



Could A Modified Piggyback System be a Line of Care for Patients with Peripheral Iridotomy and Degenerative Myopia?

Vakishan Nadarajah, OD, FAAO, FSLs; Suraj Upadhyaya, OD, PhD, FAAO; Arijit Chakraborty, MPhil, PhD
Midwestern University, Chicago College of Optometry



Introduction

Peripheral iridotomies (LPIs), a Nd:YAG laser procedure, to treat narrow angles or used prophylactically for phakic intraocular lens (IOL) surgery.

A phakic IOL is a treatment option for higher myopes who want to minimize their refractive correction. These patients are also at risk of myopic degeneration or pathological myopia.

LPIs increase the risk of having increased light sensitivity or ‘ghost images’ in about 2-7% of patients.

This report describes a case in which a myopic degeneration patient underwent LPIs, and required a rigid gas permeable (GP) contact lens to provide the clearest vision. Thus, a novel piggyback contact lenses system (PBCLS) was fit to improve both vision and visual disturbances.

Case

A 52 year-old Caucasian male, diagnosed with myopic degeneration and had bilateral LPIs performed, presented with a chief complaint of glare and reduced vision to clinic. Habitually, he was wearing GP lenses – that were two years old – instead of glasses because the contact lenses provided better optics and less minification. The bilateral LPIs were performed at 11:30 & 12:30 positions in both eyes (OU) prophylactically performed prior to phakic IOL surgery in 2014 as a type of refractive surgery (Figures 1&2). However, due to complications status-post LPIs, the phakic IOL surgery was not performed.

Clinical Findings

	Right Eye (OD)	Left Eye (OD)
Visual Acuities (VA) with Glasses	20/25	20/30-1
Refraction	-12.00-1.25x065	-19.00-1.75x090
Habitual GP Lenses		
Power	-11.25D	-16.75D
Base Curve (BC)	7.80	7.80
Overall Diameter (OAD)	9.1 mm	9.1 mm
VA with GPs	20/30-2	20/25-2
Over-refraction (OR)	+0.25D	-0.25D
Lens Evaluation	Intrapalpebral (IP) fit, inferiorly decentered, minimal apical clearance (AC) with dimple veiling, soft midperipheral (MP) bearing, adequate peripheral clearance, minimal movement on blink (MOB) (Figure 3)	IP fit, inferiorly decentered, apical alignment (AA) centrally, soft MP bearing, adequate peripheral clearance, minimal MOB (Figure 4)
	Mild scratches on surface	Trace scratches on surface



Figure 1) Displays the bilateral LPIs at 11:30 & 12:30 clock hours indicated by the dark circles of the right eye.



Figure 2) Displays the bilateral LPIs at 11:30 & 12:30 clock hours indicated by the dark circles of the left eye.

