

## BACKGROUND

Scleral lenses provide a multitude of benefits for both regular and irregular corneas. Although scleral lenses have been historically utilized for patients with progressive corneal disease or status post-surgery, they also provide improved comfort compared to RGP lenses and improved vision compared to soft lenses for patients with regular corneas.

## CASE DESCRIPTION

A 24 year old high myope with a regular cornea presented to clinic with the visual goal of improved acuity over her current soft contact lenses. On examination, she had minimal regular astigmatism and no history of refractive procedures or ectasias. As both vision and comfort were highly important to her, the patient was diagnostically fit into toric scleral lenses. The original lenses ordered were Custom Stable Elite by Valley Contax.

Lens Parameters at First Visit

	Lens	Overall Diameter	Sagittal Depth	Base Curve	Power	CT	SLZ
OD Initial	Elite	16.8 mm	4.76 $\mu$	8.23	-3.75	400 $\mu$	+4.00/-4.00
OS Initial	Elite	16.8 mm	4.76 $\mu$	8.23	-4.00	400 $\mu$	+4.00/-4.00

After wearing the initial pair for a few days, the patient returned to clinic with complaints of eye redness OU upon removal of the lenses. On further investigation, heel-down blanching with edge lift was seen 360, OU.

OCT anterior segment photos and slit lamp photos demonstrated significant impingement at the junction between limbal and scleral curves.

