

Siyun Ren, Jayeshwar Nigam, Julie Lin, Sharon Park Keh OD FAAO

INTRODUCTION

Orthokeratology (Ortho K) is an internationally used practice of applying reverse geometry rigid gas permeable contact lenses overnight to temporarily correct myopia by reshaping the cornea¹. The subject of this case report decided to cease Ortho K in adulthood after 12 years of wear. She was strictly monitored during the washout to better understand and visualize the stabilization of corneal shape and refraction following discontinuation of treatment.

Our patient, a 26 year old female, began Ortho K wear at age 14. At the time, she was an avid volleyball player and was experiencing dryness in soft contact lenses. She wore Ortho K successfully for 12 years but desired a refit into a different brand of Ortho K lenses.

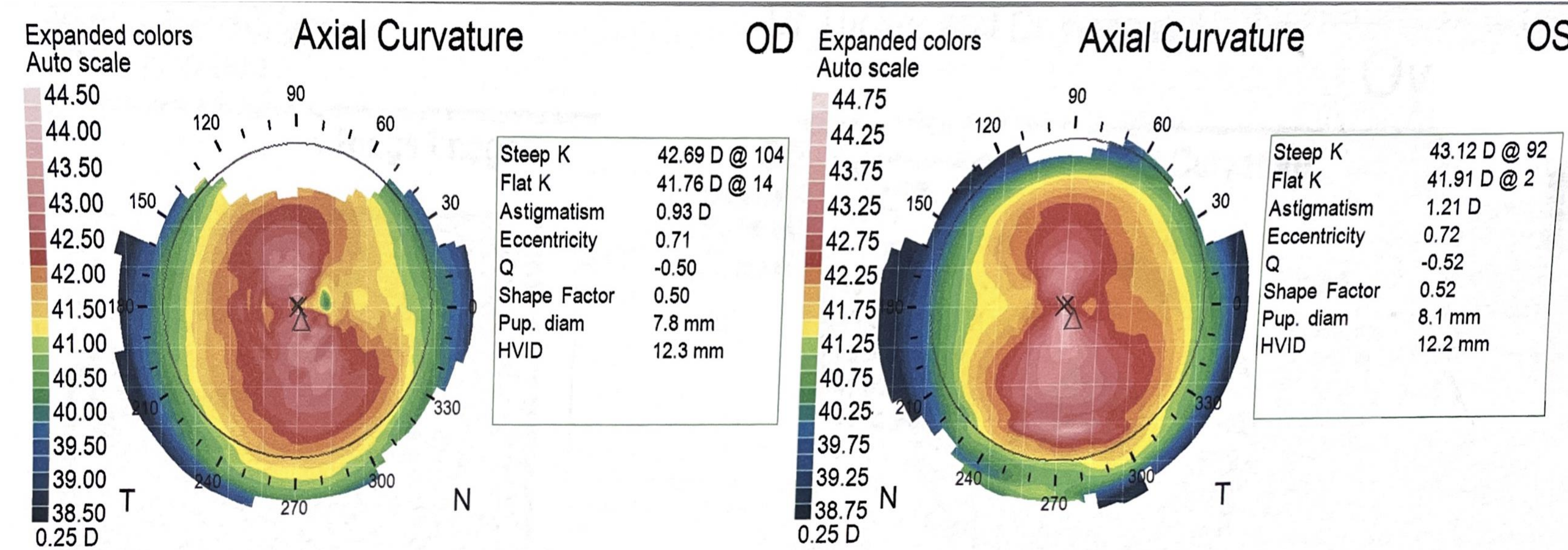


Figure 1 The corneal topography above was taken before the initiation of Ortho K treatment. The subject at this time was 14 years old.

	OD	OS
Refraction	-3.00 sph	-3.00 sph
Keratometry	41.76 @14, 42.69 @104	41.91 @2, 43.12 @92
Corneal Astigmatism	0.93D	1.21D

Table 1 Subject's pre-Ortho K measurements when the subject was 14 years old.

METHODS

Prior to washout, measurements of auto-refraction, subjective refraction, topography, axial length, intraocular pressure, near binocular testing, anterior segment evaluation with TBUT, and glare rating were acquired OU. The patient abruptly discontinued wear and all the measurements above except axial length were repeated daily for the first week and then 2-3 times a week for the following 2.5 weeks. All measurements were acquired at approximately the same time of day. For an additional two months, Corneal OCULUS Pentacam® was repeated weekly resulting in a total of **93 days of washout**. Stabilization of topography was defined as the first time that the final keratometry values was measured. Stabilization of refraction was defined as 2 repeated identical spherical equivalent readings.

RESULTS

The subject's flat keratometry values stabilized on Day 28 OD and Day 16 OS of washout. The spherical equivalent refractive error stabilized on Day 16 OD and Day 9 OS. Subjective glare rating improved throughout the washout from a 7/10 severity to 2/10. All other test findings remained relatively stable throughout the washout.

