

Treatment of Keratoconjunctivitis Sicca Secondary to Sicca Syndrome with Scleral Lenses

INTRODUCTION

The DEWS II study redefined dry eye in terms of loss of tear film homeostasis; it is now viewed as a continuum across the evaporative and aqueous deficiency etiologies.¹ The study suggested a step-wise approach to treatment, starting with over-the-counter treatment options, supplementation, and changing environmental factors that could compound dry eye disease. When first- and second-line treatment are ineffective, tertiary treatments are necessary. Scleral contact lenses offer a unique treatment option for patients with moderate to severe dry eye disease. They provide a protective shield with continuous moisture for the cornea and protect the surface from mechanical trauma and external irritation.^{2,3}

SUBJECTIVE

SW, a 37-year-old white female, presented to the practice with severe dry eye complaints that had gradually increased in severity since December of 2005. She was unsuccessfully treated with various artificial tears, steroid drops, lid scrubs, and Restasis until she was diagnosed with keratoconjunctivitis sicca in 2014 by a local ophthalmologist. Her ocular history was remarkable for keratoconjunctivitis sicca, ocular rosacea, nocturnal lagophthalmos, and previous chronic uveitis secondary to Crohn's Disease. In addition, she was being watched as a glaucoma suspect (low risk, based on larger C/D ratios). Her current regimen upon presenting was Celluvisc non-preserved drops 8-10 times per day and Equate ointment with concurrent use of Tranquileyes goggles at night. Her medical history was remarkable for Crohn's disease and allergies. The patient stated that she takes Humira 50mg/mL injectable solution and denied any use of allergy medication due to compounding dry eye/mouth side effects.

OBJECTIVE

PERTINENT EXAM FINDINGS

	OD	OS
VA c Habitual SRx	20/25-1	20/25-1
MRx	-0.75-0.50x095	-0.75-0.50x090
BCVAs	20/20	20/20
iCare (mm Hg)	14	17
Lids, Lashes, Adnexa	Posterior blepharitis of lower and upper lids, (+) telangiectasia and scalloped lid margins	Posterior blepharitis of lower and upper lids, (+) telangiectasia and scalloped lid margins
Conjunctiva	Small nasal cyst, grade 2-3 stain of nasal bulbar conjunctiva with NaFL	Grade 2-3 stain of nasal bulbar conjunctiva with NaFL
Cornea	Superior neovascularization, 3+spk with staining, three superficial corneal opacities inferior to pupil	Superior neovascularization, 3mm wide ulcer-like inflammatory nodule, 3+spk with staining, one superficial corneal opacities inferior to pupil, and two opacities nasal approaching the visual axis
Tear Volume	Low	Low
TBUT	3 seconds	3 seconds
TearLab	327	306
OSDI	56.25	

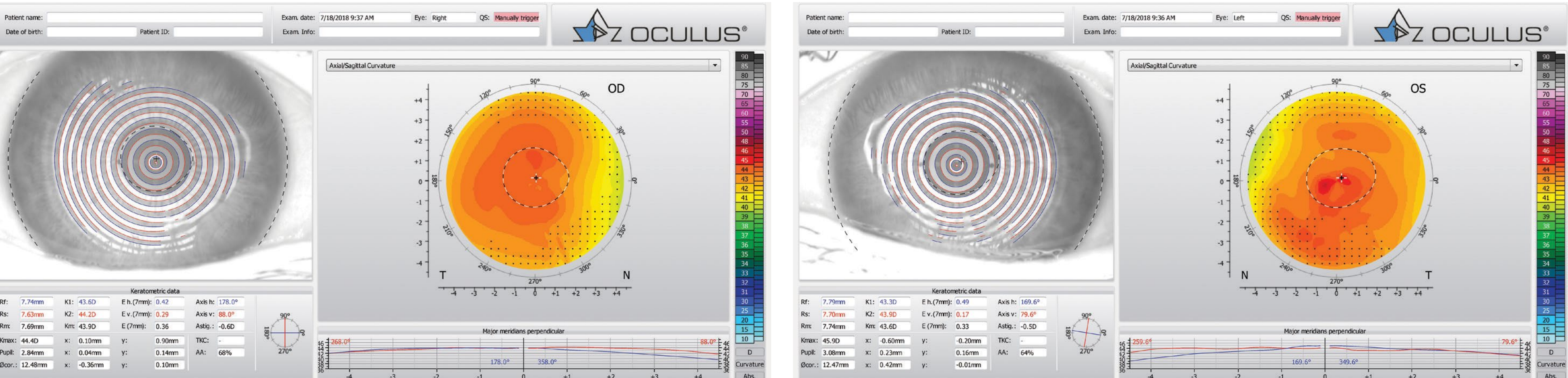


FIGURE 1: Oculus Topography scans for OD and OS demonstrated corneal irregularities (OD<OS).

