

# The Benefit of a Scleral Lens in the Treatment of a Post-Corneal Transplant Epithelial Defect

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## Introduction

Scleral lenses have a long-standing history of successfully managing patients with corneal ectasias such as keratoconus, eyes status-post refractive surgery, and those with ocular surface disease such as severe dry eye. Among those success stories are patients with corneal grafts or corneal compromise due to graft failure to the level that warrants intervention to preserve the integrity and normal physiology of the cornea. Typical resolution of corneal defects depends on extent of damage, as well as the presence of ocular and/or systemic sequelae that may prevent proper corneal healing. This case report describes a more unique case of an over-night resolution of an epithelial defect in a patient with multiple failed corneal grafts, likely secondary to concurrent systemic disease and action by mechanical forces of the eyelid.

## Indications and Clinical History

At a University Hospitals clinic in Cleveland, OH, a 68 year old Caucasian female was referred from ophthalmology to the specialty lens clinic for a scleral lens fitting.

### Scleral lens indications for this patient included:

- Allowing for loose epithelium to tether to the cornea
- Promoting healing of the epithelial defect
- Potentially stabilizing/improving vision in the right eye

### Pertinent ocular history in the right eye included:

- Multiple corneal perforations and corneal melt
- Limbal stem cell deficiency
- Peripheral Ulcerative Keratitis (PUK)
- Floppy eyelid syndrome

### Pertinent surgical history included:

- Three penetrating keratoplasties (PK) due to graft failure and MRSA infection
- Intraoperative Prokera placement

### Pertinent medical history included:

- (+) P-ANCA and MPO antibodies (indicating potential vasculitis), hypothyroidism, hypertension, and diabetes.

## Methods

Multi-day case study. Data and observation methods included slit lamp examination, and imaging by way of cellphone photography, topography and ocular coherence tomography.

## Results

### Visit #1

During the initial contact lens fitting appointment, the patient presented with a best corrected visual acuity of 20/400 in the right eye, and 20/25 in the left. Anterior segment exam with and without sodium fluorescein revealed a hazy and edematous graft with visible folds, intact sutures, and a 1x0.5mm central epithelial defect. Anterior segment topography revealed an oblate cornea, with pachymetry measurements of greater than 1100 microns in several areas [Fig. 1]. An anterior ocular coherence tomography scan (OCT) revealed loose epithelium and surface defects [Fig. 2].