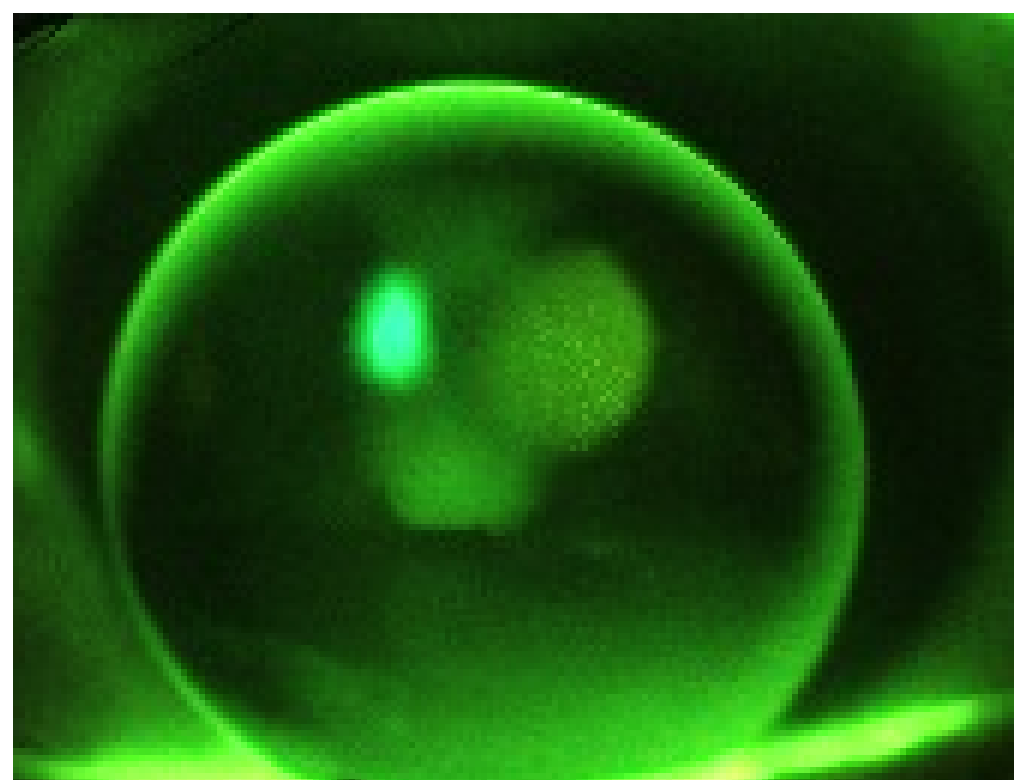


Figure 3) Displays the apical dimple veiling with habitual GP lenses indicating a steeper BC of the right eye.



Figure 4) Displays the well-fit, slightly decentered habitual GP lenses of the left eye.

Contact Lens Fitting

Piggyback System		
Clear Kontur Soft Lens	OD	OS
Center Thickness (CT)	0.2mm	0.2mm
BC	8.6	8.6
Power	PLANO	PLANO
OAD	15.0mm	15.0mm
New GP Lenses		
Power	-10.50D	-17.00D
BC	7.89	7.80
Optical Zone (OZ)	7.7	7.7
Secondary Curve x Width	9.6 x 0.2	9.3 x 0.2
Peripheral Curve x Width	10.8 x 0.3	10.5 x 0.3
OAD	9.1 mm	9.1 mm
VA with GPs	20/20-2	20/25+1
Lens Evaluation	IP fit picks up with blink, well centered, AA, soft with-the-rule MP bearing, adequate peripheral clearance, minimal MOB & separate from soft lens (Figure 5)	IP fit picks up with blink, well centered, AA, soft with-the-rule MP bearing, adequate peripheral clearance, minimal MOB & separate from soft lens (Figure 6)

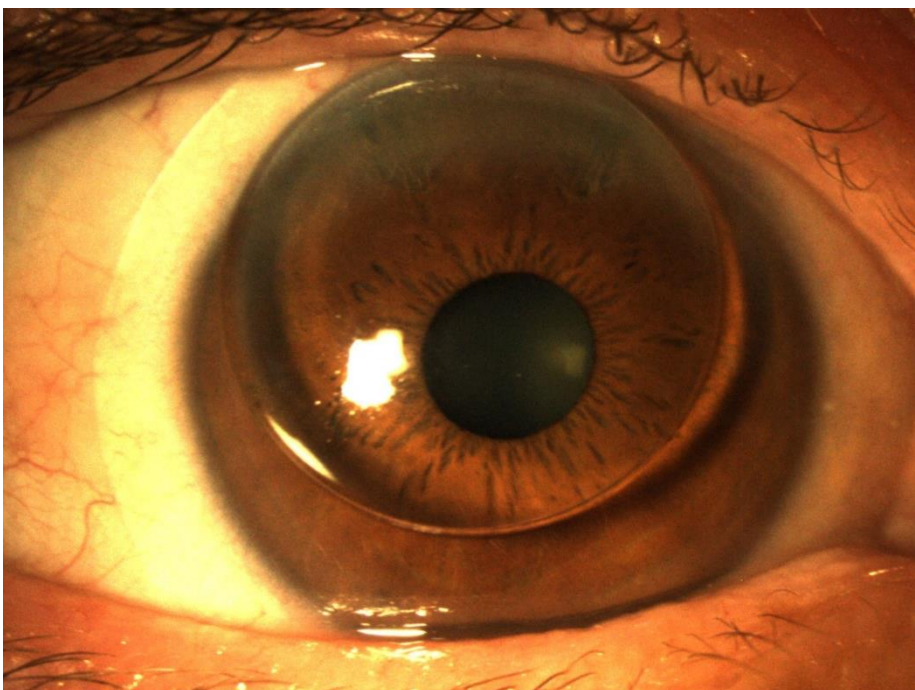


Figure 5) Displays the piggyback system utilizing the Kontur clear soft lens and the newly ordered GP lens of the right eye.

