

## Background

- Neurotrophic keratitis is a degenerative corneal disease characterized by loss of corneal sensation due to damage to the CN V anywhere along its pathway from the Trigeminal nucleus to the distal nerve endings.
- CN V damage can be caused by herpetic keratitis, corneal burns, space occupying lesions or systemic disease such as multiple sclerosis or diabetes. Neuropathy following diabetes is well documented and involves the loss of myelinated nerve fibers, and blunted nerve fiber reproduction.
- Following corneal nerve damage, epithelial function is impaired. Punctate epithelial defects and haze due to poor epithelial proliferation and wound healing eventually lead to more recurrent or permanent epithelial defects. These defects can eventually progress to corneal ulcers with stromal melting, scarring and potentially perforation. Treatment of these defects can result in long-term corneal scarring.
- Scleral lenses can be used to provide a smooth optical surface and allow improved visual outcomes.

## Case Description

- A 29-year-old with a history of uncontrolled type 1 diabetes and proliferative retinopathy presents with neurotrophic keratitis along with posterior subcapsular cataracts in both eyes. His presenting visual acuities were hand motion OD and 20/400 OS. Following cataract surgery, his visual acuities remained hand motion OD and 20/80 OS. Due to corneal stromal scarring from prior neurotrophic ulcers, vision failed to improve with manifest refraction.
- To address the irregular astigmatism from corneal scarring and better protect his epithelial surface, he was scheduled to be fit into scleral lenses bilaterally. With a trial scleral lens, he was able to achieve 20/30 vision in his left eye. We believe his right eye vision was unable to be improved due to his extensive posterior segment history. Adjustments were made to the fit of the lens in both eyes and the patients first set of lenses were ordered. As of writing this poster he is only on his second trial lens. The patient was lost to follow-up for multiple months, but has since resumed his care.

### Initial Trial Lens Parameters

	Brand	Trial Lens	FSE	Diameter	Sag
OD	Boston Sight	E-R80-8e1	FSE1	18.0	2800
OS	Boston Sight	E-L80-8e1	FSE1	18.0	2800

Table 1: Initial Trial Lens Parameters

## Initial Lens Fitting

- The patient was fit using the initial 18 mm BostonSight scleral lens: E-R80-8e1/E-L80-8e1
- The left lens was repeatedly inserted, but an insertion bubble was always present.
- The lens was given over ten minutes to settle and afterwards additional measurements were taken including autorefractometry and anterior segment OCT imaging
- A manual manifest refraction was taken over the lens and the lens was examined under the slit lamp.
- Final changes necessary for the lens were recorded and the lenses were ordered through the BostonSight FitConnect program.