ASSESSMENT

Based on her previous diagnosis and exam findings, the patient demonstrated Sicca syndrome with keratoconjunctivitis, keratoconjunctivitis sicca, and corneal opacities OU.

PLAN

The patient was started on an initial, short-term topical steroid treatment (Alrex) prior to scleral lens use² and was prescribed Xiidra for long-term treatment (concurrent with scleral lens use). It was also recommended that she continue use of nighttime ointment and Tranquileyes goggles to address her nocturnal lagophthalmos, as well as lid scrubs and a Bruder mask to address her blepharitis. She was also advised that she could use Refresh Optive artificial tears up to four times per day as needed. The patient was unable to continue Xiidra due to hypersensitivity reaction of the adnexa after 2 days of use. SW was fit with ZenLens Toric PC scleral lenses with the following parameters to address corneal signs and symptoms:¹⁻³

TRIAL LENS PARAMETERS AND ASSESSMENT

	BC (mm)	SPHERE (D)	DIAMETER (mm)	CENTRAL CLEARANCE (μm)	ROTATION OF HASH MARKS	FIT ASSESSMENT	CL OR (D)	BCVAs WITH OR
OD	7.30	-2.00	17.0	309	@ 160	Low nasal clearance	-1.50	20/20
OS	7.30	-2.00	17.0	298	@ 020		-1.25	20/20

First ordered lens: Based on the fit of the trial lens, the lenses were ordered in the following parameters:

- OD: BC 7.30mm, -3.50DS in a 17mm diameter lens, sag 5.200, Limbal clearance 60, APS H: Flat1/ V: Steep 3
- OS: BC 7.30 mm, -3.25DS in a 17mm diameter lens, sag 5.200, APS H: Flat3/ Steep 3

FOLLOW UP

PARAMETERS AND ASSESSMENT OF FIRST LENS AFTER FOUR HOURS OF WEAR

	BC (mm)	SPHERE (D)	DIAMETER (mm)	CENTRAL CLEARANCE (μm)	ROTATION OF HASH MARKS	FIT ASSESSMENT	CL OR (D)	BCVAs WITH OR
OD	7.30	-3.50	17.0	315	@ 155	Slightly tight nasal; debris under lens	-0.25	20/15-2
OS	7.30	-3.25	17.0	232	@ 010	Slight edge lift inferior; debris under lens	+0.25	20/15

Based on the comfort and fit of the lens, an additional parameter change was ordered:

- OD: BC 7.30mm, -3.75DS in a 17mm diameter lens, sag 5.200, Limbal clearance 60, APS H: Flat3/ V: Steep 3
- OS: BC 7.30mm, -3.00DS in a 17mm diameter lens, sag 5.200, APS H: Flat3/ Steep 4

PERTINENT EXAM FINDINGS AFTER ONE MONTH OF SCLERAL LENS WEAR

	OD	OS
VA c Scleral Lenses	20/15-2	20/25-1
Lids, Lashes, Adnexa	(+) telangiectasia, lid margins appear less inflamed/ scalloped	(+) telangiectasia, lid margins appear less inflamed/ scalloped
Conjunctiva	Small nasal cyst	Unremarkable
Cornea	Superior neovascularization (receded), 1+SPK with staining, (-) corneal opacities	Superior neovascularization (receded), 1+SPK with staining, 1 peripheral corneal opacity located at 4:30
Tear Volume	Low	Low
TBUT	3 seconds	3 seconds
TearLab	325	352
OSDI	2.08	

PARAMETERS AND ASSESSMENT OF FINAL LENS

	BC (mm)	SPHERE (D)	DIAMETER (mm)	CENTRAL CLEARANCE (μm)	ROTATION OF HASH MARKS	FIT ASSESSMENT	CL OR (D)	BCVAs WITH OR
OD	7.30	-3.75	17.0	248	@ 160	Slightly flat nasal	+0.25	20/15
OS	7.30	-3.00	17.0	232	@ 005	Slightly flat nasal	pl	20/15

