

Feeling that Edge, Quadrant Specific Piggybacked GP

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Introduction

Penetrating keratoplasties can lead to high amounts of irregular astigmatism requiring a contact lens for patients to achieve functional vision.¹ Scleral contact lenses (ScCL) have been used effectively in this situation. However, corneal grafts with decreased endothelial cell function may have edema complications with ScCL resulting from a reduced oxygen environment.

Corneal gas permeable contact lenses (cGP) also correct high amounts of astigmatism. Available in high DK materials, they provide better oxygen transmission with ample tear exchange.³ As a corneal GP attempts to align with the corneal profile, one study showed having a corneal elevation difference less than 350 microns showed a 88.2% chance of a success.³

Case Details

51 yo HM presented to clinic for a specialty CL Evaluation OS. He was prescribed ScCL in both eyes at an outside clinic but developed corneal edema OS. The OS lens was switched to a cGP, but the clinic could not arrive at a comfortable cGP, so he was referred.

Keratoconus OD/OS ~1987

s/p Penetrating Keratoplasty OS ~1989 (~29 years!)

Medications: lisinopril 10 mg PO QD

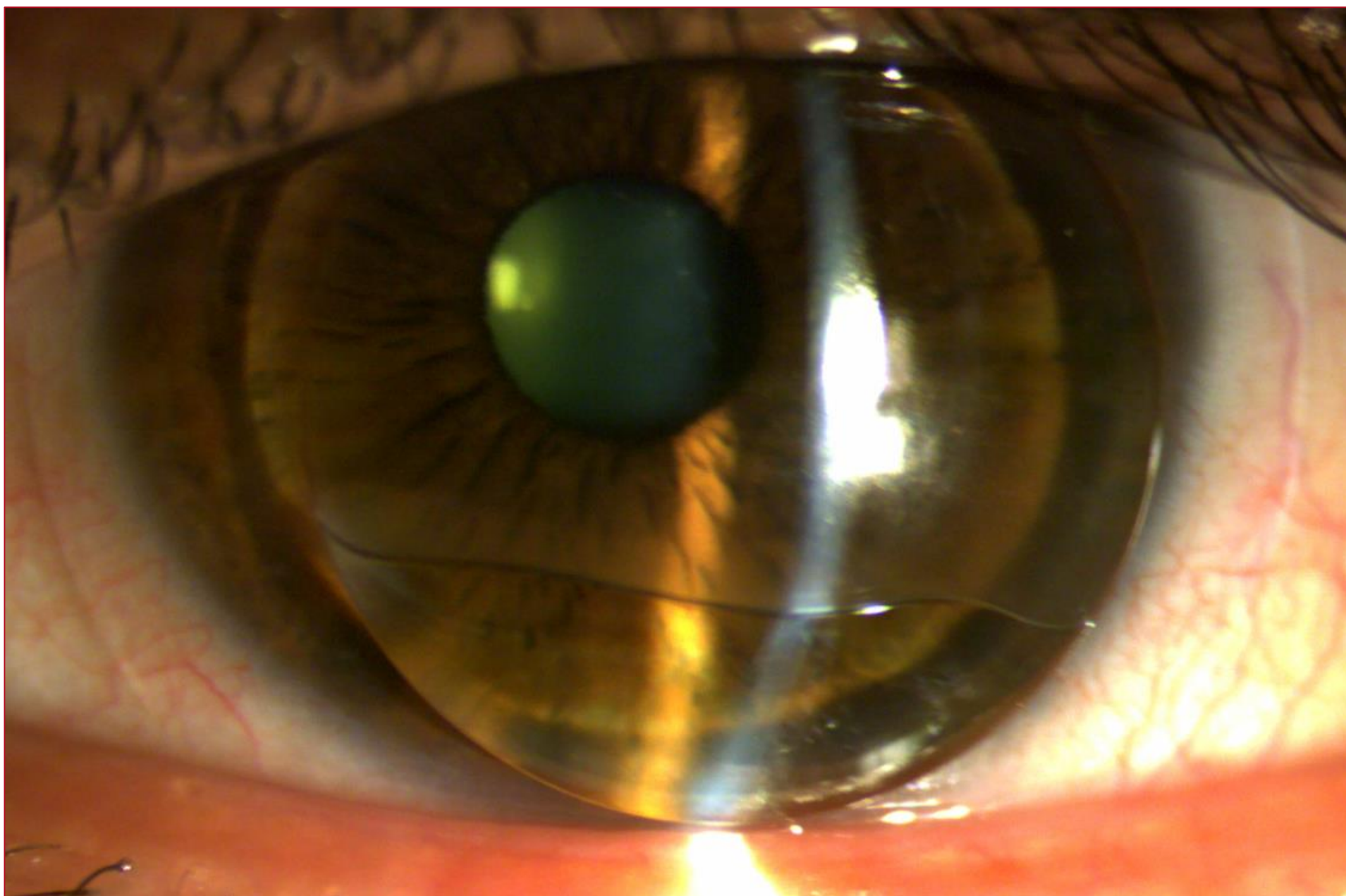
MHx, FHx, SH unremarkable in regards to case

