

Restoring Vision In Patients Of Corneal Ectasia With Very High Cylinder Post Cross-Linking

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ABSTRACT

To show how Custom and Made-to-Order Toric IOLs can be used effectively to restore high-quality vision in patients with stable corneal ectasias following cross-linking. After receiving informed consent, a custom-made toric IOL with high cylindrical power was implanted to correct the refractive defect in each eye, followed by clear lens extraction by phacoemulsification. Six months after surgery, the average power of the cylinder fell from 8.6 D to 0.75 D and the average power of the sphere from 2.95 D to 0.6 D. Patients with corneal ectasias with high cylinder post cross linking who were unable to tolerate CL or Glasses can be safely and efficiently fitted with high cylindrical power custom-made toric IOLs, improving their quality of life after surgery.

Keywords: Cornea; Keratoconus

INTRODUCTION

The cornea takes on a conical form due to the bilateral chronic, asymmetric, progressive ectatic condition known as keratoconus (KC). It also increases higher order aberrations (HOAs), regular and irregular astigmatism, and other abnormalities that have negative effects on the patient's ability to see [Fernandez-Vega-Cueto L, 2017]. There is no doubt that keratoconus appears from adolescence and worsens until the third decade of life [Krachmer, J. H. et al., 1984]. Recent research demonstrates that there were 265 cases of keratoconus per 100,000 people [Godefrooij et al., 2017]. This research also revealed that the men had a higher prevalence than women [Godefrooij et al., 2017]. Patients with keratoconus generally experience a decline in their quality of life. [Aydin Kurnaet al,2014]

There are a number of treatment options for keratoconus, including intrastromal corneal ring segments, rigid gas permeable lenses, deep anterior lamellar keratoplasty, photo refractive keratectomy, spectacles and soft contact lenses in early cases, and corneal crosslinking (CXL) in moderate and severe cases.

Even though keratoconus was once thought to be a non-inflammatory disorder, current study has found elevated levels of inflammatory mediators in the tears of patients with keratoconus who do not exhibit any outward indications of inflammation. [Lema and others, 2004]. As a

result, it has been claimed that keratoconus should not be considered a noninflammatory illness and that chronic inflammatory events may contribute to the aetiology of keratoconus progression (Lema, I. et al., 2008; Yu, Jessica et al., 2010). It should be mentioned that wearing contacts causes inflammation [Efron, Nathan, 2017]. According to Lema et al. [Lema, Isabel et al., 2008], patients with keratoconus who wear rigid gas permeable lenses have higher levels of proinflammatory mediators in their tears. This raises the question of whether it's possible to enhance the quality of life for keratoconus sufferers without the use of contacts or eyewear.

The necessity for keratoplasty, particularly in young patients, and the morbidity related to more advanced KC disease may be reduced if keratoconus progression is prevented.

Thus far corneal collagen cross-linking has been shown to be the only treatment option capable of slowing down or halting KC progression

In general, stopping the ectatic process, restoring corneal shape, and reducing refractive error are the three issues that need to be addressed in keratoconic cornea visual rehabilitation. Each of these issues and how they affect the disease and the patient's vision quality would be among the considerations that would determine the course of treatment. That is, whether or not the keratoconus is advancing, the degree of concomitant ametropia, the amount of higher order aberrations (HOAs), and how irregularly shaped the cornea is.

Although almost all patients will eventually develop visually significant cataracts, patients with KC typically experience this at a younger age than the general population. Due to the challenges of interpreting keratometry results, estimating astigmatism, calculating axial length, and achieving an accurate IOL power estimate in patients with KC, cataract surgery might be difficult. Additionally, because of corneal scarring and thinning, cataract surgery in keratoconic eyes may be more technically challenging.

Additional challenges are choosing the intraocular lens (IOL) and forecasting the refractive result. Few studies have indicated that phacoemulsification with the implantation of a toric IOL is a viable solution when the patient has cataracts and keratoconus that has caused corneal astigmatism. Both faults are simultaneously addressed by a single treatment. The aim of our study was to assess the visual and astigmatic results of cataract surgery with toric IOL implantation in keratoconus patients.

- **PURPOSE:**

To demonstrate the effective use of Customized and Made-to-order Toric IOLs incorporating the entire cylindrical power to restore quality vision in patients of stabilized corneal ectasias post cross linkage.