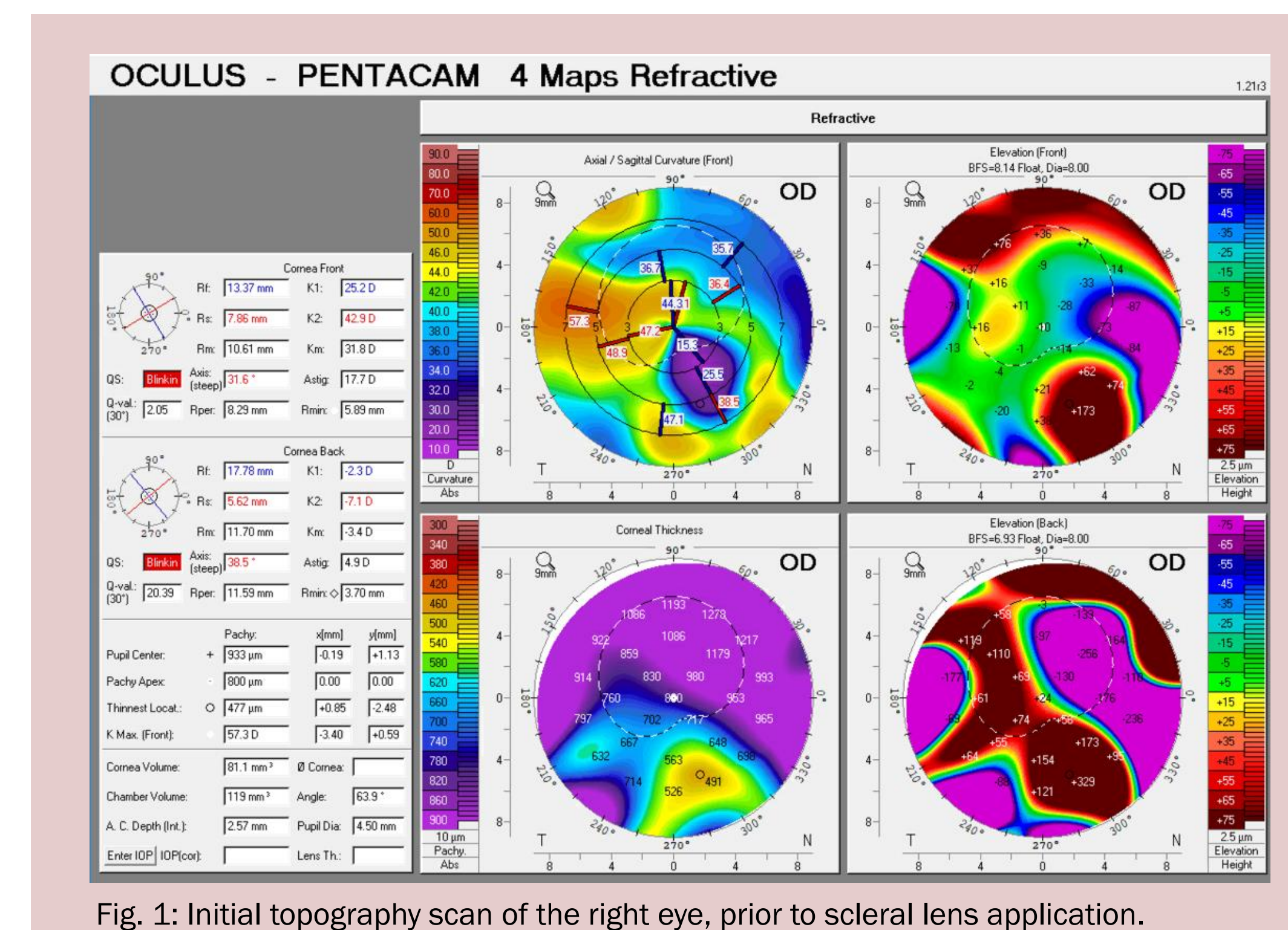


Fig. 1: Initial topography scan of the right eye, prior to scleral lens application.

