder power of 3.75 D at the IOL plane and 2.57 D at the corneal plane was implanted and aligned at an axis of 0° . Uncorrected visual acuity improved from 6/60 to 6/10. Postoperative best corrected visual acuity was 6/6, 6 months after the operation. In conclusion, phacoemulsification with toric IOL implantation can be performed in eyes with keratoconus and cataract.

Keywords: Intraocular lens, Toric IOL, Keratoconus, Cataract surgery.

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INTRODUCTION

Surgical correction of refractive errors in patients with keratoconus is still challenging. As the disease progresses, it is usually associated with significant astigmatism and often accompanied by myopia.

The use of special intraocular lens (IOL) in patients with nonprogressive keratoconus is a recent development in refractive surgery, with only a few published articles till date.¹ There are just a few reports on the use of phakic IOLs (angle-supported phakic IOLs, iris-fixated phakic IOLs and posterior chamber phakic IOLs), refractive lens exchange (with or without toric IOLs) and sequential surgery (intrastromal corneal ring and phakic IOLs) for cases of keratoconus and clear crystalline lens. When there is cataract associated with stable moderate to high astigmatism, phacoemulsification and implantation of a toric IOL can be performed.

We present a case of cataract surgery with toric IOL implantation in patient with keratoconus with stable topography for several years.

CASE REPORT

A 73-year-old man sought consultation due to decreased visual acuity in his left eye. Four years before he underwent phacoemulsification and nontoric intraocular lens (IOL)

implantation in the right eye. On presentation, uncorrected visual acuity (UCVA) was 6/60 OU. Refraction was $-0.75 - 5.0 \times 65^\circ$ OD and $-3.25 - 4.0 \times 98^\circ$ OS. Nuclear sclerosis and posterior subcapsular cataract +2 was observed in the left eye. The posterior segments were unremarkable.

Corneal topography performed with Orbscan (Bausch and Lomb, Rochester, NY) showed central thinning of 457 microns and positive islands of elevation typical for keratoconus in the right eye (Fig. 1). In the left eye a less pronounced inferior cone was observed (Fig. 2), without any area of significant thinning near the limbus typical for pellucid marginal degeneration.² Keratometry (K)-values on EyeSys (EyeSys Laboratories, Houston, TX) for the steep and flat axis were 57.49 D at 138° and 52.57 D at 48° OD and were 47.73 D at 0° and 45.48 D at 90° OS (Fig. 3). Corneal topography was stable for several years.

Due to the postoperative high residual astigmatism in the right eye we decided to perform phacoemulsification and implant a toric IOL in the left eye. A web-based toric IOL calculator program was used to determine the optimal cylinder power and alignment axis of the IOL (<http://www.acrysoftoriccalculator.com>).

A standard phacoemulsification was performed with a 3.2 mm limbal incision at 90° . A hydrophobic acrylic toric IOL (Acrysof SN60T6, Alcon, Ltd, Fort Worth, TX) with a spherical power of 16.5 D and a cylinder power of 3.75 D at the IOL plane and 2.57 D at the corneal plane was implanted and aligned at an axis of 0° . Three weeks after surgery, the UCVA was 6/12 and the best spectacle-corrected visual acuity (BSCVA) was 6/7.5 and 3 months after surgery UCVA was 6/10 and BSCVA was 6/6 with a refraction of $0.75 - 1.5 \times 125^\circ$. Six months after the procedure, patient's satisfaction is high and refraction remains stable.

DISCUSSION

Eyes with keratoconus eye suitable for IOL implantation should have a central clear cornea, mild astigmatism, stable refraction and good BSCVA.¹ There are just a few reports on the use of phakic IOLs, refractive lens exchange and sequential surgery suggesting good predictability, efficacy and safety.

Toric IOLs can be implanted in the bag in cases of keratoconus and clear crystalline lens or cataract. Navas