- **METHODOLOGY:**

- A pilot study was conducted at Santosh Medical College, Ghaziabad and Columbia Asia Hospital, Ghaziabad.

- Three patients (5 eyes) of corneal ectasia post CXL, presented to Santosh Medical College and Columbia Asia Hospital OPD for visual rehabilitation
- These patients were unable to tolerate CLs or glasses due to very high corneal astigmatism of more than 8 D
- All were observed for stable corneal topography and refraction
- Corneal Topography (Figure1) and Biometry (Figure2) were performed using Orbscan and Lenstar respectively
- 8 to 13 months post CXL: After informed consent, Clear lens extraction by phacoemulsification was done and Custom-made Toric IOL(Figure3) with high cylindrical power was implanted to correct the refractive error in each eye.

SUMMARY OF VISUAL AND REFRACTIVE STATUS PRE AND POST IOL(Table1)

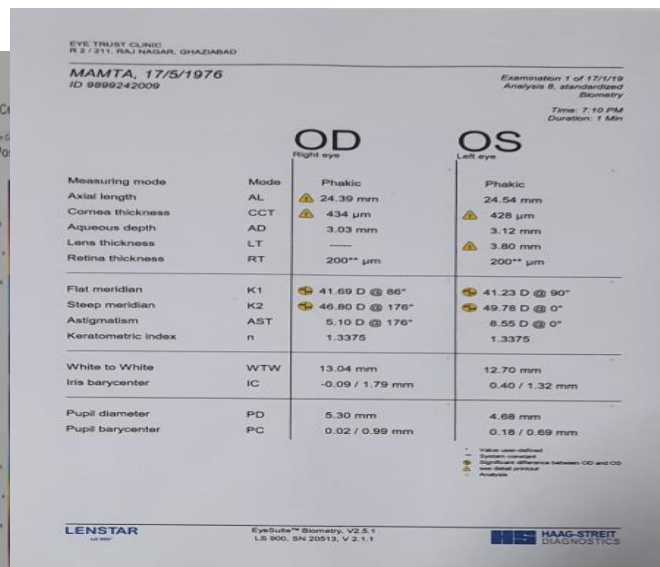
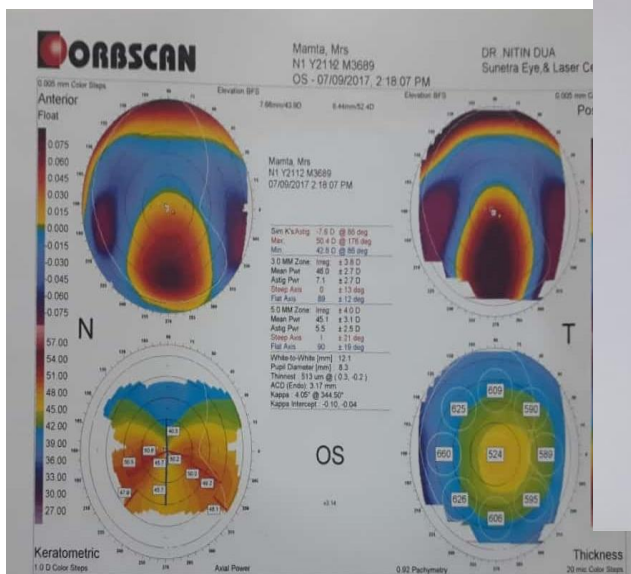
		EYE1	EYE 2	EYE 3	EYE 4	EYE 5
AGE		41 YEARS	41 YEARS	39 YEARS	39 YEARS	42 YEARS
VISUAL ACUITY (logMAR)	Pre UCVA	1.3	1.6	2	1.3	1
	Pre BCVA	0.32	0.44	0.76	0.3	0.42
	Post UCVA	0.38	0.36	0.66	0.34	0.3
	Post BCVA	0.04	0.12	0.18	0.14	0.16
Pre KERATOMETRY (LENS STAR)	K1	39.89@73	40.37@92	40.08@85	39.10 @13	41.88@63
	K2	47.89@163	49.39@2	49.76@175	47.09 @103	49.76@153
DURATION BETWEEN CXL & PHACO	MONT HS	13	11	9	10	8
AUTOMATED REFRACTION	PRE	+3.0DSP /-8.25 DCY X 70	+3.00DSP/-9.25 DCY X 96	+2.00DS P/-9.50 DCY X 90	+2.50D SP/ - 8.00DC Y X 10	+3.00DS P/-8.00 DCY X 60