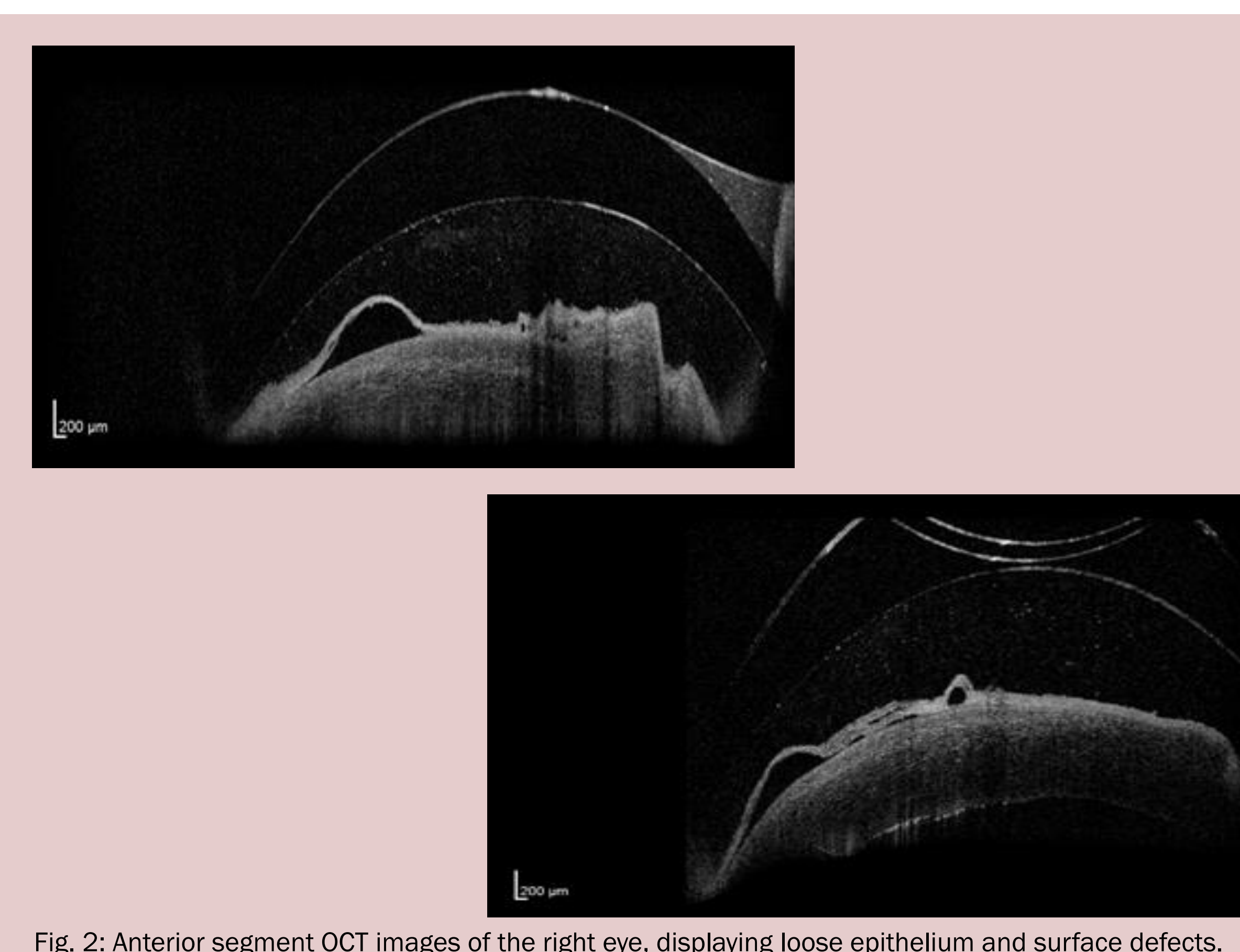


Fig. 2: Anterior segment OCT images of the right eye, displaying loose epithelium and surface defects.

An oblate-design scleral lens was placed into the right eye and the fit was deemed acceptable [Fig. 3]. The lens was ordered, and the patient was told to continue all prescribed drops as indicated (topical prednisolone, serum tears, and ofloxacin). On the return appointment, the lens was dispensed, and the patient was educated on the proper care, handling, insertion and removal of the lens. The patient slept with the lens on overnight and returned to the clinic the next day.

Lens	ZenLens (#Z-24) Obl-17
BC	7.90
Diameter	17.0
Category	BX02
Power	-2.00
OR	+7.25
Resulting Power	+6.00
VAOR	20/200
Sag	5.700
Tk	0.35
APS	Std
Fit Description	Adequate central/limbal clearance, no vessel impingement

Fig. 3: Initial scleral lens selection and fit data.

### Visit #2

At the next visit, visual acuity was stable, and anterior segment slit lamp examination with and without sodium fluorescein revealed no visible signs of the previously seen central epithelial defect [Fig. 4]. Due to time constraints, an anterior segment OCT was not taken at the visit. The patient was educated on removing the lens once daily to administer her prescribed drops. Furthermore, the patient was to remain in the extended wear modality for a few weeks to allow for proper attachment of loose epithelium, and to eventually wear the lens only during day time.

As of this publication, the patient is under the management of the contact lens and ophthalmology clinics in Cleveland. The next several images [Fig. 5] detail the status of the corneal epithelium with the scleral lens after a few days of wear.

