

Visual outcome of fitting Rose-K2 XL lens in a case with advanced keratoconus

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ABSTRACT

Keratoconus is a progressive non inflammatory bilateral but usually asymmetric corneal disease characterised by paraxial stromal thinning and weakening that leads to corneal surface distortion. Rose K2 XL lens has an aspherical optical zone and is employed in the fitting of irregular corneas for vision and comfort while maintaining corneal health. Rose K2 XL lens was fitted in a 35 year old male presented to contact lens clinic of BP Koirala Lions center for Ophthalmic Studies, Kathmandu having advanced keratoconus. His presenting best corrected visual acuity was 6/36 in right eye with plano and 2/60 in left eye with plano with no improvement with glasses. The corneal topography performed with Bon Sirius showed keratoconus compatible in both eye. Rose K2 XL is a mini scleral lens which saw excellent fitting attending visual acuity of 6/12 in both eyes. Rose K2 XL lenses are of viable alternative in the visual rehabilitation of patients with advanced keratoconus.

Keywords: keratoconus, visual outcome



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INTRODUCTION

Keratoconus (KC) is a progressive, non-inflammatory, bilateral (but usually asymmetric) ectatic corneal disease, characterized by paraxial stromal thinning and weakening that leads to corneal surface distortion¹. Visual loss occurs primarily from irregular astigmatism and myopia, and secondarily from corneal scarring.

Eyeglasses or soft contact lenses may be used to correct the mild nearsightedness and astigmatism that is caused by the early stages for keratoconus. As the disorder progresses and cornea continues to thin and change shape, rigid gas permeable contact lenses can be prescribed to correct vision adequately.

Rose K2 XL is a semi-scleral lens (Menicon Co.) predominantly used for irregular cornea. The primary indications of Rose K2 XL lens are Keratoconus, Pellucid Marginal Degeneration (PMD), Post Graft, Corneal Rings, Post-LASIK ectasia, advanced dry eye and any irregular corneal conditions that cannot be successfully fitted within the limbus, while the secondary indications are polluted work conditions, stability for sports or working environment, corneal GP intolerance, piggyback and finally it can be used as a daily wear in patients with irregular cornea with adequate vision in advanced stages². The contact lenses must be carefully fitted, and frequent checkups and lens changes may be needed to achieve and maintain good vision. In a few cases, a corneal transplant is necessary. However, even after a corneal transplant,

eyeglasses or contact lenses are often still needed to correct vision.

CASE REPORT

A 35 year old male presented to the general OPD of B.P.Koirala Lions Center for Ophthalmic Studies with a chief complaint of reduced sharpness (quality) of vision in left eye since 5 months. He had no previous history of any ocular examination and sustained no ocular trauma. He had no any systemic diseases. His presenting best corrected visual acuity was 6/36 in right eye (RE) with plano and 2/60 in left eye (LE) with plano with no improvement with glasses. Slit lamp examination revealed corneal scar, vort striae & fleischer's ring in RE and corneal degeneration, Vogt striae, Fleischer's ring and nipple cone in LE which are the most common findings seen in Keratoconus of both the eyes. Scissoring reflex & oil droplet reflex was seen on performing retinoscopy of LE.

There was no epithelial defect noted on fluorescein staining. Keratometry (Sim-K) value obtained from Bon Sirius topography is a diagnostic tool for any types of corneal pathology and it indicated corneal astigmatism of -4.16 Dcyl against the rule astigmatism [vertical: 6.44mm (51.90 D), horizontal: 5.99 mm (56.28 D)] in RE and corneal astigmatism of -6.24 Dcyl against the rule astigmatism vertical: 4.87 mm (69.68 D), horizontal: 4.44 mm (75.92 D)] with 8 mm RMS/ Aback 0.67 $\mu\text{m}/\text{mm}^2$ and 1.66 $\mu\text{m}/\text{mm}^2$ in both eyes respectively. The thinnest location was found to be 331 μm in RE and 142 μm in LE. The corneal