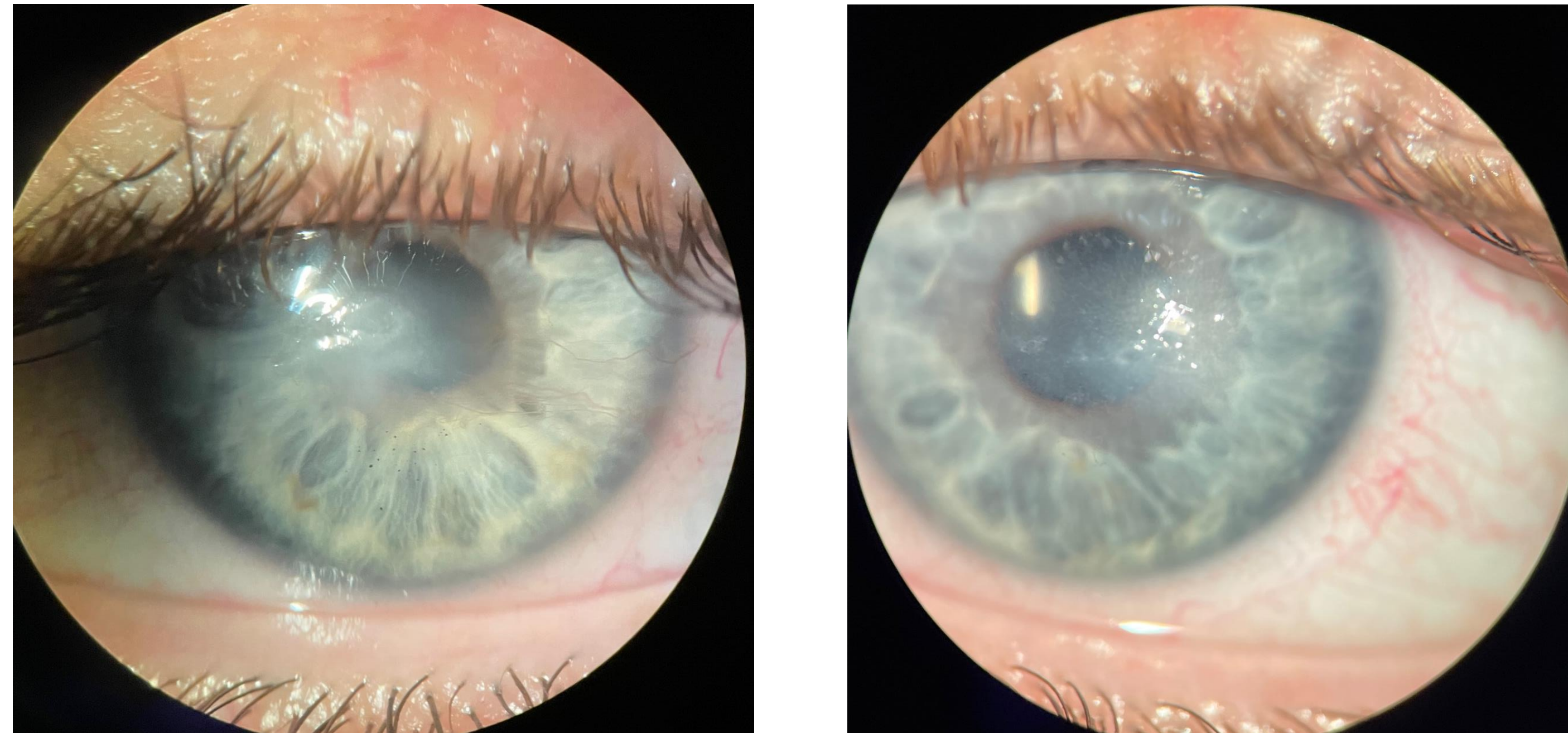


Figure 1: Initial patient presentation: OD (left) OS (right), note deep neovascularization OD with central scarring OU

