

Case Report:

Two curves are better than one

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Introduction

A 39-year-old female who had undergone PRK in 2016. She was a pre-surgical -6D myope, so her corneal surface was rather flat from the beginning. Her post-surgical regression refraction is currently -1.75-0.50x100. Post-refractive surgery patients are often reluctant to wear glasses or hard specialty lenses due to the perceived difficulty of handling the lenses and discomfort. Such was the case with this patient; therefore the custom soft contact lens option was chosen.

Background

LASIK and PRK are common corneal refractive surgeries for myopia that can potentially regress post-operatively. Due to the nature of ablation, the resultant oblate-shaped cornea often leads to an unstable fit with conventional soft contact lenses, thus causing inadequate vision and discomfort. Despite advances in contact lens technology, discomfort-related dropout rates remain high, not only for post-refractive patients, but also for general contact lens users. One significant factor contributing to this issue is the mismatch between ocular shape and lens design. Typically the height of the lens, the diameter, or the base curve do not fit the shape of the patient's ocular surface well; consequently, a custom soft lens design may solve the problem.

Challenge

Most modern commercially available soft lenses have a constant base curve (BC) and fixed sagittal heights. In this case, conventional or commercial lenses with different BC were tried on:

The 8.5mm BC lens had a very steep fit, relative to the eye shape, which resulted in fluctuation in vision (Figure 1). The 9.0mm BC on the other hand, had a flat base curve relative to the peripheral curve, which fit the center but not the sides, causing excessive decentration that also fluctuates vision (Figure 2). This patient was an ideal candidate for using scanning technology to match a novel dual base curve design (Figure 3).



Fig. 1 Commercial 8.5mm BC



Fig. 2 Commercial 9.0mm BC

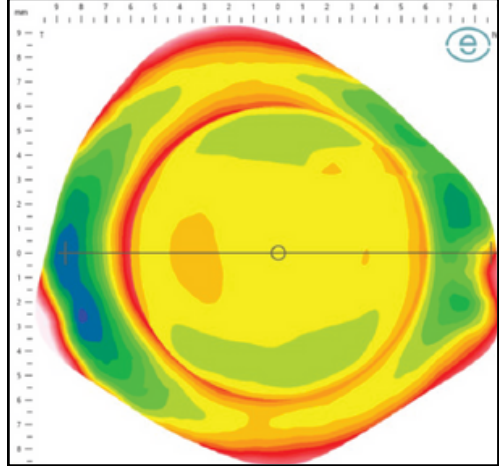


Fig. 3 Custom 9.0/8.5mm BC

Profilometry Measurements

Measurements were taken with the Eye Surface Profiler (ESP) from Eaglet Eye (The Netherlands). The ESP is a corneo-scleral profilometer that measures the sagittal height of the complete ocular surface, up to 20mm diameter. In this case, the sagittal height at a chord of 15mm helped predict the sagittal height of the custom soft contact lenses.

Sagittal height		
Chord length	15.00	✓
Meridian	3.59mm	
Average	3.48mm	
Tsag - Nsag	0.06mm	
90° MINsag	3.40mm	@78°
90° MAXsag	3.61mm	
Difference	0.22mm	
MINsag	3.38mm	@53°
MAXsag	3.61mm	@168°



Lens Fitting

A novel, customized soft contact lens design was augmented with a flatter central BC and steeper peripheral BC to provide a more optimal fit for this patient with a post-refractive corneal shape. The dual design 9.0/8.5 (Figure 3) resulted in a more stable, better centered lens design, combining the sagittal height data and using the dual base curve in the center to create the better fit, with enhanced comfort, and optimal vision correction for the patient.



Conclusion

Understanding a patient's ocular shape and how to customize soft contact lenses to better contour the unique eye can help achieve an optimized contact lens fit. This novel custom soft, oblate, dual base curve lens design was effective for this post-refractive contact lens fitting. Offering a more personalized contact lens option can help satisfy the needs of our patients and enhance their quality of life. Using SAG data can also help normal shaped eyes to get the best commercially available lens.