

Case Report:

Empirical Freeform Scleral Lens Fitting

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Kyriakos Telamitsi is a highly experienced contact lens practitioner based in Limassol, Cyprus. He has been operating his private practice, Kyranto Optical Center, since 1995. With a Bachelor of Science in Optics-Optometry and numerous certifications, including one from the International Academy of Myopia Management, Kyriakos specializes in OrthoK, specialty contact lens design for conditions such as keratoconus, presbyopia, and myopia management, as well as dry eye treatment. He is fellow of the Scleral Lens Education Society and of the European Academy of Optometry and Optics.



Introduction

A 58-year-old female with a history of severe myopia over -20DS underwent refractive surgery at the age of 16. Over time, she developed Post-LASIK ectasia, which significantly impacted her vision. In 2022, she was referred by an ophthalmologist for specialty contact lens fitting to address her complex visual needs. Given her challenging ocular history, a customized approach was required to achieve the best outcome.

Background

The patient's unaided visual acuity (VA) is OD 1/10. She was wearing spectacles with a prescription of OD +3.00-1.25x97 and OS 0.00-1.00x63. The best corrected VA for the right eye was 6/10, while visual acuity for the left eye could not be determined due to a recent vitrectomy for macular hole treatment and left ptosis. The patient had undergone radial keratotomy years ago for myopia correction, cataract surgery in both eyes, and also reported experiencing severe dry eye (Figure 1).

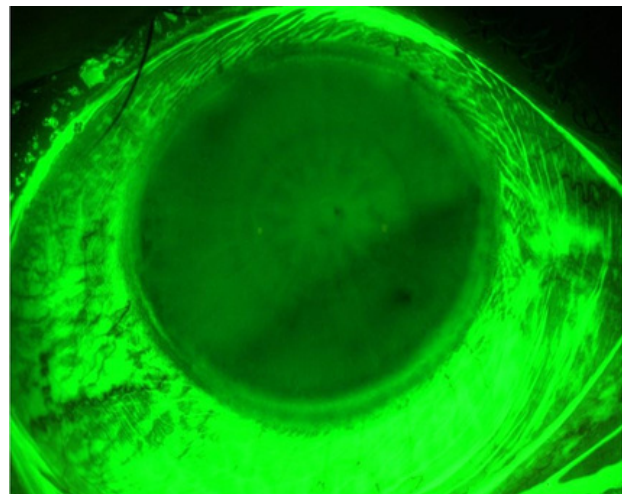


Figure 1 Slit lamp photograph after fluorescein instillation.

Profilometry data

For precise corneal and scleral shape analysis and empirical fitting, measurements were taken with the Eye Surface Profiler (ESP, Eaglet Eye, The Netherlands). The ESP captures comprehensive data over a 20mm diameter in one single scan, without the need for stitching or data interpolation.

The ESP data revealed a highly irregular scleral pattern, as seen on the ESP bi-sphere elevation map (Figure 2).

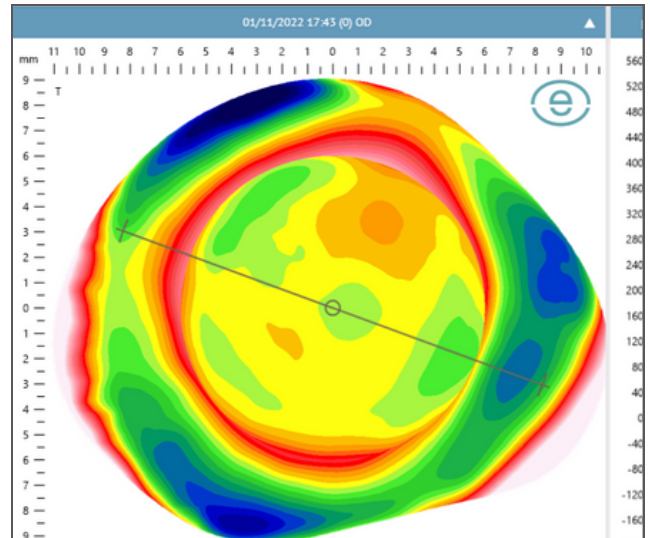


Figure 2 Bisphere elevation map by the ESP.

First Lens Fit

Due to the asymmetry of the cornea and sclera, a customized freeform lens was selected. The detailed scans were sent to the lab, and a custom freeform lens, the SLC Adapta (MedLac, Italy), was designed and manufactured based on the corneoscleral profilometry.

At the initial fitting, the VA with the lens was OD 9/10. The lens exhibited uniform clearance, and scleral redness was reduced. The patient reported better comfort and vision with the lens (Figure 3).

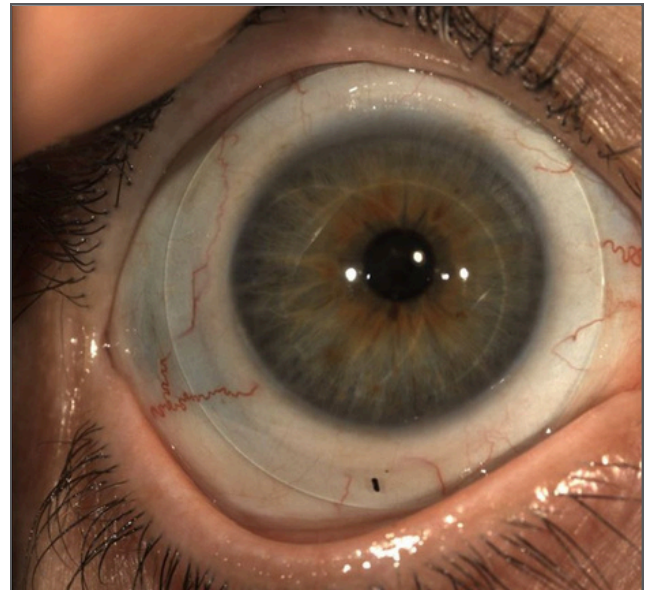


Figure 3 First and final fit.

Conclusion

Whereas conventional scleral lenses are fitted using a trial lens adjusted for a proper fit, freeform scleral lenses are designed empirically based on individual corneo-scleral profilometry. This scan-based approach can improve patient outcomes, significantly reduce chair time and the need for refits, and ultimately lead to greater patient satisfaction. In this case, the Eye Surface Profiler (ESP) provided precise mapping of the ocular surface, which was crucial for achieving optimal visual rehabilitation in a patient with a very complex ocular history.