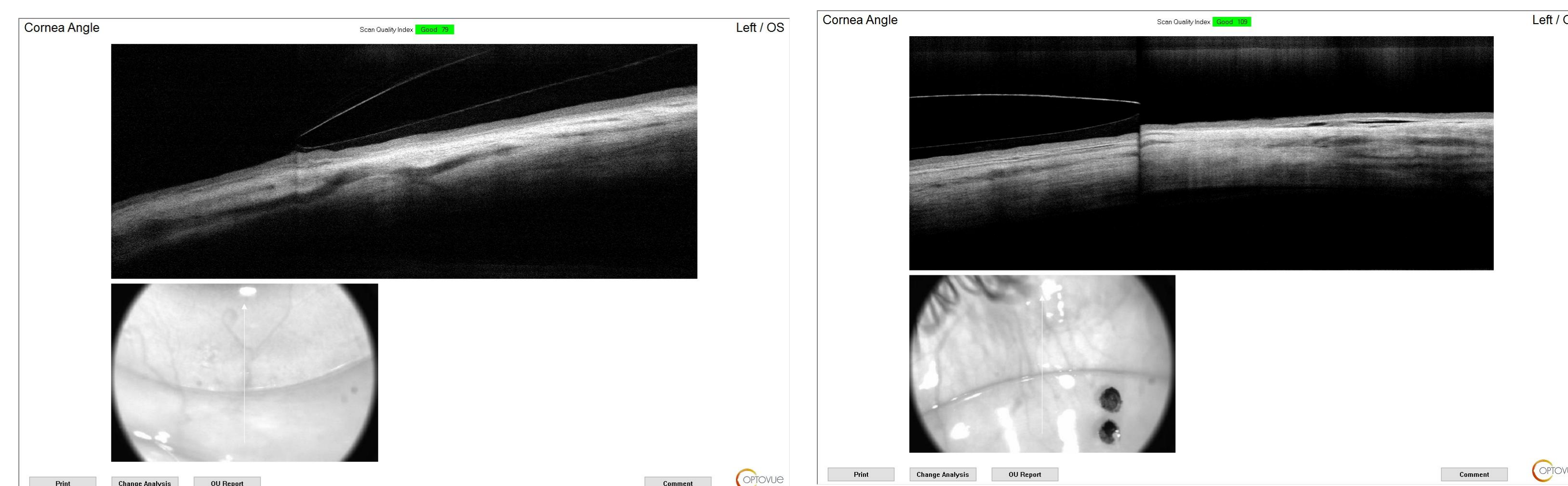
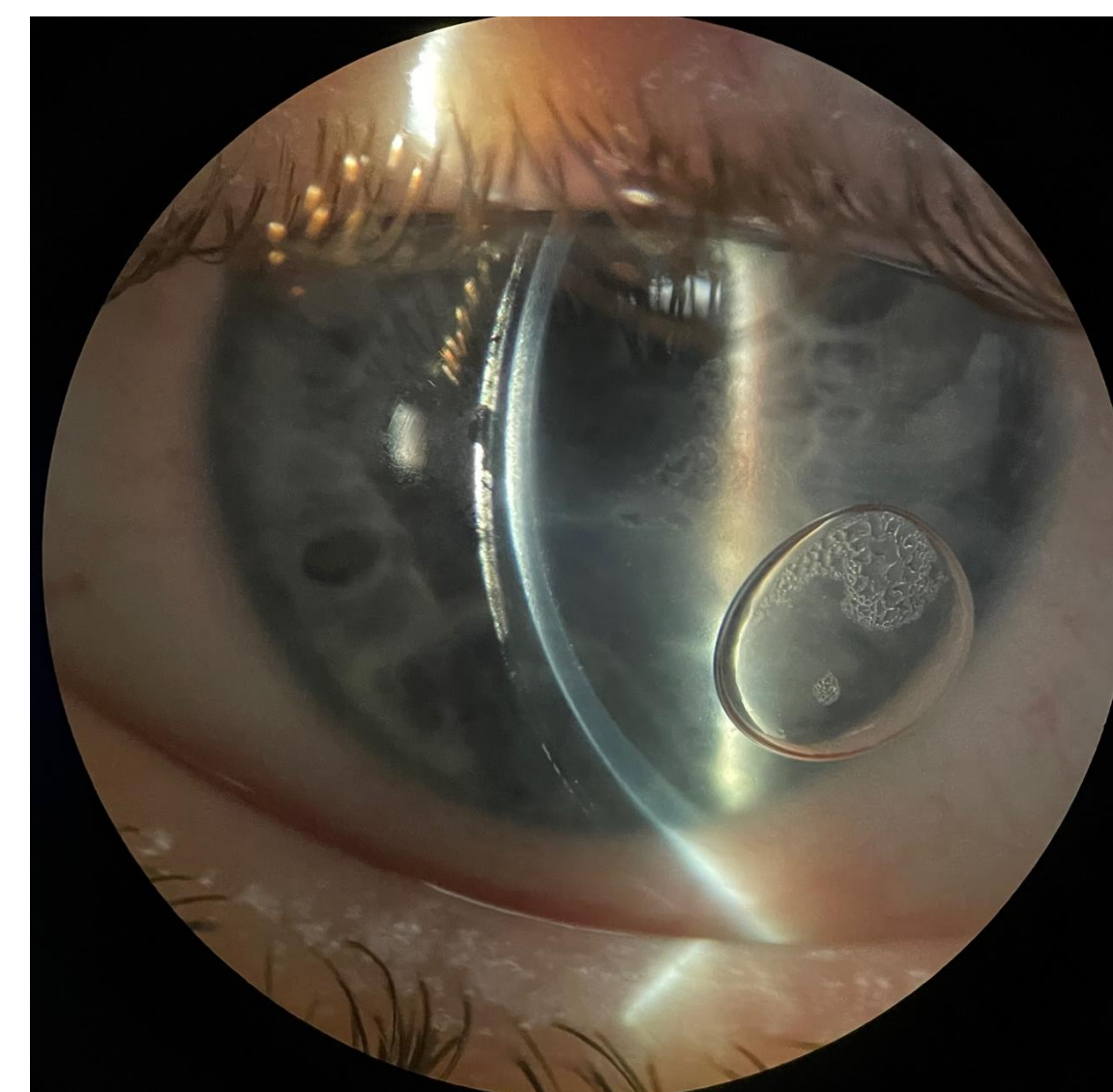


Figure 2: Initial trial lens fit OS: Large insertion bubble (center) due to vertical edge lift (inferior view left, superior view right)

### 1<sup>st</sup> Lens Parameters

	VA	Base Curve	Prescription	Meridian Changes	Sagittal Height
OD	CF @ 1 ft	8.0	+0.25 SPH	0/0/0/0	2800
OS	20/50	8.0	+4.25 SPH	-200/0/-100/0	2800

Table 2: 1<sup>st</sup> lens parameters. No changes were made OD. For OS lens was steepened in the vertical meridian and over refraction was added

