

Successful Scleral Lens Fit After Failure in a Hybrid Lens in a Post-RK Patient

Tristan Barrueco, OD and Harald Olafsson, OD, FAAO

PURPOSE

Radial keratotomy (RK) was a popular procedure in the 1970's and 1980's that was performed on hundreds of thousands of patients in the United States.¹ It was originally intended to correct for myopia, but eventually led to significant refractive shifts and irregular astigmatism. In order to help patients regain sight, practitioners started to fit these patients into specialty lenses.

This case discusses a patient who had bilateral RK procedures and was eventually fit into hybrid lenses. While the patient was able to tolerate the hybrid in the right eye, poor fit and comfort prevented the patient from wearing the hybrid lens in the left eye. This case then goes on to discuss how the patient was successfully refit into a scleral lens.

METHODS

A 73-year old white male presented to the Salt Lake City VA Medical Center with significant corneal irregularities secondary to RK procedures in both eyes. The patient has a history of glaucoma as well as dry macular degeneration.

The right eye was successfully fit into a hybrid lens. The left eye was also fit into a hybrid lens, however through multiple iterations of lenses, the patient reported that no lens was able to be successfully fit on the left eye. Patient stopped wearing a lens altogether in the left lens due to the poor fit and discomfort. The patient desired better vision and comfort in the left eye. The hybrid fit in the left eye was abandoned and the patient was then fit into an oblate design scleral lens.

RESULTS

RK surgery is a former refractive surgery technique which used radial cuts in the cornea to flatten the central cornea to correct myopia. This technique resulted in large hyperopic shifts as well as irregular astigmatism many years after the surgery.² In addition to hyperopic shifts in refraction, it has been documented that the refraction can also vary diurnally.³ Lastly the size of the pupil could result in significant aberrations, with larger pupils having significant decreases in visual quality as a result of the aberrations.⁴

The patient's right eye had significant irregularities throughout the cornea but with the hybrid lens was able to achieve a best corrected visual acuity of 20/25-1. No changes were made to this lens.

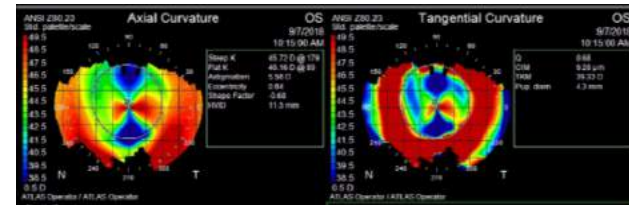
The patient's left eye had significant peripheral steepening along with a large amount of central astigmatism. The hybrid fitting set available in the clinic had limited parameters of which could be changed. Despite numerous trial fits, no lens was able to achieve an adequate fit, as such the hybrid fit was abandoned.

A normally shaped cornea is prolate in nature with a flatter periphery and a steeper center. A post-refractive surgery cornea however is oblate with a steeper periphery and a flatter center. As such the fitting relationship with standard lenses is poor. Using an oblate design scleral lens we were able to successfully vault the central cornea while simultaneously clearing the peripheral cornea without excess vault. The scleral alignment of the lens helped with patient comfort.

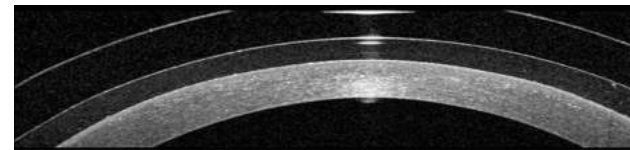
Final visual acuity with the scleral lens fluctuated between 20/30 and 20/40. Hinderances to a better final visual acuity included large drusen and drusenoid PEDs scattered throughout the macula. Despite this, the patient reported better overall visual quality with the scleral lens as well as better comfort.

Final Lens:

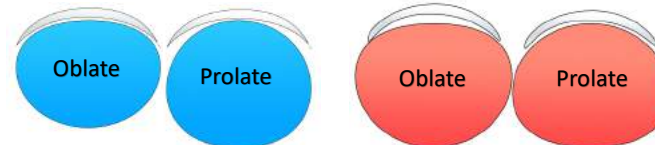
Type	Sag	Base Curve	Diameter	Power	Peripheral
Zenlens	5.000	8.50D	16.0	-3.25sph	Vertical Standard
Oblate					Horizontal Flat 3



The patient's corneal topography of the left eye can be observed in these maps. Note the significant steepening in the mid-peripheral to peripheral cornea.



The central vaulting after settling as observed on an OCT. Note the generally uniform clearance throughout the entire width of the cornea.



Demonstration of the difference of how the same oblate lens fits on an oblate versus prolate spheroid (left) and how the same prolate lens fits on an oblate versus prolate spheroid (right)



Faint RK scars can be observed beneath the lens.

CONCLUSION

Hybrid lenses are excellent options for patients who would like the quality of vision of a GP but with the comfort of a soft lens. The limited design options can at times hinder the fitting process in patients with non-regular corneas. Using an oblate design scleral lens in a post-refractive surgery patient can not only provide similar comfort, but the inherent corneal vaulting can both correct and help avoid issues caused by highly irregular corneas. It is also important to recognize that visual acuity is not the sole indicator of success and a patient can be happy with improved visual *quality* despite what may appear to be poor visual acuity.

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