	OD	OS
BCVA (CLs)	20/25	20/40-
Conj	WNL	WNL
Cornea	Subtle apical thinning	s/p PKP, clear graft, no NaFl staining, no opacities, no MCE 1+ NV @ 3 & 10 o'clock outside of graft host junction
Lens	Clear	Clear
Posterior Seg	unremarkable	unremarkable

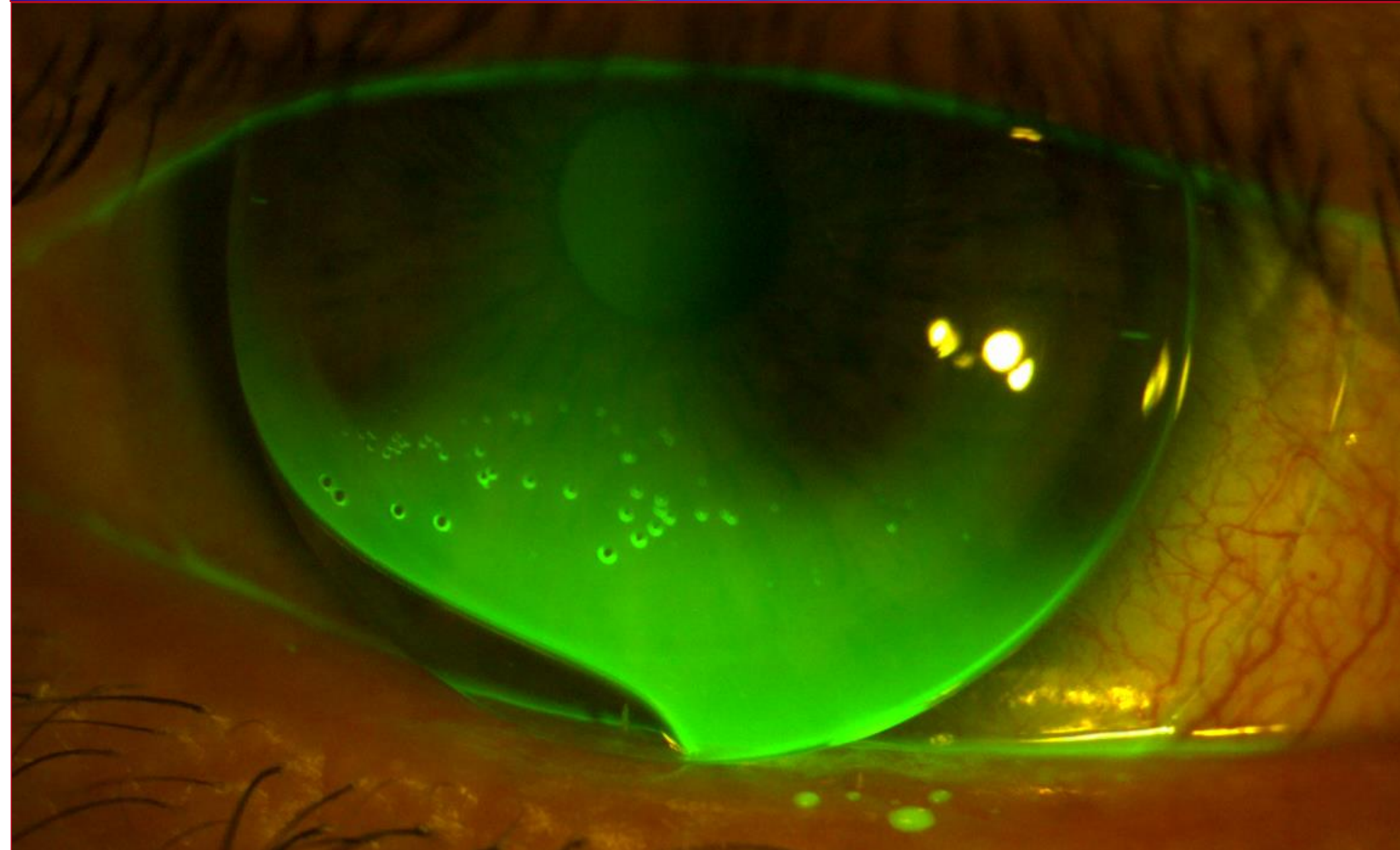
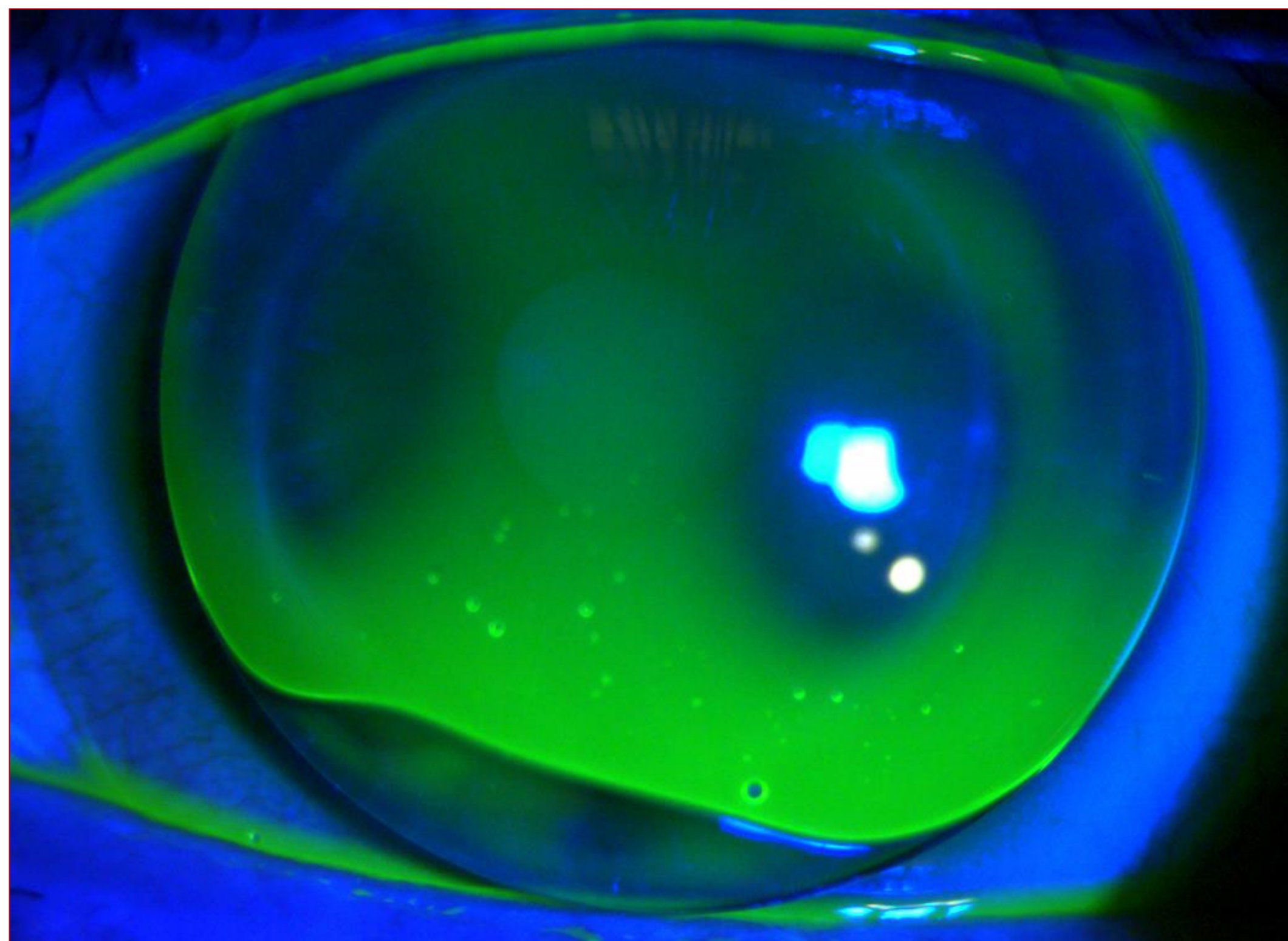