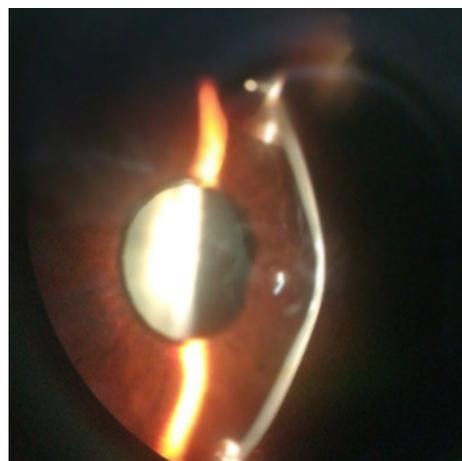


Figure 1 : LE central corneal thinning and scarring

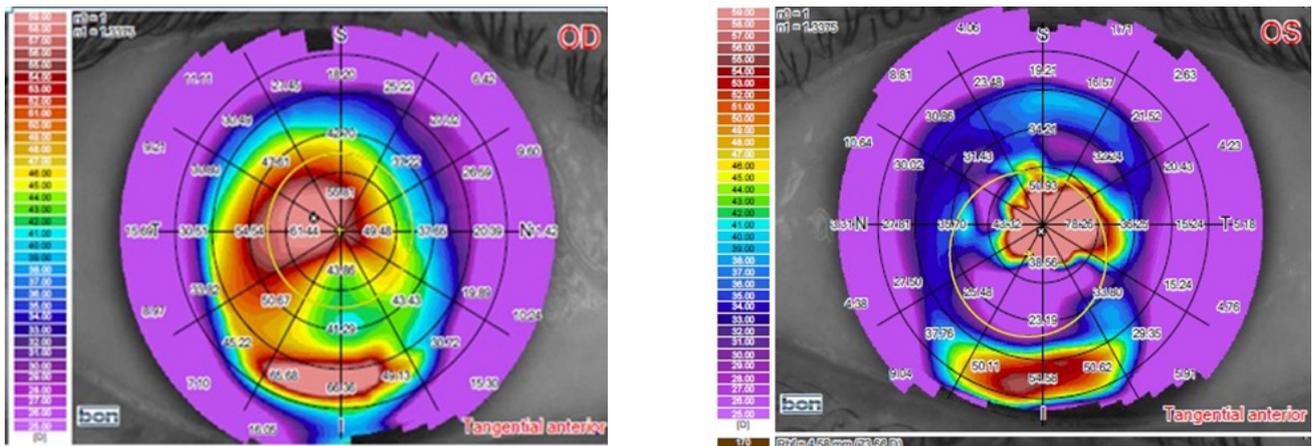


Figure 2 : Corneal topography of RE and LE showing paracentral and central Corneal thinning

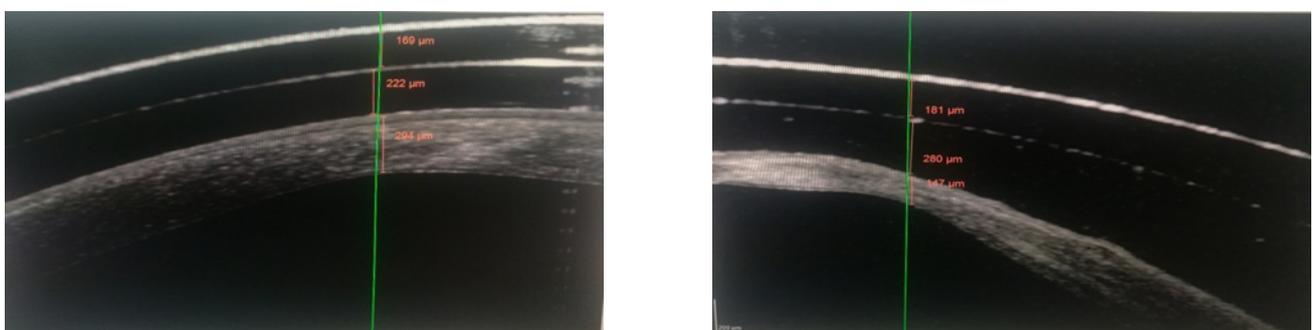


Figure 3: Measure of vault thickness in RE and LE after fitting Rose K2XL

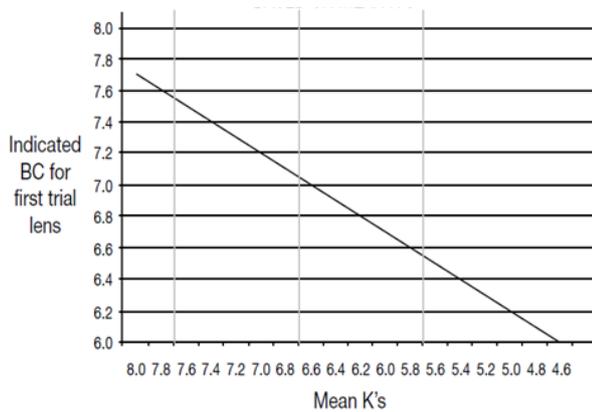


Figure 4: Keratoconus Guide for first trial lens (Based on Mean K's)

