

Case Report:

The Key to Successful Hyperopic OrthoK

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Dr. Wolf provides topography-guided and tomography-guided corneal, scleral, and orthokeratology lenses, impression-based lenses, and custom HOA correcting lenses. He is a Fellow of the American Academy of Optometry, Fellow of the Scleral Lens Society, and a Fellow of the International Academy of Orthokeratology and Myopia Control.



Introduction

63-year-old white female with moderate hyperopia OD +3.00 -0.75 x 060, OS +2.75 -0.50 x 150, mature presbyopia +2.50 Add, and dry eyes.

Background

She had been treated with hyperopic orthokeratology (orthok) before but had problems with decentered treatment. A two-month washout period was suggested for her corneas to revert to their normal baseline shape before starting the new treatment. With hyperopic orthok, lens centration is often the biggest barrier to success. The goal was to get her spectacle-free with hyperopic orthok lenses, which ultimately creates a center-near multifocal effect.

Corneal Topography vs. Corneo-scleral Profilometry

Due to the tightness of her eyelids, acquiring reliable, good quality maps of the full cornea with traditional corneal topography was very challenging (Figure 1).

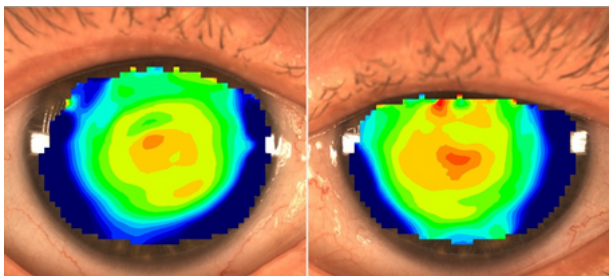


Figure 1 Tight eyelids prevented high-quality Placido topography.

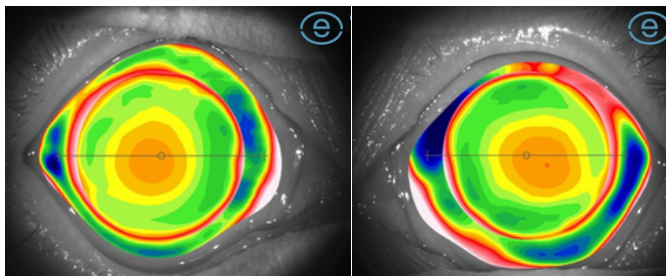


Figure 2 Reliable full corneal data with the ESP despite tight eyelids.

The Eye Surface Profiler (ESP) provided a significant advantage over Placido-based topography due to the increased working distance between the instrument and the eye, allowing the practitioner to manually open the patient's eyelids fully, resulting in complete corneal-limbal scans (Figure 2). The ESP data obtained was highly reliable—despite the tight eyelids—and optimal for fitting custom orthok design. Since this is a hyperopic case, already more complex than myopic orthok, precise data of the full cornea is necessary to achieve the perfect fit. Her maps exhibited a regular corneal shape, size and eccentricity, with mild mild corneal toricity of 30-40 microns at 8mm chord.

First and Final Lens

NightLens by WAVE Contact Lens System was chosen for this case. Using the DirectConnect functionality, the complete ESP data was transferred to the WAVE lens design software. Using WAVE's CAD/CAM software, custom hyperopic orthok lenses were designed, creating center-near multifocal optics (Figure 3). The near optic zone for the dominant eye was slightly smaller, with a shorter intermediate transition compared to non-dominant eye to achieve optimal visual quality at all ranges, similar to other multifocal lenses. The results were exceptional, achieving a 'one and done' success with 20/20 vision in both eyes, at both distance and near, with no need for follow-up adjustments. The patient experienced excellent vision at all ranges, along with great comfort, fit, centration, and stability (Figure 4).

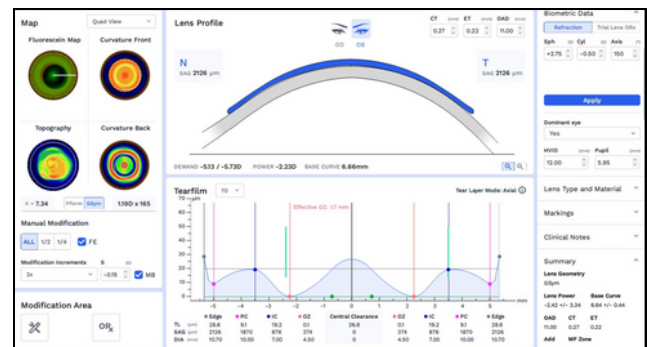


Figure 3 WAVE lens design software (OS, horizontal meridian).

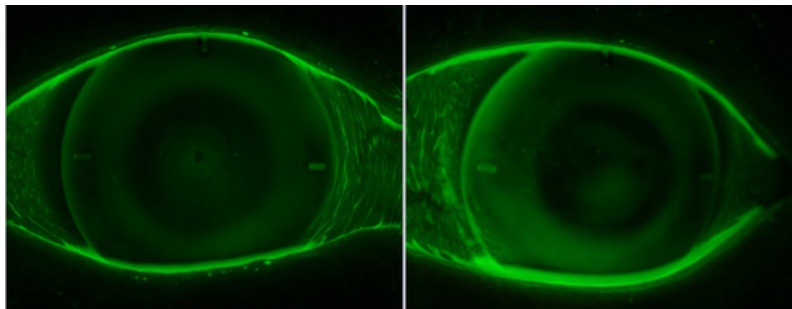


Figure 4 Typical hyperopic orthok lenses showing central and peripheral tear reservoirs with mid-peripheral applanation.

Conclusion

While orthokeratology usually brings to mind myopia corrections and myopia control, modern orthok can correct other types of refractive errors such as hyperopia. Successfully inducing steepening in the central cornea can be more challenging than flattening. For this patient, the complete correction and stability were only achievable due to the complete corneal data gathered using the ESP, allowing for a precise, tailored lens fitting.