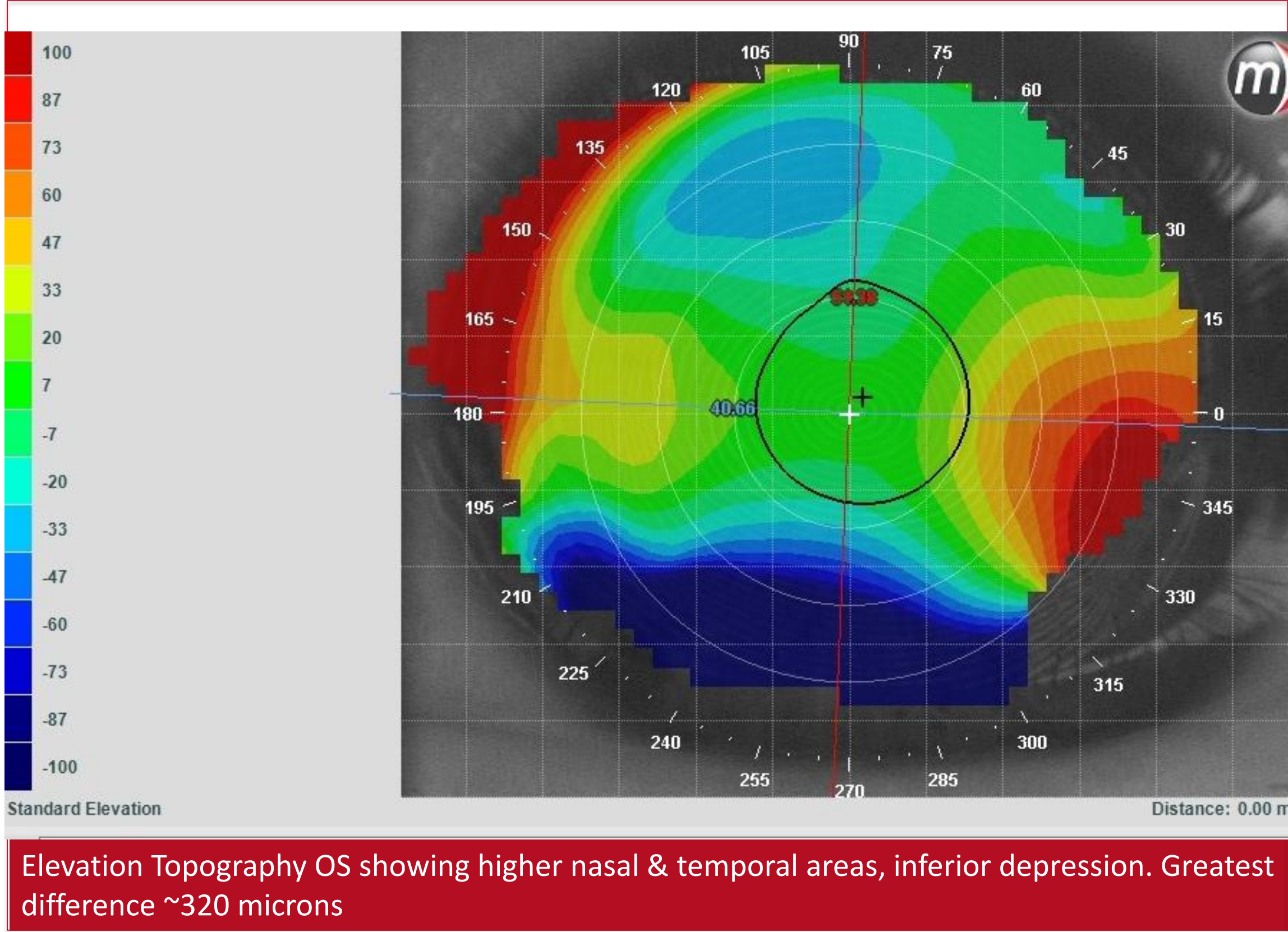
Diagnosis: corneal graft edema OS from reduced endothelial cell function and ScCL-induced hypoxia