(GRAND SEIKO)	POST	- 0.75DSP /- 0.75DC Y X 140	+1.00DSP/+1.00 DCY X 170	+0.50DS P/ -1.00 DCY X 90	+0.50D SP / - 0.75 DSP X 90	+1.00DS P/ -0.75 DCY X 70
SUBJECTIVE REFRACTION	PRE	+1.00DS P/- 8.00DC Y X 70 0.32	+2.00DSP/ 8.00DCY X 90 0.44	+1.00DS P/- 8.00DC Y X 90 0.76	+1.50D SP / - 8.00DC Y X 10 0.30	+2.25 DSP/ - 8.00 DCY X 65 0.42
	POST	- 0.50DSP /- 0.75DC Y X 140 0.04	+0.50DSP/+0.50 DCY X 170 0.12	0.00DSP /-1.00 DCY X 90 0.18	0.00DS P/ -1.00 DCY X 90 0.14	+0.50 DSP / - 0.50 DCY X 70 0.16
FOLLOW-UP (MONTHS)		7	9	6	12	7

PATIENT WORKUP

Figure1

Figure2



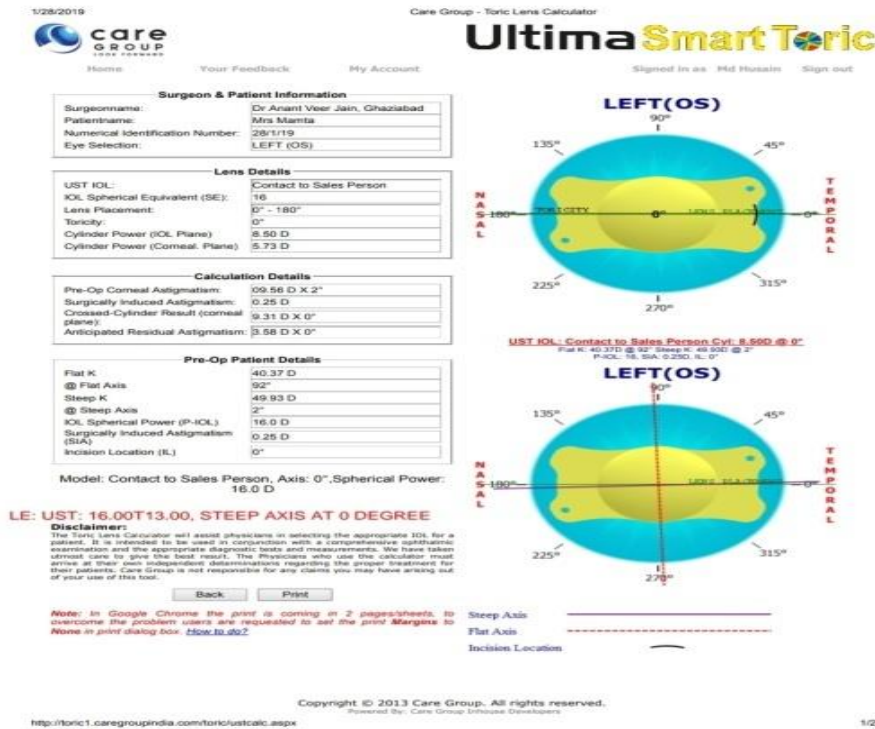


Figure.3

RESULTS:

- Average UCVA of 1.44 log MAR & BCVA of 0.45 log MAR, improved to 0.41 log MAR & 0.12 log MAR respectively. post-surgery. The average power of Cylinder decreased from 8.6 D to 0.75 D and sphere from 2.95 D to 0.6 D, 6 months postoperatively. All patients were highly satisfied with their visual outcome, which improved their Quality of life

CONCLUSION:

- Custom made toric IOLs of high cylindrical power can be safely and effectively used to restore quality vision in patients of corneal ectasias with high cylinder post cross linking, who were not able to tolerate CL or Glasses, imparting good Quality of life post-surgery. However, the study size is very small and needs to be evaluated with greater sample size. As our cohort is of young patient’s, ectasia may progress even post CXL therefore need of longer follow up then present study. The outcome is parallel with the work of Abou Samra (Abou Samra W et al,2018)

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Conflict of interest: Nil

Informed Consent Taken

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