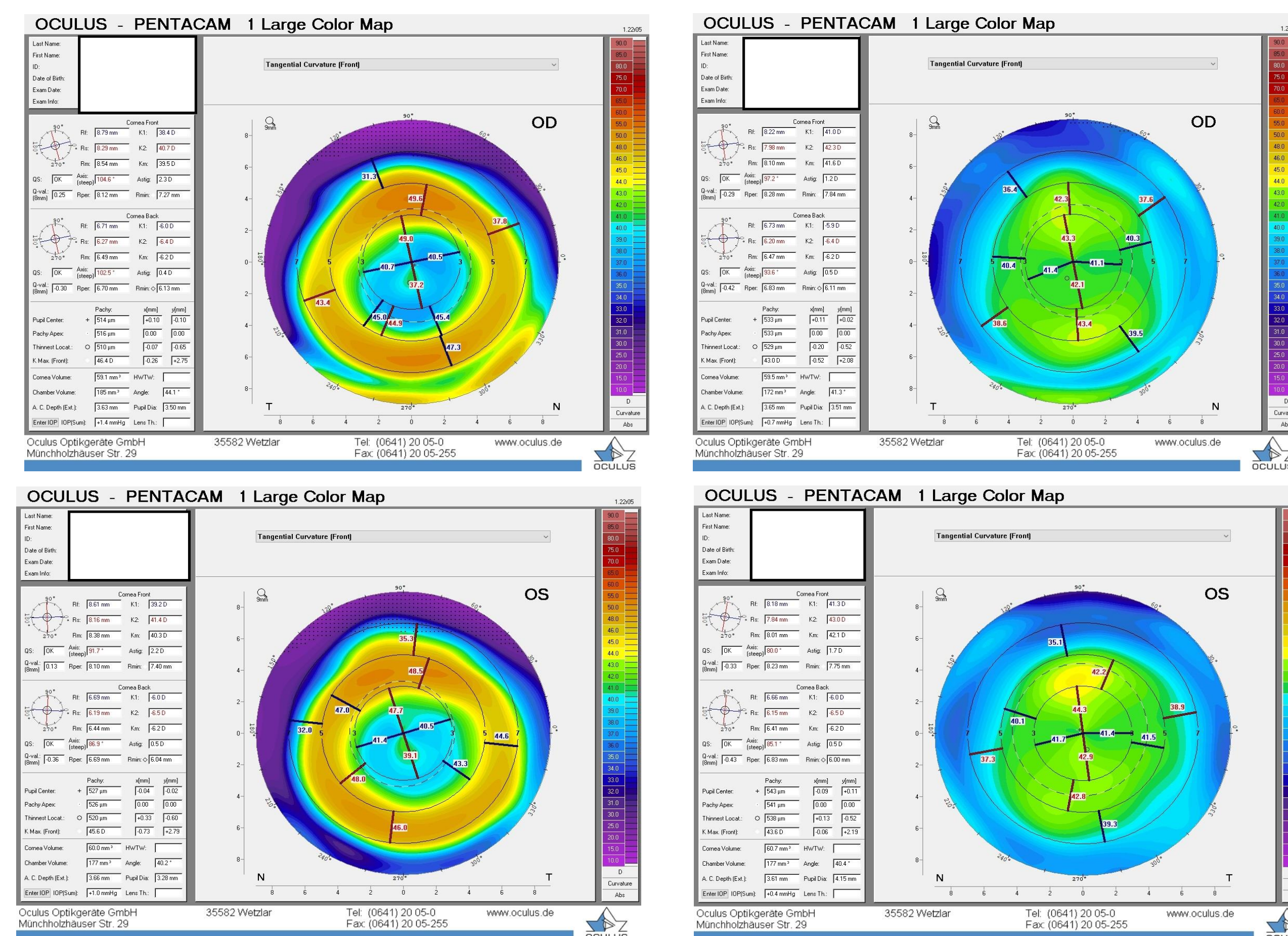


Figure 2 Tangential maps of Scheimpflug topography pre-washout and day 54 of washout OU