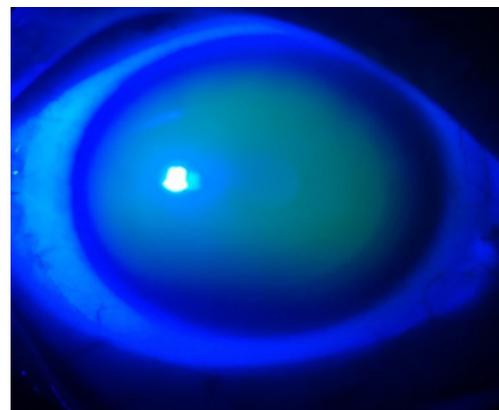


Figure 5: Showing optimal Fitting of RoseK2 XL

topography performed with Bon Sirius showed keratoconus compatible in BE.

According to clinical findings, the diagnosis was made both eyes advanced keratoconus. There are different optical modalities for treatment of keratoconus like glasses and soft lens for mild keratoconus, customized rigid gas permeable for mild to moderate but the case was advanced

keratoconus. So, Rose K2 XL was given for the treatment. Rose K2 XL lenses were used in our subject. Base curve of 6.40 mm, total diameter of 14.60 mm, back vertex power of -8.00 DS, and standard edge lift resulted in the improvement of VA to 6/12 in RE with the Rose K2 XL lens (0.20 mm flatter than typical K reading). Similarly with the following parameters: 6.00 mm base curve, 14.60 mm total diameter, -12.00 DS back vertex

power, and standard edge lift resulted with the improvement of VA to 6/12 in LE. The lens was evaluated for optimal fittings There was significant improvement in visual acuity with Rose K2 XL lens in comparison to spectacles.

DISCUSSION

Because of the development of irregular myopic astigmatism caused by progressive corneal ectasia, optical correction of keratoconus is a difficult problem for eye-care practitioners. Although rigid gas permeable lenses give superior visual acuity, many patients discard them due to discomfort and inadequate corneal physiological response. Soft contact lenses are quite comfortable and have a good physiological response, but they lack the superior optics of rigid lenses³. Scleral lenses, hybrid lens designs, soft toric lenses, specialized soft lenses, and piggyback lens systems are some of the other contact lens fitting alternatives for keratoconus patients⁴. Because of the steep contour of the cornea and a significant decentration tendency of the contact lenses, fitting contact lenses in keratoconus is problematic.

Rose K2 XL lenses were used in our subject. Improvements in RGP materials and manufacturing processes have sparked renewed interest in large diameter lenses in the previous decade. RGP contact lenses with a large diameter provide excellent comfort, avoid stress on an already impaired cornea, and give outstanding visual performance. The Rose K2 XL lenses are made of Tisilfocon A material (Menicon Z, Menicon Co. Ltd., Nagoya, Japan). The lens has an aspherical optic zone and comes in nine different edge lifts (from double decrease to double increase in 0.5 steps). The trial set included 14 lenses with overall diameters ranging from 13.0 to 14.6 mm, depending on the back optic zone radius (BOZR), which means that the diameter increases as the BOZR increases and vice versa. The experimental set included conventional edge lift lenses. Base curve of 6.40 mm, total diameter of 14.60 mm, back vertex power of -8.00 DS, and standard edge lift resulted in the improvement of VA to 6/12 in RE with the Rose K2 XL lens (0.20mm flatter than typical K reading). Similarly with the following parameters: 6.00 mm base curve, 14.60mm total diameter, -12.00 DS back vertex power, and standard edge lift resulted with the improvement of VA to 6/12 in LE.

The keratoconic cornea's unique profile prevents

the use of standard gas-permeable lenses with broad back optic zones, which induce misalignment and consequent tear pooling and sealing between the RGP lens's back surface and the cornea⁵. As a result, fitting is challenging due to decentration and center touching. To try to align the back surface of the lens as perfectly as possible with the peculiar shape of the keratoconic cornea, the Rose K lens design has up to six different curves over the back surface of the lens and a decreasing optic zone as the base curve steepens. The Rose K lens has been reported to provide improved visual acuity and increased comfort for keratoconus patients when compared to other designs⁶. It is easy to fit for beginner practitioners and delivers better visual acuity and increased comfort for keratoconus patients. The Rose K lens has been the subject of numerous research⁶⁷. When compared to the best corrected vision before lens fitting, visual acuity with the Rose K lens was greatly enhanced.

CONCLUSION

Rose K2 XL lens provide patients with irregular cornea with both quantitative and qualitative optimal visual function with high degree of patient comfort and satisfaction with minimal corneal scarring.

CONSENT

Verbal as well as written consent was taken from the subjects before recruiting them in the study.

CONFLICT OF INTEREST

None.

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