Differential Diagnoses: Early graft endothelium failure OS

Plan: Employ diagnostic quadrant specific peripheral curve [Asymmetric Corneal Technology (ACT)] cGP to improve lower edge lift



(Image above) Presenting cGP OS w/ piggyback CL; significant inferior edge lift



(left top) Trial #2
(left bottom) Trial #3 Toric Peripheral curve cGP
(Right photo) Final cGP w/ piggyback CL showing improved edge lift

Testing

Specular Microscopy (cells/mm²)

OS: ~1008. Endothelial scan showed frank polymegathism

Results

Eye	BC (mm)	Power (D)	OAD (mm)	Type	Material	CT (mm)	Misc.
OD	8.40	-5.25	16.0	Scleral CL	Menicon Z w/ HydraPEG	0.30	SAG 3.5 mm SLZ F=35, S=44
OS	7.29	-10.25	10.6	corneal GP	Menicon Z	0.13	Rose K lift -0.50, ACT 4.00

Average wear time: 12-14 hours (5-6 hours without piggyback)
Visual Acuity: 20/20- OD, 20/25- OS

Lens Evaluation

OD lens: OR plano
central clearance 225 microns, no impingement 360 degrees
flat markers at 135 degrees

OS lens: OR -0.75-0.25x158
moderate inf-temp decentration, dumbbell NaFL pattern, 3 & 9 mid-peripheral bearing, moderate inferior edge lift