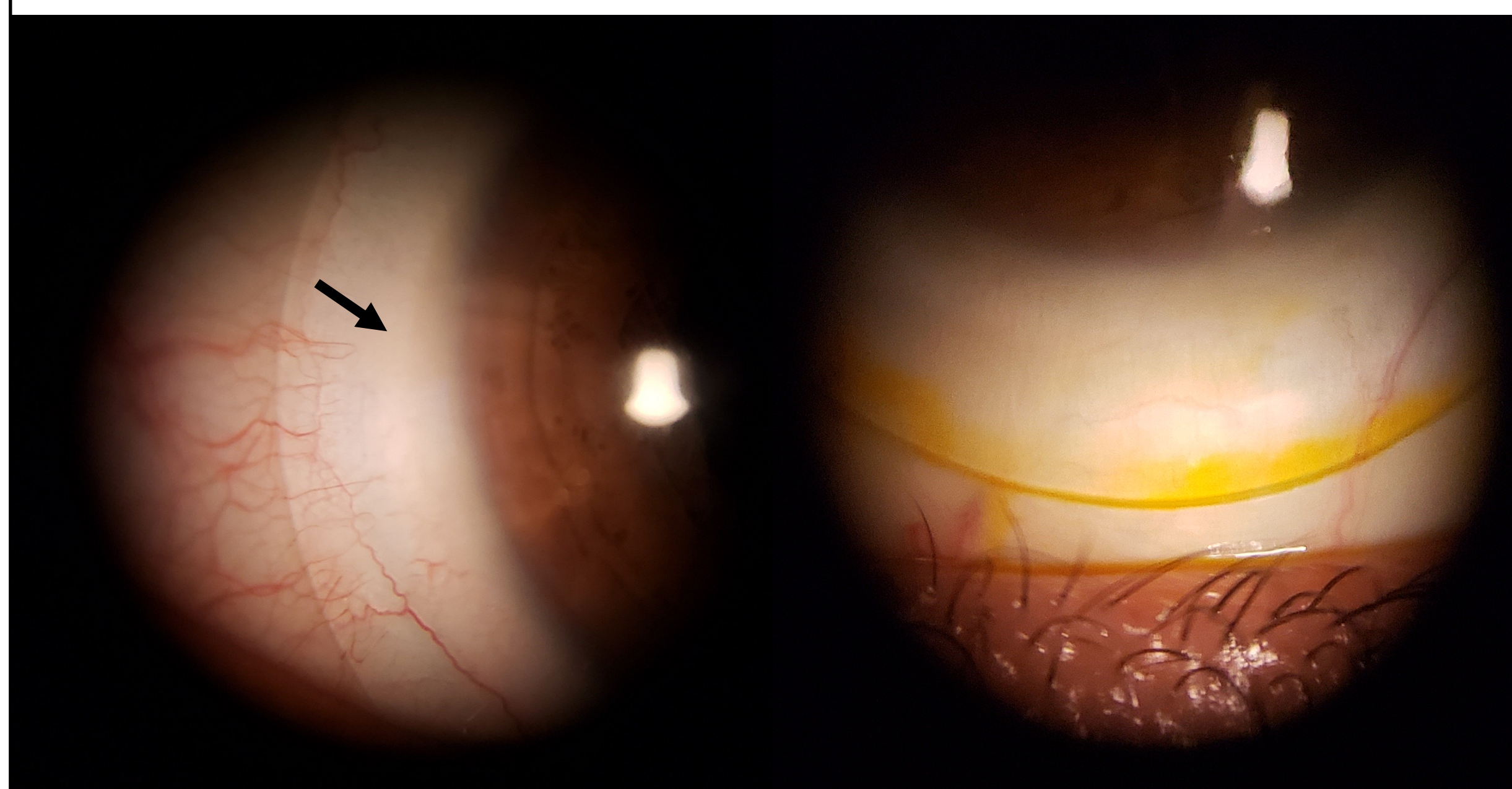


Figure 1: Slit lamp photos of initial lenses. The photo on the left demonstrates heel-down blanching of the conjunctival blood vessels. The photo on the right shows pooling of fluorescein underneath the lens, suggestive of edge lift.

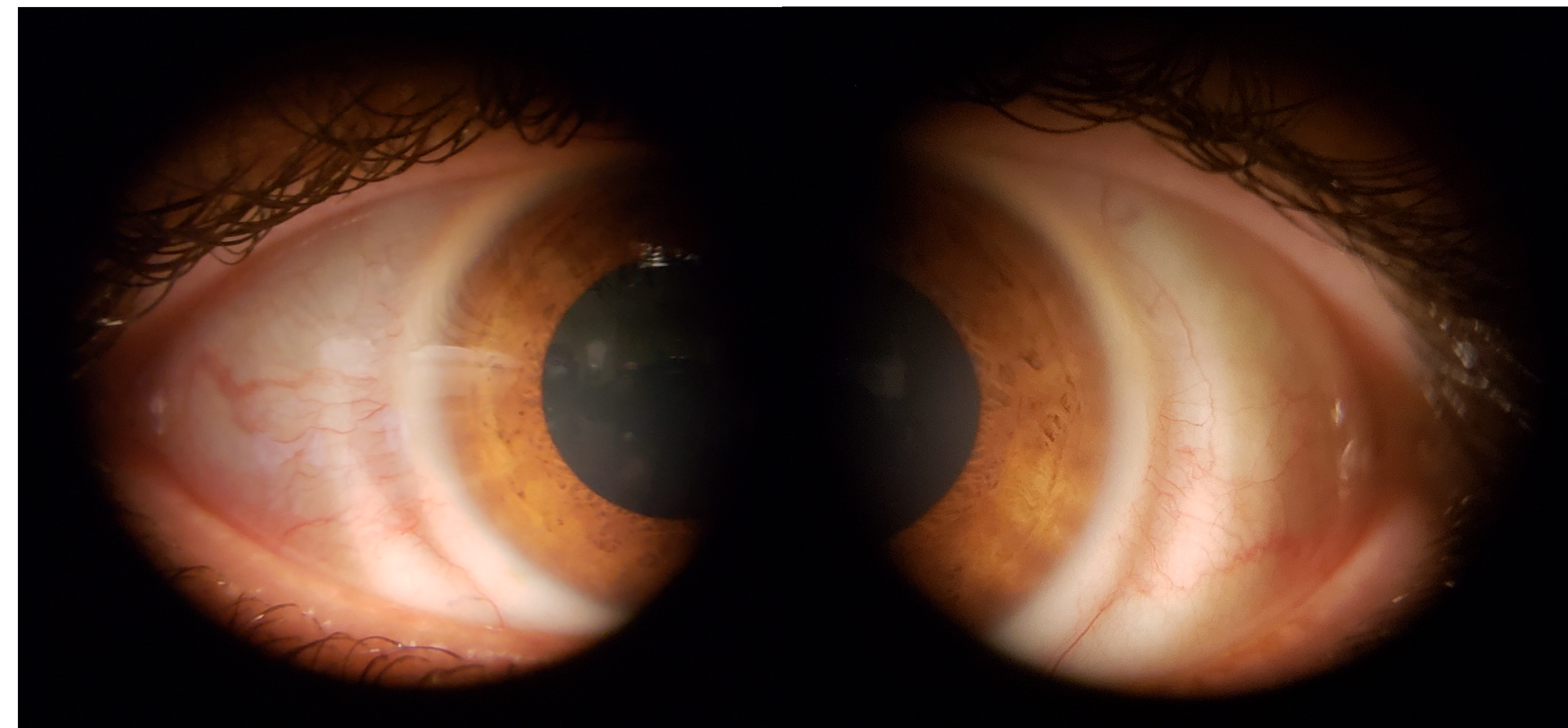


Figure 2: Slit lamp photos taken immediately after lens removal demonstrate blanching adjacent to areas of injection in a circumferential pattern.