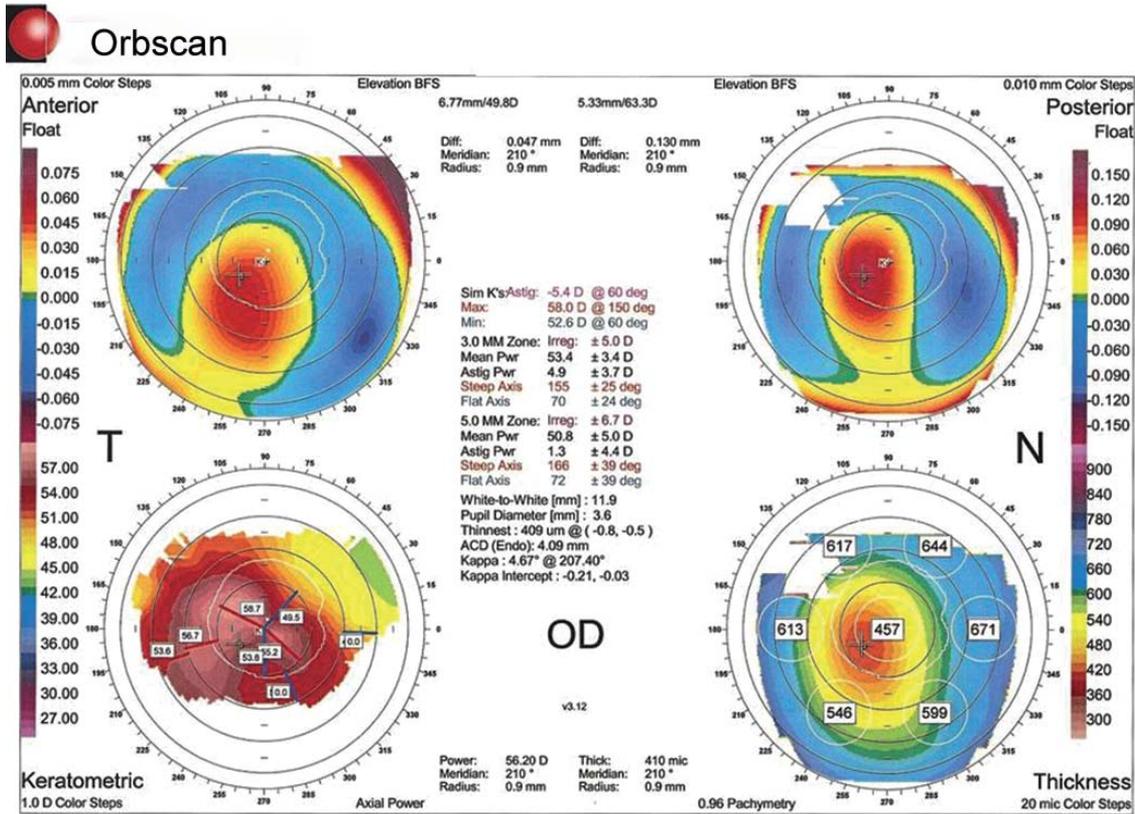


Fig. 1: Corneal topography of the right eye (Orbscan, Bausch and Lomb, Rochester, NY)