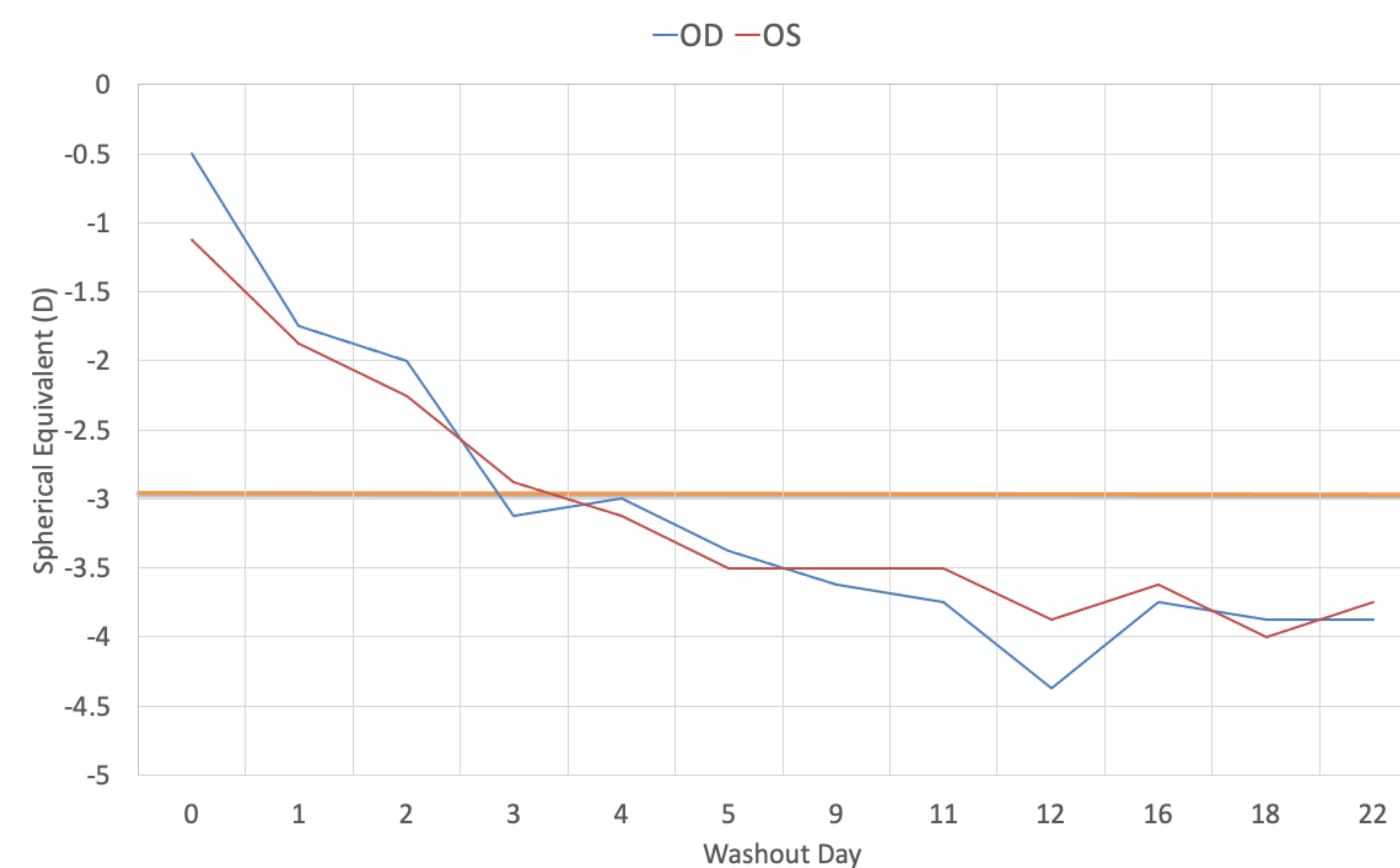


Figure 3 Spherical equivalent progression from washout Day 0 to Day 22. The right eye is highlighted in blue and the left eye in red. The demarcation at -3.00 spherical equivalent represents the patient's pre-Ortho K refractive error OU.

	OD	OS
Refraction	-3.50 -0.50 x 015	-3.00 -1.00 x 165
Keratometry	41.1 @2.9, 42.4 @94.7	41.3@171.4, 43 @79.8
Corneal Astigmatism	1.3D	1.7D

Table 2 Subject's post washout measurements when the subject was 26 years old.

