Advanced scleral lens fitting on a status post LASIK corneal ectasia patient

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Background

The available technology for fine-tuning scleral lens fits has become increasingly advanced throughout the years. Initially, we relied on data gathered from fluorescein patterns to judge our fits with spherical diagnostic lenses. Today, current diagnostic techniques include the use of anterior segment optical coherence tomography, scleral topography, and the ability to take an impression of a patient's eye. This data provides us with more knowledge to customize newer scleral lens designs. With the new date that most scleras are not spherical(1), newer designs incorporate toric peripheries into the diagnostic set to reduce chair time and reorders. Ultimately, this improves patient health, satisfaction and comfort.

The following case highlights a patient whose initial scleral lens fitting required multiple visits and remakes to finalize the fit. She returned a few years later for a refit, where we used a new design. The patient reports greater satisfaction with her vision after being refit in a new set of lenses with significantly less chair time.

Objectives

- To introduce a new scleral contact lens stabilization technology, which improves patient comfort and provides more consistency with visual acuity.

Case Report

A 62-year-old female presenting with corneal ectasia OU secondary to LASIK surgery complains of having to wear glasses over her contact lenses to correct her residual astigmatism. She reports clear vision and comfort while wearing her lenses, however the combination of wearing a pair of glasses over her scleral lenses led to her frustration. The patient was fitted in scleral lenses three years ago.

Three years ago, we tried many iterations of scleral lenses with front surface toric optics weighted with a prism ballast. However, these lenses resulted in fluctuating vision and an inconsistent over-refraction. The toric markers were inconsistent, being located at a different position at each follow up visit, despite increasing prism ballast to attempt to stabilize the lens. At the time, the lab was unable to manufacture a lens with back surface toric haptics to properly stabilize the lens. Eventually, the patient was fitted with a spherical set of lenses and prescribed a set of spectacles to correct the patient's residual astigmatism.

Examination

Her presenting visual acuities (VA) were 20/20 OD and 20/20 OS. Her scleral lenses had a base curve (BC) of 44mm OU, a sagittal depth (sag) of 4.48mm OU a diameter of 16mm OU and powers of -2.50D OD and -2.00D OS. Her glasses prescription was -0.75+0.50x175, add +2.50 OD and -1.75+1.25x153, add +2.50 OS.

Contact Lens Evaluation

The patient's pupils were equal, round and reactive to light with no APD OU. Her extraocular movements were full OU. A slit lamp examination revealed clear lashes OU, clear corneas with low tear lakes OU and deep and quiet anterior chambers OU. 1+ nuclear sclerosis OU was noted OU. The patient's intraocular pressure was 15mm Hg OU. Topography showed plateau-shaped corneas with mild inferior ectasia OU. Her keratometry readings were 42.51/41.87@071 OD and 44.58/43.44@088 OS (Figure 1). An undilated posterior segment evaluation revealed a healthy fundus OU.

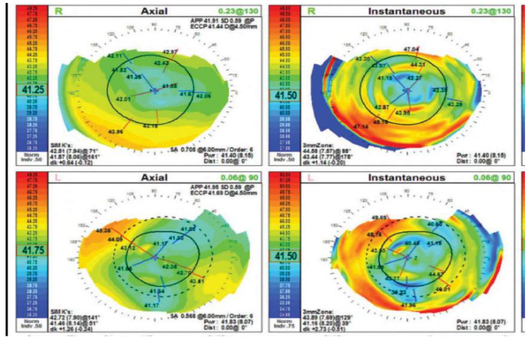

Fig. 1. Pictured here is a plateau-shaped corneal topography OU.

Contact Lens Fitting

The SynergEyes VS is a scleral lens that utilizes back surface toric haptics for stabilization. These lenses are non-rotationally symmetrical and use bitangential peripheral landings that rest gently on the sclera and match the natural contour of the scleral shape. This design also achieves superior centration, improving optics and fits.(2) The patient was refit into this lens with the goal of eliminating her spectacle over correction.

The initial diagnostic lens was placed on the patient's eyes with parameters of 3600 sag/plano/16.0 haptics, 36/42 OD and 3600 sag/plano/16.0 haptics, 34/40 OS. Centrally, the sag was adequate with about 250µm of central clearance OU after initial insertion. There was adequate limbal clearance and the haptic sat nicely aligned OD, but the left lens had 360 slight edge lift, causing the patient to have lens awareness OS.
Over-refraction revealed:
+0.50 +0.75x170 (VA of 20/20) OD (toric marker line at 5:30 clock hour)
+0.50 +1.00x155 (VA of 20/20) OS (toric marker line at 7:30 clock hour)

The axis was adjusted to accommodate the position of the toric markers per the lab's formula, and the following lens parameters were ordered: +1.25-0.75x155 OD and +1.50-1.00x155 OS. The lenses had a sag of 3600, a BC of 8.4mm, a diameter of 16mm and toric haptics of 36/42.

Contact Lens Dispensing

Two weeks later, the lenses were fitted to the patient's eyes. Her vision was 20/20 OU. The fit was optimal with 200µm of central vault upon settling. The toric line was aligned at the expected positions—5:30 OD and 7:30 OS (Figures 2 and 3). Over-refraction was plano OU. The lenses were dispensed.

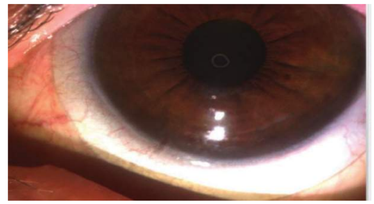

Fig. 2. The toric marker in this eye is aligned to 7:30 clock hour OS.

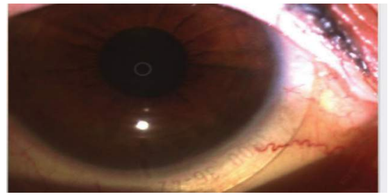

Fig. 3. The toric marker in this eye is aligned to 5:30 clock hour OD.

Follow up

Two weeks later, the patient reported that she was absolutely thrilled with her vision. She reported seeing distant objects clearly without having to wear glasses, allowing her to enjoy a more active lifestyle. The fit was finalized.

Discussion

Stabilizing front surface toric optics with toric haptics is a much more predictable, comfortable and effective method to stabilizing a lens compared to prism ballast.(3) This allows the lens to settle naturally on the sclera, causing the toric haptic lines to land in a consistent location. Toric haptics can also improve centration of lens optics, reducing the amount of induced cylinder from a decentered lens.

Prism ballast, on the other hand, can add thickness to the lens, making edge awareness more prevalent in patients. The lens does not fit as securely as a lens with toric haptics. In addition, prism ballast lenses tend to rotate, especially if a patient has a non-spherical sclera, which is common.(1,4)

The SynergEyes VS lens design has improved the predictability of designing front surface astigmatism scleral lenses resulting in less chair time, making these scleral lenses valuable in our clinical practice.

References

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