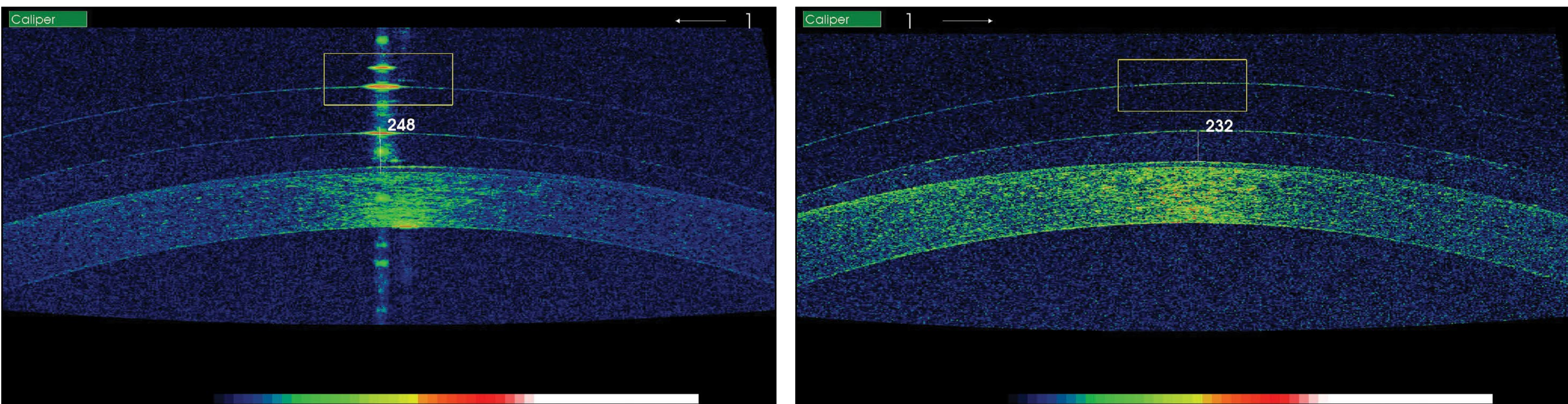


FIGURE 2: Topcon 3D OCT images demonstrating central clearance OD and OS four hours after lens insertion at one-month follow-up.

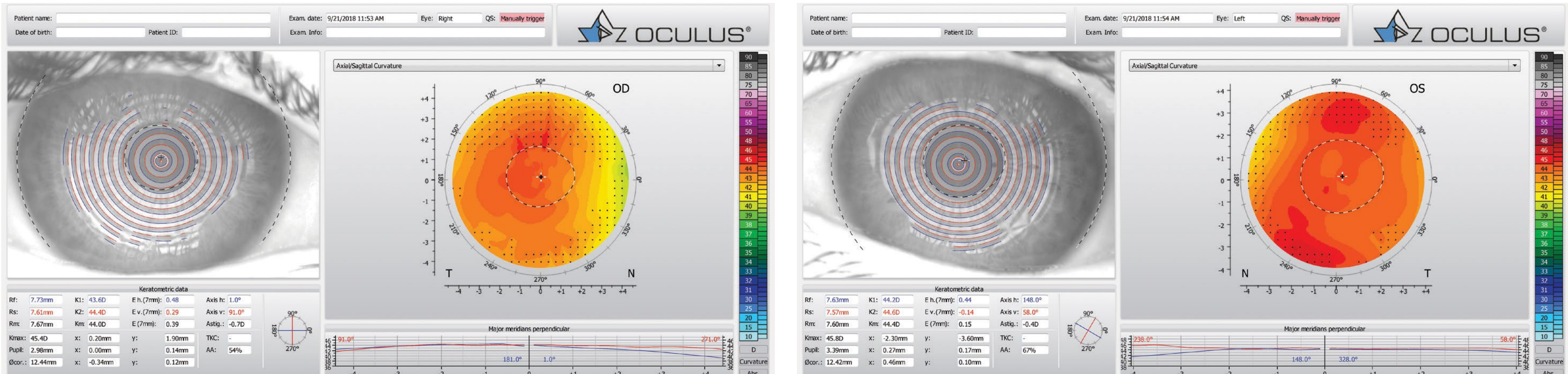


FIGURE 3: Oculus Topography scans for OD and OS demonstrated improved corneal regularity (OD<OS) at one month follow-up.