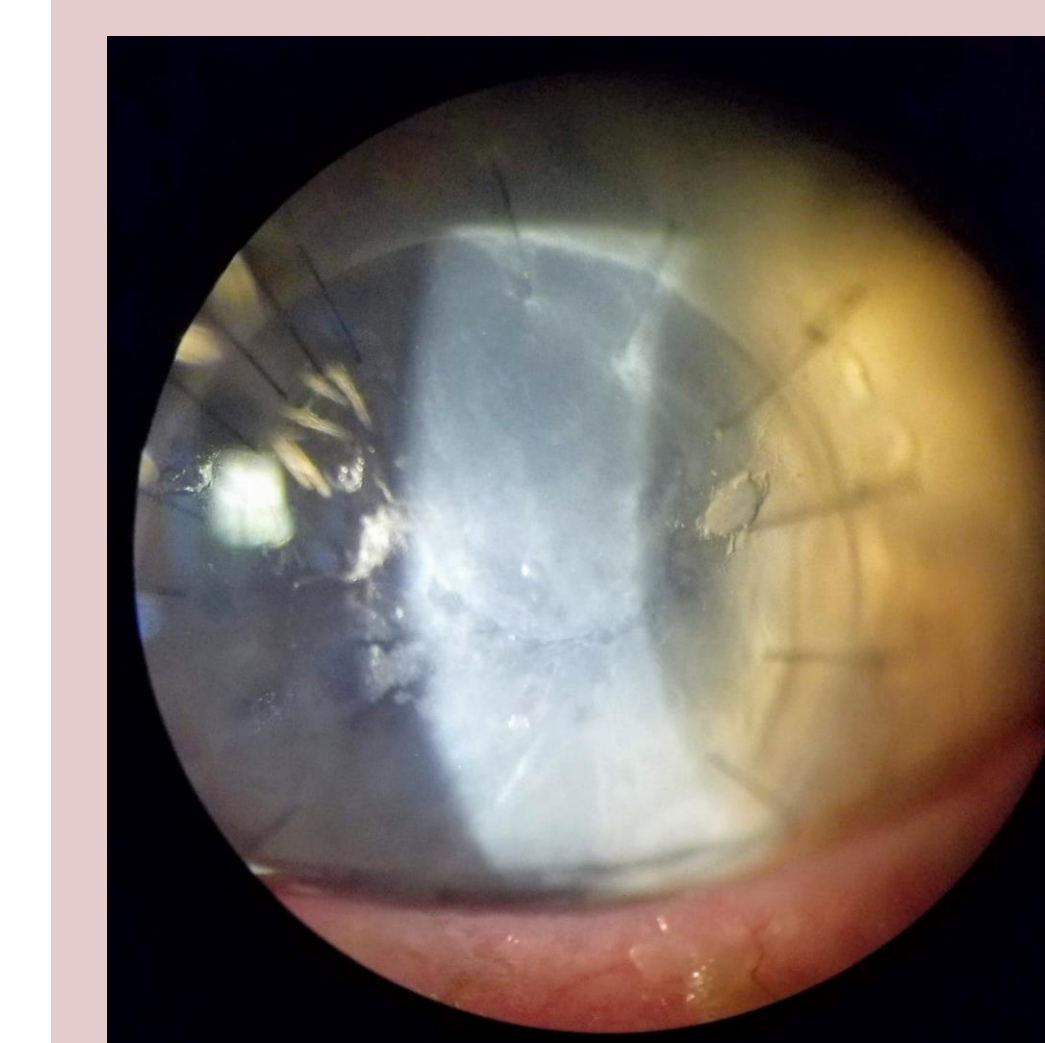


Fig. 4: Cell phone image of the patient's right eye without a scleral lens, showing no central staining.