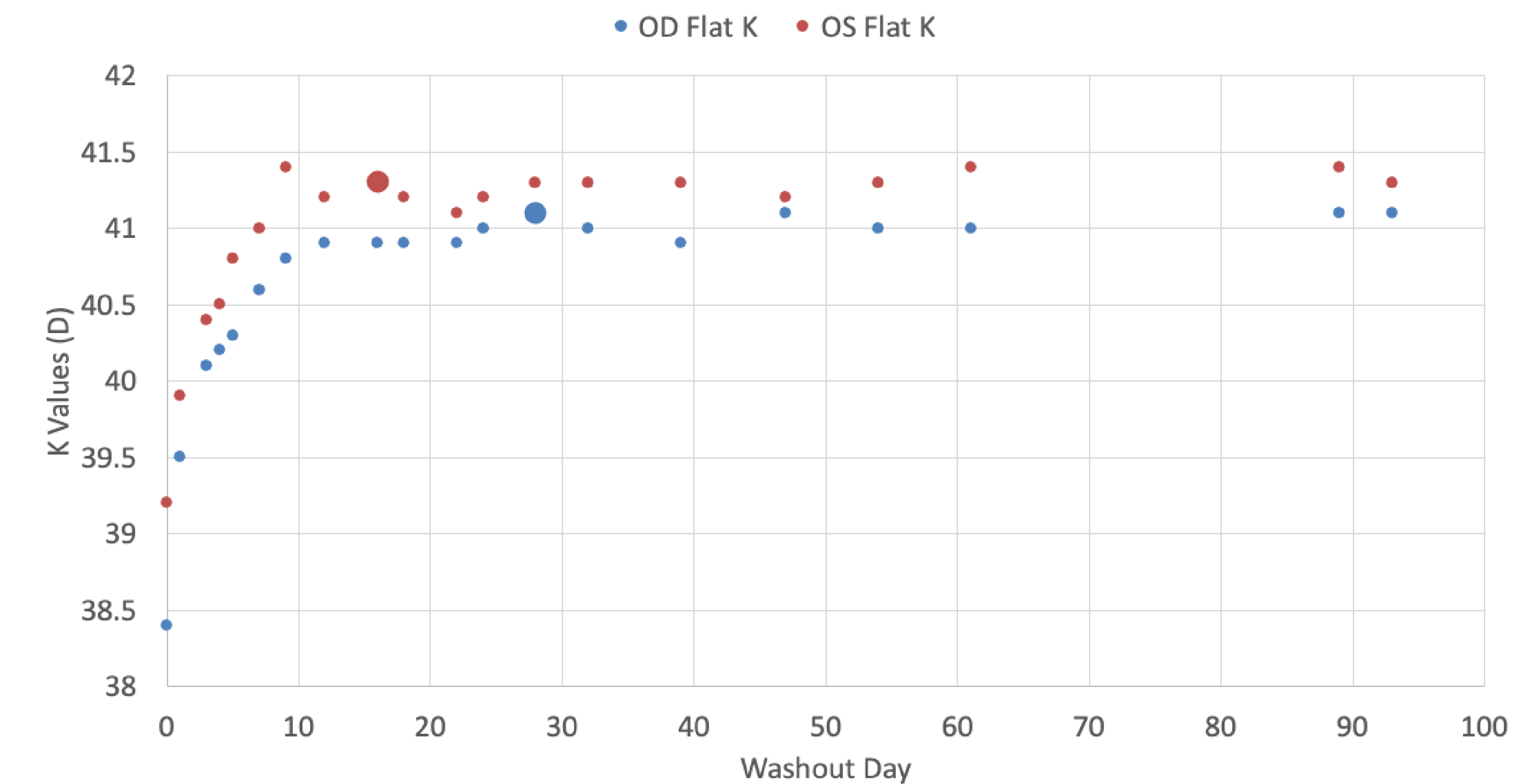


Figure 4 Flat K progression from washout day 0 to 93 in the right and left eyes. The right eye is highlighted in blue and the left eye in red. The larger points indicate the stabilization of Flat Ks in each eye.

A previous study by Chen et al. found an increase in corneal toricity between pre-Ortho K and post Ortho K discontinuation measurements which was associated with an increase in refractive astigmatism³. Similarly, there was an increase in our subject's corneal astigmatism following Ortho K washout compared to the amount of corneal astigmatism present before Ortho K wear. Our subject had an increase of 0.37D of corneal astigmatism in the right eye and 0.49D in the left eye along with an increase in refractive astigmatism.

CONCLUSION

After washing out for approximately 13 weeks, corneal topography still showed minor areas of treatment and the resulting keratometry readings were flatter than the pre-Ortho K keratometry readings. These areas of flattening may steepen with a more extended washout. However, persistence of these areas may suggest permanent corneal flattening from long term Ortho K wear. Because post washout corneal topography was different from pre-Ortho K topography, this could suggest that it's beneficial to utilize post washout keratometry readings and refraction when re-fitting Ortho K patients into a different brand of reverse geometry lenses, as there may be long term changes from the pre-Ortho K cornea. The post washout Ortho K topography and refraction may yield the most accurate empirical data for determining new Ortho K lens parameters. The patient in this case study was successfully refitted into new Ortho K's using the post washout keratometry readings and refraction.

Special thanks to CooperVision Specialty EyeCare for providing the post-Ortho K refit Paragon CRT lenses for our patient.

REFERENCES

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- 2) Wu R, Stapleton F, Swarbrick HA. Residual Corneal Flattening After Discontinuation of Long-Term Orthokeratology Lens Wear in Asian Children. *Eye & Contact Lens: Science & Clinical Practice*. 2009;35(6):333-337. doi:10.1097/ICL.0b013e3181bdc41f
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