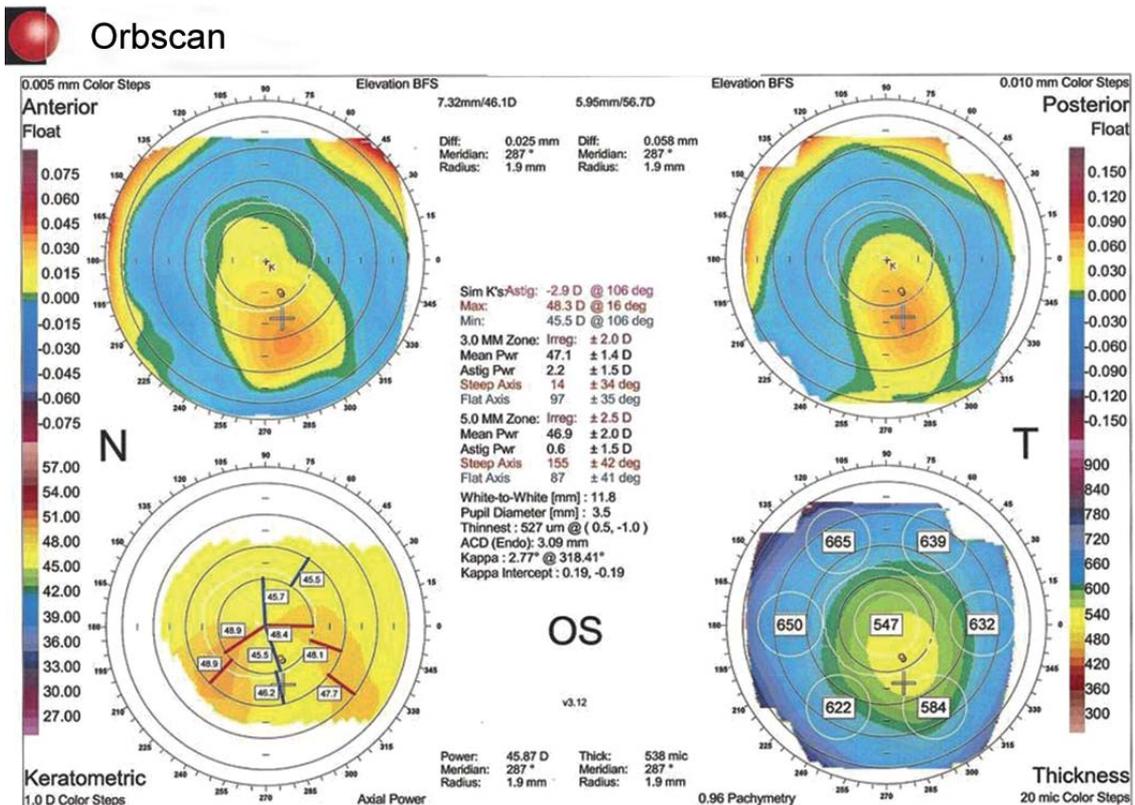


Fig. 2: Preoperative corneal topography of the left eye (Orbscan, Bausch and Lomb, Rochester, NY)

and Suárez³ were the first to report the use of a toric IOL (AcrySof toric SN60TT IOL, Alcon, Inc.) for forme fruste keratoconus without cataract. Preoperative refraction was $-6.50-3.00 \times 135^\circ$ and $-5.00-3.00 \times 85^\circ$. One year

postoperatively, the UCVA was 20/25 in both cases, with a refraction of $-0.25 -0.50 \times 140^\circ$ and $0.25 -0.50 \times 60^\circ$ respectively. No progression and no IOL rotation were observed.

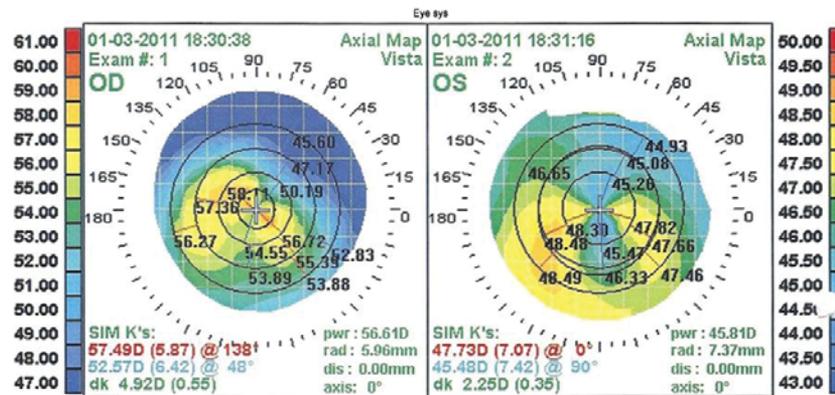


Fig. 3: Keratometry of both eyes (EyeSys, EyeSys Laboratories, Houston, TX)

Jaimes et al⁴ retrospectively reviewed 19 eyes with keratoconus treated with refractive lens exchange and in-the bag toric IOL implantation (models T3 to T9, AcrySof SN60TT; Alcon Laboratories Inc). All cases had topographic and/or refractive stability for at least 1 year prior to undergoing IOL implantation. Mean preoperative sphere was -5.25 ± 6.40 diopters (D), and mean postoperative sphere was 0.22 ± 1.01 D. Mean preoperative cylinder was 3.95 ± 1.30 D, which decreased to 1.36 ± 1.17 D postoperatively. Preoperative mean UCVA was 20/447 and postoperative mean UCVA was 20/39.

Finally Visser et al⁵ reported on three eyes of keratoconus and cataract, phacoemulsification with a toric IOL (cylinder power: 3.0 – 6.0 D). UCVA increased from 20/400 to 20/130 – 20/30. The refractive cylinder decreased by 70 to 75% postoperatively. No IOL misalignment or other complications occurred.

Good results have been also achieved with IOL implantation in cases of pellucid marginal degeneration (PMD).⁶⁻⁸ It is crucial that the refraction will be stable for at least 6 months before the procedure.⁶ It has been suggested by some authors that the results in PMD may be better than in keratoconus because the astigmatism at the center of the cornea is more regular in PMD, although there are no comparative studies till date.

In our case a significant improvement in UCVA was observed from 6/60 preoperatively to 6/10, 3 months after the procedure compared with the fellow eye in which significant residual high astigmatism remained after the implantation of a standard nontoric IOL.

CONCLUSION

Toric IOL implantation can be used to correct high stable astigmatism associated to keratoconus in eyes with cataract.

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ABOUT THE AUTHORS

Jaime Levy (Corresponding Author)

Ophthalmologist, Department of Ophthalmology, Soroka University Medical Center, Beer-sheva, Israel, e-mail: ljaime@bgu.ac.il

Anry Pitchkhadze

Ophthalmologist, Department of Ophthalmology, Soroka University Medical Center, Beer-sheva, Israel

Tova Lifshitz

Chair, Department of Ophthalmology, Soroka University Medical Center, Beer-sheva, Israel