

Scleral Contact Lens Considerations in a Keratoconic Patient with Glaucoma

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BACKGROUND

Glaucoma (GLC) is a progressive ocular disease that results in optic nerve damage and vision loss. It can arise from many etiologies, most commonly from increased intraocular pressure (IOP) which results in degeneration of retinal ganglion cells leading to optic neuropathy. Treatment for glaucoma includes medication and surgery aimed at lowering the intraocular pressure. A scleral gas permeable lens (ScCL) that vaults over the cornea and rests its weight on the sclera is a great form of vision correction for patients with ectatic and post-surgical corneal conditions.

CASE REPORT

A 61 year-old male patient presents for a contact lens fitting, OU. He reports satisfactory vision at distance and near with his habitual 15 month old ScCLs.

Ocular history includes OU: Keratoconus; Dry Eye; Primary Open-Angle Glaucoma; post-LASIK; and Conjunctival Hyperemia, OS greater than OD. His topical medications are Latanoprost; Restasis; Systane Ultra, OU and Brimonidine and Dorzolamide, OS only.

Medical history consists of previous shoulder, knee, and foot surgeries, and cardiac ablation for atrial fibrillation. Current systemic medication is Ambien prn for episodic insomnia.

Pertinent findings with current ScCL OU are:

	Brand	Power	BC	Diam	Sag
OD	SynergEyes VS Front Toric	-2.00 -1.75 x 020	8.00 mm	16.00 mm	3700
OS	SynergEyes VS Front Toric	-5.25 -0.75 x 155	7.80 mm	16.00 mm	4000
	CT	Edge	Material	Color	Tx
OD	0.27 mm	SLZ 38-44	Optimum Extreme	Clear	Tangible Hydra-PEG
OS	0.26 mm	SLZ 38-44	Optimum Extreme	Blue	Tangible Hydra-PEG
	DVA	NVA	OR	VA c OR	
OD	20/25		+0.50 sph	NI	
OS	20/25		-0.75 sph	20/20-2	
OU	20/20-2	20/25		20/20-2	
	Centration/Movement	Central Fit	Limbus	Edge	
OD	inf decent, no movement	50um apical clearance	excessive inf gimbil clearance	NaFi leak IT	
OS	inf decent, no movement	apical bearing	excessive inf gimbil clearance	NaFL leak ST/IN	

Pentacam® Topography

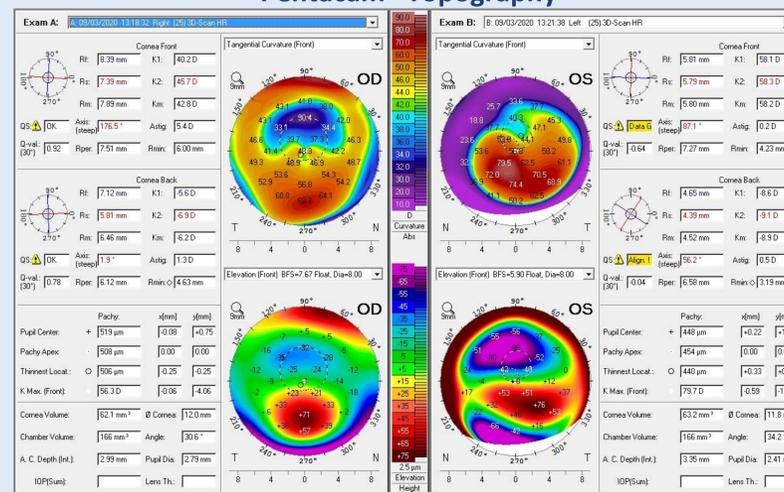


Figure 1. Anterior Tangential Curvature and Anterior Corneal Elevation, OD and OS

	OD	OS
Topography	irregular corneal astigmatism	irregular corneal astigmatism
Sim K	40.20 / 45.70 @ 176	58.10 / 58.30 @ 087
Pachymetry	506 um	440 um
IOP	17 mmHg	24 mmHg

Figure 2. Ancillary findings, OD and OS

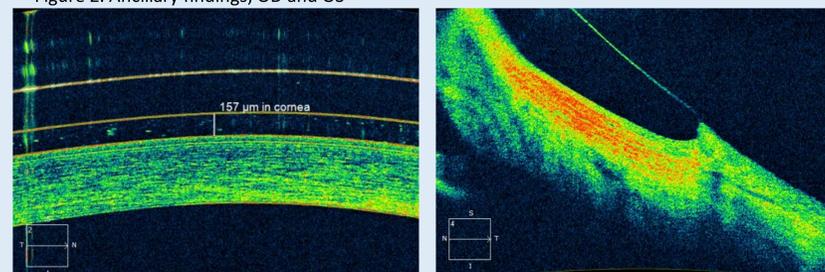


Figure 3. OD, 157um central clearance after 4 hours of wear with new ScCL

Figure 4. OD, Compression of nasal conjunctival, scleral, and adjacent structures with trial lens

After discussing the latest research and alternative lens options with the patient, he elected to remain in ScCLs. Modified Monovision was utilized for clear distance and intermediate vision appropriate for the patient. Care was taken to ensure appropriate scleral landing zone fit, minimizing compression of peri-limbal areas.

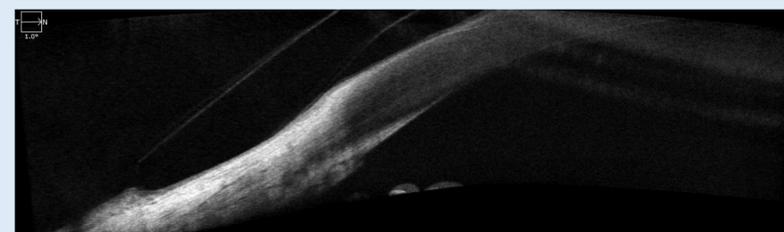


Figure 5. OS, Edge profile of latest dispensed ScCL

DISCUSSION

The concern and possible mechanism of increased IOP with ScCL wear was presented in 2016. It was hypothesized that scleral lens landing zone settling could cause compression of conjunctival tissue, Schlemm's Canal, and adjacent structures, subsequently leading to reduced aqueous outflow and increased IOP¹. Another suggested cause of increased IOP is the displacement of intra-ocular fluid resulting from contact lens bearing on the ocular surface. This study showed IOP increased by an average of 5mmHg after scleral lens wear, regardless of scleral lens diameter size. They further suggested the similar increase in IOP was due to the similar primary functional diameter, the chord where the lens actually lands on the conjunctiva, between the two lenses². An earlier study by Nau et al. had demonstrated that after 2 hours of 15mm diameter scleral lens wear, there was no significant increase in IOP in healthy eyes³. Both studies acknowledged that a flaw in each study is the inability to accurately assess intra-ocular pressure during lens wear. Transpalpebral tonometry and pneumatonometry assessment of IOP have been shown to be highly variable with poor accuracy, depending on the instrument used⁴. Walker et al. attempted to indirectly assess IOP during scleral lens wear by assessing optic nerve head minimum rim width which has been shown to thin with increases in IOP. They concluded that short term scleral lens wear has not shown significant impact in the optic nerve head structure and IOP in normal eyes⁵.

CONCLUSION

While some studies support the finding of increased IOP secondary to ScCL wear, others refute it. Additionally, no research has been published specifically on ScCL wear in diseased eyes, particularly in patients with GLC and/or keratoconus. Careful monitoring of IOP, retina, and optic nerve, and visual function in ScCL patients should be the new norm until more research is available on the link between ScCL wear and GLC.

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