

INTRODUCTION

Orthokeratology uses specialty reverse-geometry rigid gas permeable lenses that are worn overnight to reversibly change the corneal epithelium. This process flattens the central cornea as the mid-peripheral corneal epithelium thickens. The result is myopia correction. Good candidates for orthokeratology include mild to moderate myopes with mild to moderate astigmatism. A 2015 study showed patients with a myopic refractive error lower than -5.00 diopters had great success with orthokeratology. Indications for orthokeratology include myopic/astigmatic correction and myopic control. Other indications include unique cases where patients have a job or hobby that requires excellent uncorrected vision.

CASE HISTORY

A 25-year-old white male presented for a soft contact lens fit. He was complaining of blur in his right eye because he had lost his last monthly contact lens during a “tough mudder” race. The patient further explained that he has had issues in the past with mud and other debris on his lenses during races that affected his performance. Systemic history was unremarkable. Ocular history was remarkable for compound myopic astigmatism, spectacle wear, and soft monthly contact lens wear.

Clinical Exam	OD	OS
Unaided Visual Acuities	20/70	20/100
Best Corrected Visual Acuity (BCVA)	20/20	20/20
External Evaluation	WNL	WNL
Baseline Corneal Topography Flat K	45 diopters	45.37 diopters
Slit Lamp Evaluation	WNL	WNL

Based on the patient’s lifestyle, refraction, and corneal topographies, we determined that orthokeratology was a good option for him. After discussing this possibility with the patient, he agreed and we began a Paragon CRT fit. The following diagnostic lenses were selected at this visit:

Right Eye (OD):	Left Eye (OS):
Base Curve: 7.8	Base Curve: 7.8
Return Zone depth: .525	Return Zone Depth: .550
Landing Zone Angle: -34	Landing Zone Angle: -34

EXAMINATIONS AND RESULTS

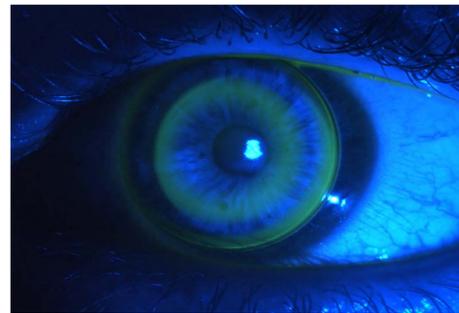


Figure 1: Fluorescein pattern of a diagnostic lens in the left eye demonstrating an acceptable fit.

Visit 1: The vision in the diagnostic lenses was 20/20 OD with a +0.50D over-refraction and 20/20 OS with a +0.50D over-refraction. These lenses were dispensed for overnight wear.

Visit 2 (1 day follow-up): The right lens was riding slightly superior. Upon fluorescein staining the treatment zone appeared adequate OU. Visual acuity without lenses was 20/20 OD and OS with a +0.50D subjective over-refraction OU. The over-refraction mildly improved the quality of the vision. Topographies revealed slightly superior decentered applanation zone in the right eye and a centered applanation pattern in the left eye.

Visit 3 (1 week follow-up): The patient reported mild blur OU. Refraction revealed -0.50D residual prescription OD, -0.50D OS. Fluorescein staining revealed that the right lens was still centered superiorly. Topographies at this visit revealed that the right lens was also sitting superior during overnight wear, indicated by the “superior smile” pattern seen below. At this visit, we made the following changes to compensate for the superior fit in OD and over-refraction in OS:

OD:	OS:
Base Curve: 7.8	Base Curve: 7.9
Return Zone Depth: .550	Return Zone Depth: .550
Landing Zone Angle: -34	Landing Zone Angle: -34

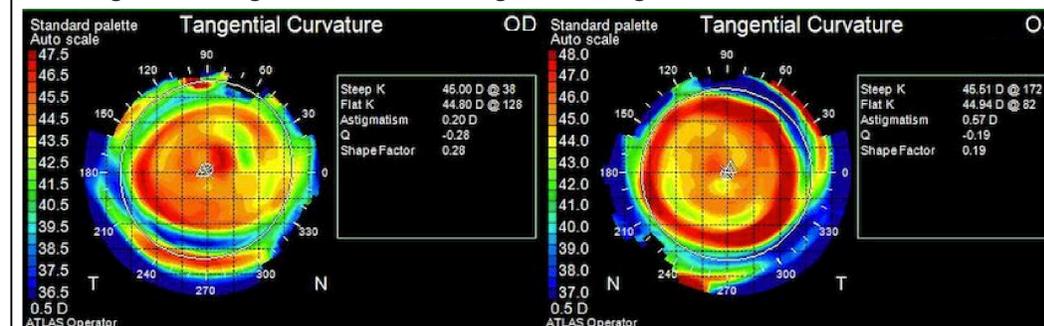


Figure 2: 1 week follow-up tangential topographies OU in first trial lenses.