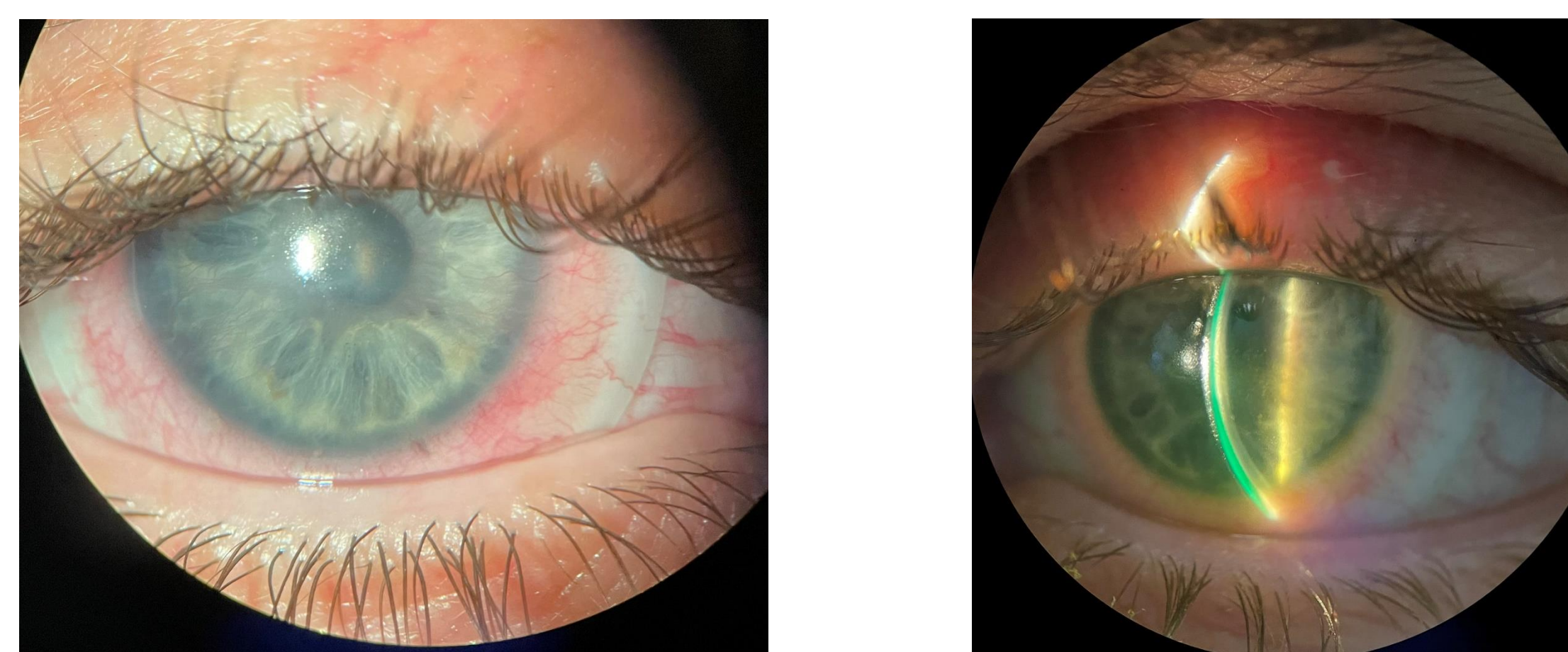


Figure 3: 1<sup>st</sup> lens fit on eye. Note blanching

## Follow-up

- New lenses were ordered based on patients 1<sup>st</sup> lens and patient was scheduled to follow-up to pick up new lenses
- Patient was lost to follow-up for over a month.
- When he returned for follow-up he had broken his right lens and only had his left lens.
- As of this poster, he is currently trialing his second lens. Changes will be made based on his return follow-up.
- He was able to achieve 20/30 OS with -0.75 sph over refraction. Changes to the fit of the lenses will be judged once he has worn the lenses for an extended duration of time.
- With regard to his neurotrophic keratitis, along with continued scleral lens wear we plan to start the patient on Oxervate
- As of this poster the prior authorization approval has been sent to the patient's insurance.

### 2<sup>nd</sup> Lens Parameters

	VA	Base Curve	Prescription	Meridian Changes	Sagittal Height
OD	CF @ 1 ft	8.0	+0.25 SPH	50/50/50/50	2800
OS	20/40	8.0	+5.25 SPH	50/0/50/0	2800

Table 3: 2<sup>nd</sup> parameters. The lens was flattened 360 degrees OD. For OS a +1.00 over refraction was added and the vertical meridian was flattened

## CONCLUSION

- Neurotrophic keratitis is a serious complication of diabetes and type 1 diabetics experience diabetic ocular damage earlier in life which significantly affects activities of daily living and quality of life. Properly treating and managing this condition can improve vision and protect the ocular surface from future degradation. Scleral lenses can provide patients with the visual acuity necessary to gain independence in their lives even with extensive corneal scarring.

## Acknowledgments/References

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