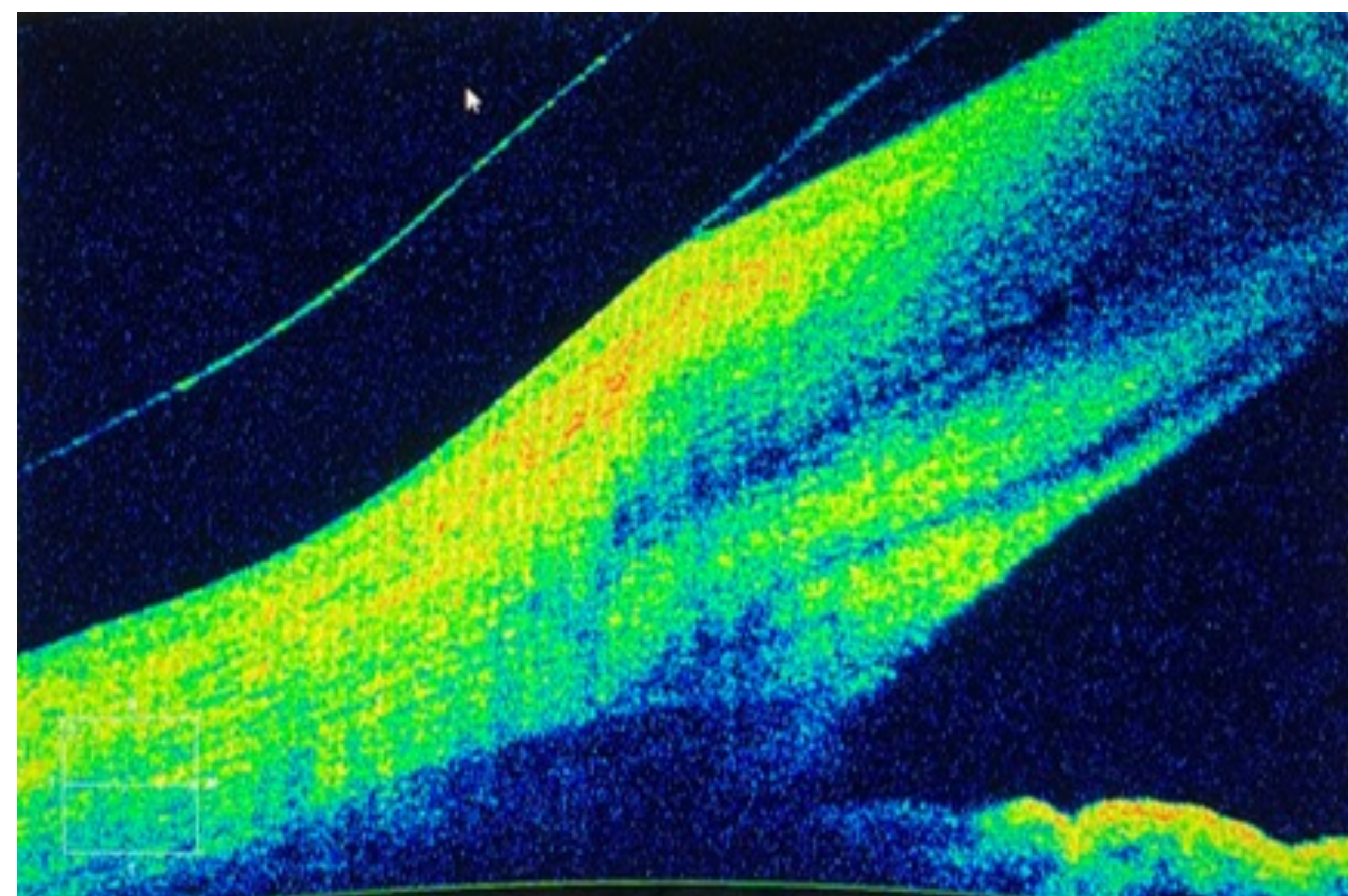


Figure 3: Anterior segment OCT imaging shows the scleral lens is fit too steep over the limbus, compressing the sclera before the lens edge. To correct this, flatten the limbal curve.