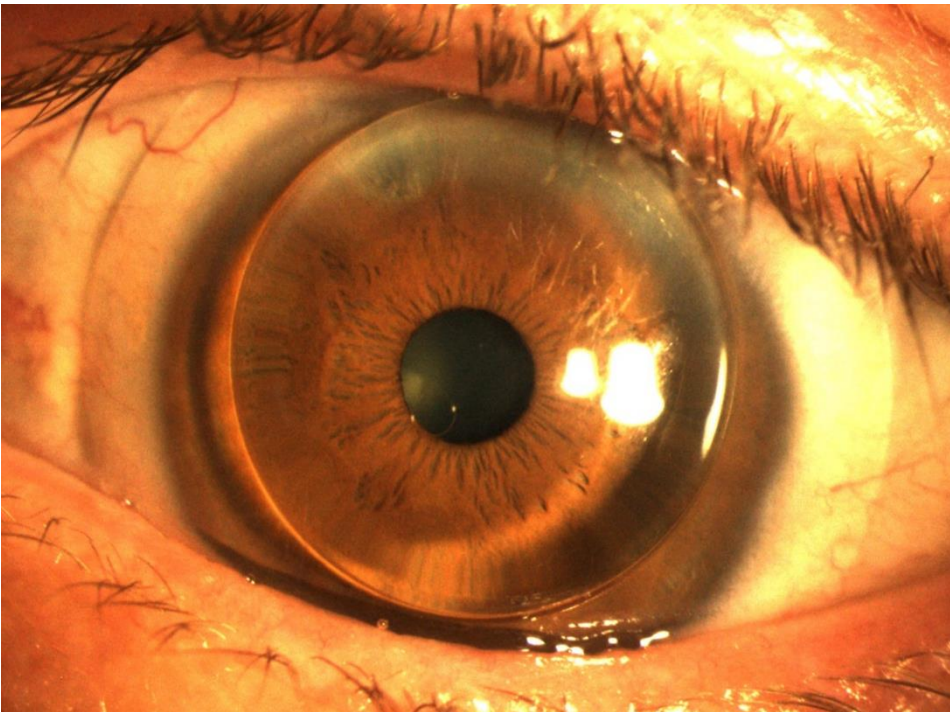


Figure 6) Displays the piggyback system utilizing the Kontur clear soft lens and the newly ordered GP lens of the left eye.

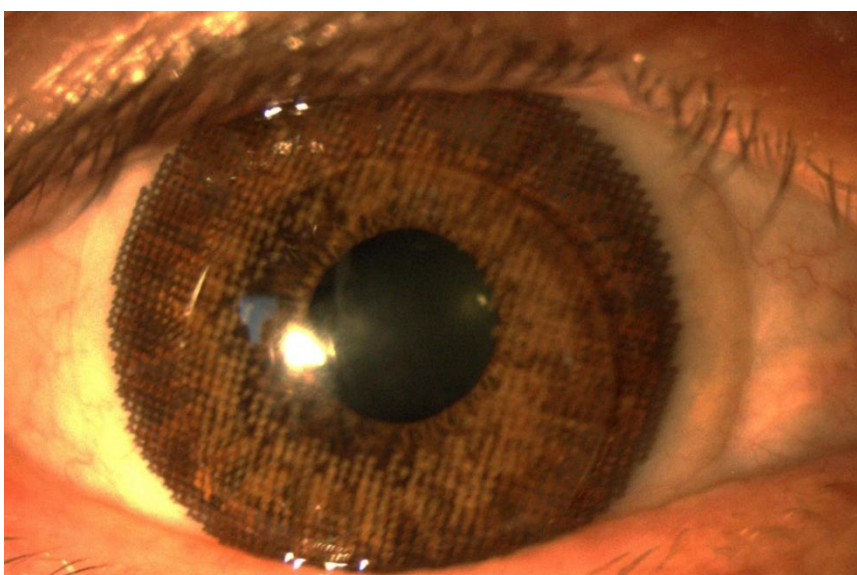


Figure 7) Displays the piggyback system utilizing the Air brown Optix soft lens and the new GP lens of the right eye.

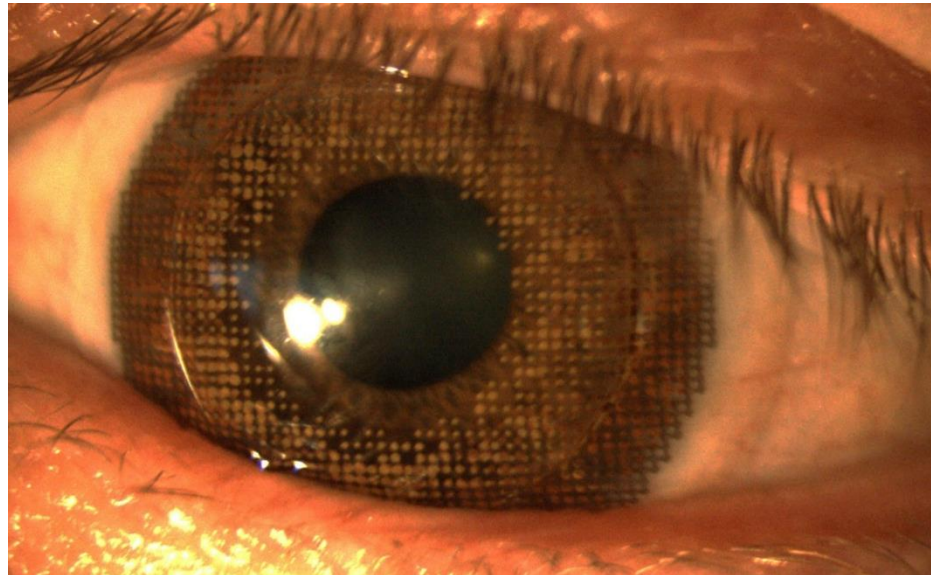


Figure 8) Displays the piggyback system utilizing the brown Air Optix soft lens and the new GP lens of the left eye.