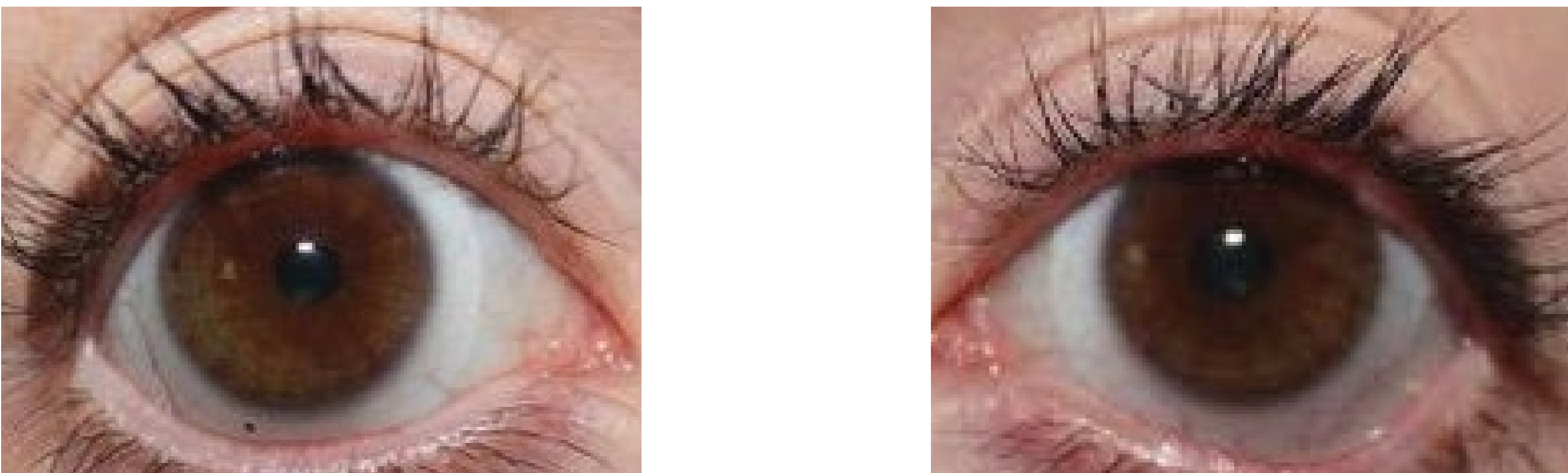


FIGURE 4: Photos of lenses on eye after eight hours of wear: OD and OS.

DISCUSSION

After one month of daily use of the scleral lenses, the patient reported fewer symptoms and increased ocular comfort. Objectively, the appearance of the cornea and adnexa improved. However, TBUT and tear volume remained constant, and Tear Lab values did not improve.

CONCLUSION

This case presents how strategic use of scleral lenses in a patient with severe dry eyes who was previously unsuccessfully treated with conventional options can improve and protect the corneal surface, which leads to decreased symptomology. The patient's initial OSDI score was 56.25 (severe); after one month of scleral lens use, her OSDI dropped to 2.08 points. Based on her improved comfort, ability to use the lenses, and visual outcomes, it is recommended that the patient stay in scleral lenses for the foreseeable future. The improvement noted in the brief case study warrants future follow-up to determine the long-term efficacy of scleral lenses for severe dry eye treatment. If the scleral lenses had not worked, our next course of action would have been autologous tears or amniotic membrane to address her ocular surface issues.

REFERENCES

- Cressey, A., Jacobs, D. S., Remington, C., & Carrasquillo, K. G. (2018). Improvement of chronic corneal opacity in ocular surface disease with prosthetic replacement of the ocular surface ecosystem (PROSE) treatment. *American Journal of Ophthalmology Case Reports*, 10, 108-113. doi:10.1016/j.aajoc.2018.02.010
- TFOS DEWS II - Introduction. (n.d.). Retrieved from http://www.tfosdewsiireport.org/report-tfos_dews_ii_report/36_36/en/
- Weber, S. L., Souza, R. B., Gomes, J. A., & Hofling-Lima, A. L. (2016). The Use of the Esclera Scleral Contact Lens in the Treatment of Moderate to Severe Dry Eye Disease. *American Journal of Ophthalmology*, 163. doi:10.1016/j.sjo.2015.11.034