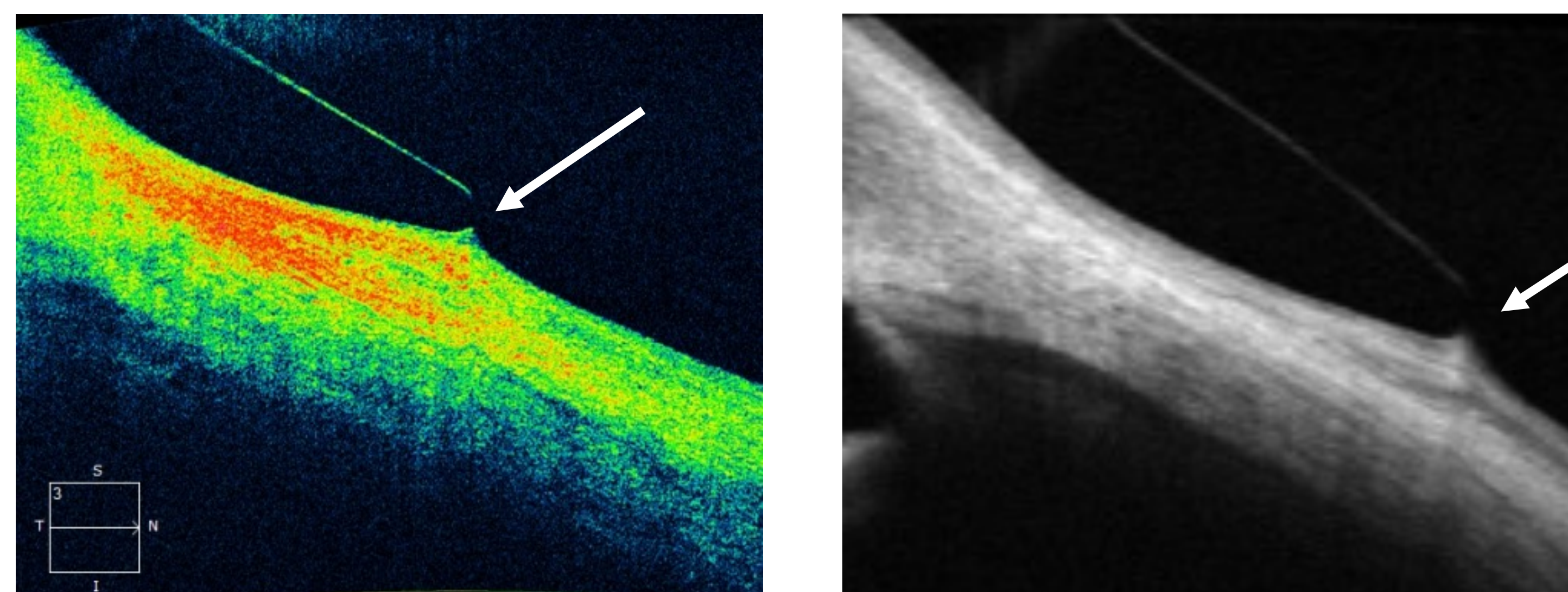


Figure 4: Lens edges exhibiting mild lift on OCT. This was improved by steepening the scleral landing zone

## RESULTS

New lenses were ordered and dispensed to the patient. The redesigned final lens parameters are shown in the table below.

Final Lens Parameters

	Lens	Overall Diameter	Sagittal Depth	Base Curve	Power	CT	SLZ
OD Redesign	Elite, Oblate	16.8 mm	4.76 $\mu$	8.23	-3.25 - 0.75 x 080	400 $\mu$	+1.00/-6.00
OS Redesign	Elite, Oblate	16.8 mm	4.76 $\mu$	8.23	-3.50sph	400 $\mu$	+1.00/-6.00

At follow-up approximately 1 month later with the redesigned lenses, the patient reported adequate comfort. After these corrections, the lenses were well-centered, had adequate clearance, and had appropriately aligned edges. A spherocylindrical over-refraction was performed OD, and a spherical over-refraction was performed OS. BCVA was 20/15 OD and OS. The final lenses provided superior vision and adequate comfort.

## DISCUSSION

In order to correct for heel-down blanching or “impingement at the elbow”, you can alter 2 aspects of the Custom Stable Elite lenses. Troubleshooting these issues involves either flattening the Limbal independent transfer zone (LITe zone) and/or steepening the scleral landing zone (SLZ).

After settling, the initial lenses showed such marked blanching and edge lift, both parameters were altered simultaneously. To correct for these issues, the LITe zone was flattened 4 steps. Each step of change corresponds to 50 microns, so the LITe zone was effectively flattened 200 microns to optimize clearance over the limbus and to more evenly align to the sclera. To correct for edge lift seen, the SLZ was steepened 360 with additional steepening in the flat meridian as well. Each step of change used to steepen the SLZ leads to a change in sagittal depth of 30 microns, so the new lens was effectively steepened by 90 microns in the flat meridian and 60 microns in the steep meridian, to correct for edge lift.

## CONCLUSION

Scleral lenses are an excellent option for both regular and irregular corneas. For patients with regular corneas, these lenses provide improved comfort over RGP's and sharper vision over soft contact lenses. After initially fitting sclerals, there are common issues that require troubleshooting – with heel-down blanching and edge lift being relatively common. The ability to identify and correct for these issues is imperative for long-term success.

## Acknowledgments

Thank you to Valley Contax for their support of our research and educational programs to allow our students to experience the benefits of scleral lenses.