Air Optix N&D 8.4 BC -0.50 D soft CL added for piggyback

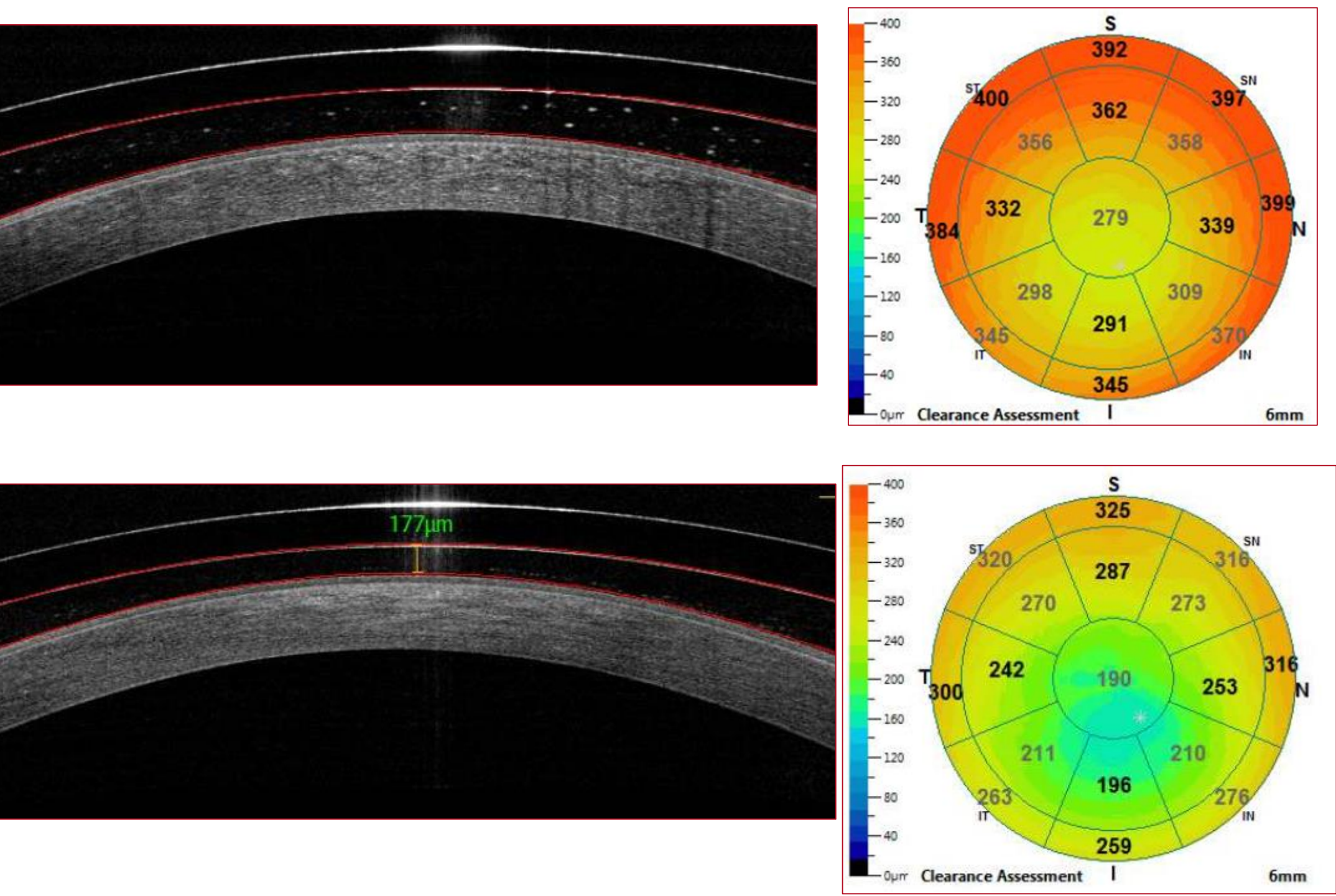
Trial	BC (mm)	Power (D)	OAD (mm)	CT (mm)	Misc.
1	7.45	-9.25	10.9	0.14	Rose K lift standard, ACT 2.00 Added Piggyback SCL
2	7.29	-10.25	10.3	0.13	Rose K lift standard, ACT 3.00
3	7.29	-10.25	10.6		Rose K lift -1, Toric PC 2.00 to see if it would improve alignment

Challenges Faced/Lessons Learned

- No external photo to help guide AS-OCT optical pachymetry scan position. With variation in reproducibility, may be difficult to monitor for subclinical edema. Center of pupil was used as target.
- ACT 2.00 mm was initially the highest amount, but the CL lab contacted Menicon and discovered we could still increase that curve

Conclusion

- CL Laboratories are helpful to look for more options to troubleshoot issues
- Corneal GPs with quadrant specific or toric designs can be utilized on some irregular corneas when ScCL are not indicated



References

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