Visit 4 (3 week follow up): Vision was 20/20 OD, 20/20 OS with no residual prescription in either eye. Fluorescein staining revealed centered lenses with ideal applanation and edge clearance. Corneal topographies revealed a centered zone of applanation OU.

FINAL TOPOGRAPHY

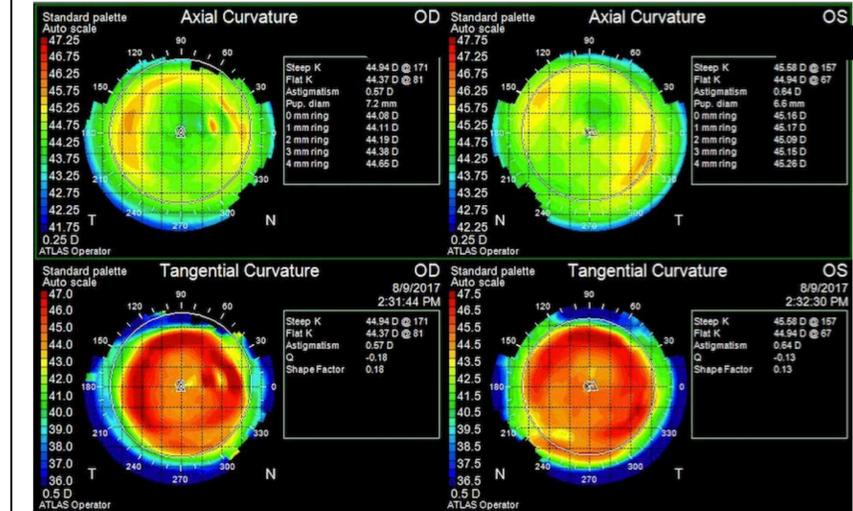


Figure 3: Final corneal topographies showing an aligned fit OU

DISCUSSION AND CONCLUSION

Orthokeratology is a safe alternative to spectacle or soft contact lenses. It is also a great alternative to LASIK or other forms of permanent refractive surgery because it is reversible. Fitting these lenses is straightforward when you have an understanding of three important parameters: base curve, return zone depth, and landing zone angle. The base curve is responsible for correcting the refractive error. Return zone depth is responsible for centering the applanation zone. Landing zone angle is responsible for edge lift and clearance. This case demonstrates how changing one parameter at a time can fix problems with fit and vision. An indication for orthokeratology, emphasized in this case, includes jobs or hobbies where being corrected without the use of daily lens or spectacle wear greatly improves patient satisfaction and daily life. These are patients who may not necessarily need orthokeratology lenses, but are grateful when given the option. They are motivated and compliant with lens care and wearing regimen, and become life-long, satisfied patients.

REFERENCES

- Liu, Y. and Xie, P. (2016). The Safety of Orthokeratology—A Systematic Review. *Eye & Contact Lens: Science & Clinical Practice*, 42(1), pp.35-42.
- Professional Fitting and Information Guide: Paragon CRT. (2017). [ebook] Mesa, Arizona: Paragon Vision Sciences, Inc. Available at: <https://www.paragonvision.com/crt-lenses/>
- Rajabi, M., Hosseini, S., Ghorbani, Z., Nobahari, F., Bazvand, F., Doostdar, A., Zarrinbakhsh, P. and Rajabi, M. (2015). Utility of orthokeratology contact lenses; efficacy of myopia correction and level of patient satisfaction in Iranian myopic/myope-astigmatic patients. *Journal of Current Ophthalmology*, 27(3-4), pp.99-102.
- Riley, C. and Pence, N. (2004). Forms of Vision Correction. *Eye & Contact Lens: Science & Clinical Practice*, 30(3), pp.138-143.