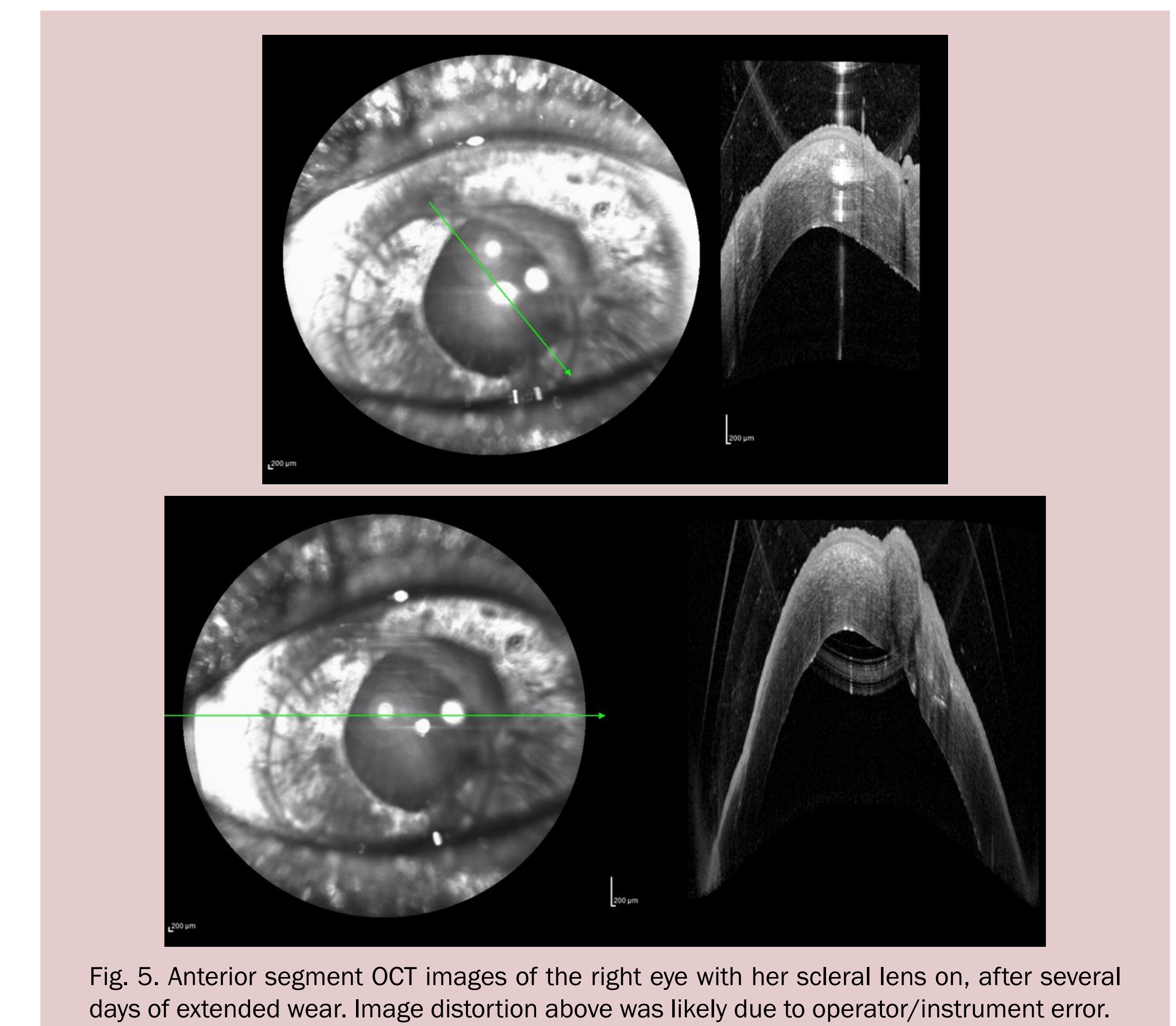


Fig. 5: Anterior segment OCT images of the right eye with her scleral lens on, after several days of extended wear. Image distortion above was likely due to operator/instrument error.

## Discussion and Conclusion

The potential presence of vasculitis, concurrent systemic disease including diabetes, and mechanical forces of the eyelids may collectively serve as the reason for the patient's difficulty with corneal healing and integrity. Despite this, traditional management to prevent corneal graft failure and infection, as well as simultaneous use of scleral lenses for sustaining bio-integrity of corneal tissue, still proves to be an effective strategy. Recently, there has been an increasing interest in the role of scleral lenses in treating epithelial defects. A small study performed by Khan et al. (2018) tested duration of time for complete re-epithelialization of a corneal defect, as well as the final visual outcome of eight eyes from eight patients using scleral contact lenses overnight. The results showed no signs of scleral lens-related complications, a mean re-epithelialization period of  $11.1 \pm 5.5$  days, and an improvement in final visual acuity in all but one patient [1]. As in the case of this patient, faster recovery is possible. The importance of patient education in understanding their ocular condition, as well as proper scleral lens care and wearing modality are critical in the speed and effectiveness of corneal recovery.

## Sources and Acknowledgements

1. Khan M, Manuel K, Vegas B, Yadav S, Hemmati R, Al-Mohtaseb Z. Case series: Extended wear of rigid gas permeable scleral contact lenses for the treatment of persistent corneal epithelial defects. *Cont Lens Anterior Eye*. 2018 Sep 25 [Epub ahead of print]

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