Piggyback System		
Air Optix Brown Soft Contact Lens	Right Eye (OD)	Left Eye (OD)
Center Thickness (CT)	0.08mm	0.08mm
BC	8.6	8.6
Power	PLANO	PLANO
OAD	15.0mm	15.0mm
New GP Lenses		
Power	-10.50D	-17.00D
BC	7.89	7.80
Optical Zone (OZ)	7.7	7.7
Secondary Curve x Width	9.6 x 0.2	9.3 x 0.2
Peripheral Curve x Width	10.8 x 0.3	10.5 x 0.3
OAD	9.1 mm	9.1 mm
VA with GPs	20/20-2	20/25+1
Lens Evaluation	IP fit picks up with blink, well centered, AA, soft with-the-rule MP bearing, adequate peripheral clearance, minimal MOB & separate from soft lens (Figure 7)	IP fit picks up with blink, well centered, AA, soft with-the-rule MP bearing, adequate peripheral clearance, minimal MOB & separate from soft lens (Figure 8)

Scleral Piggyback System

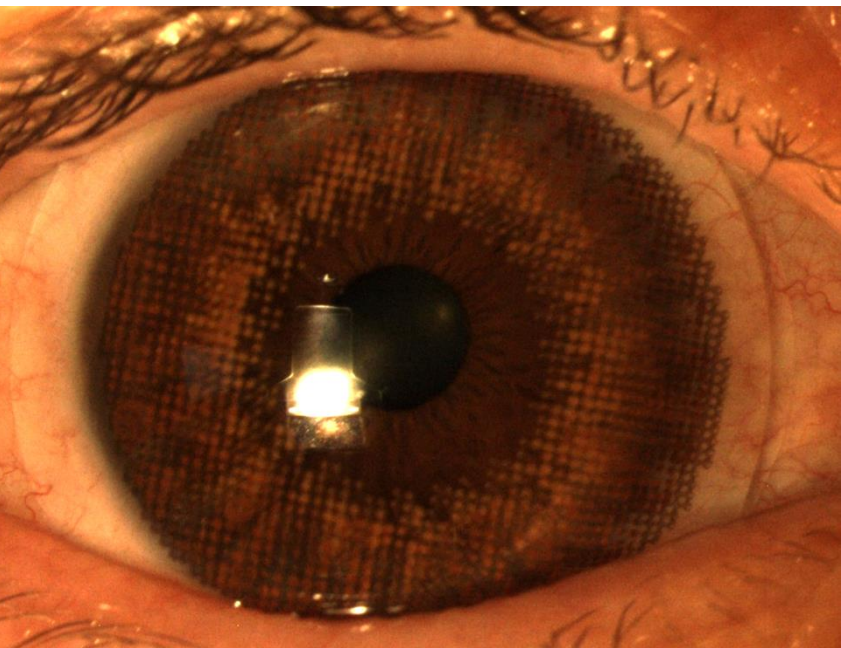


Figure 9

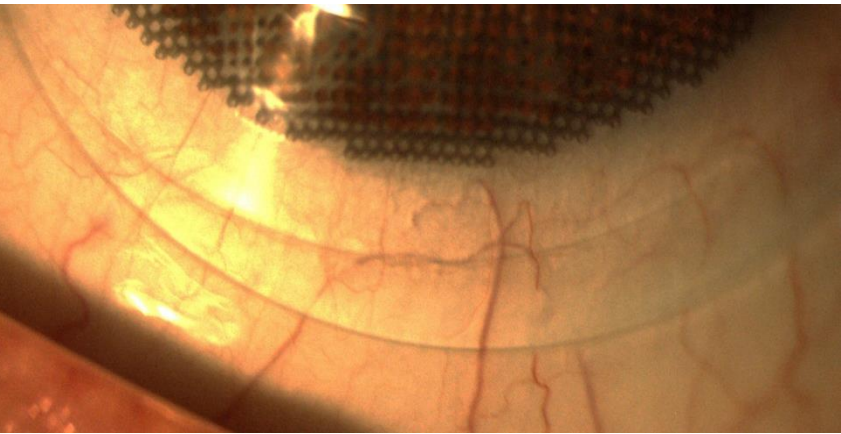


Figure 10

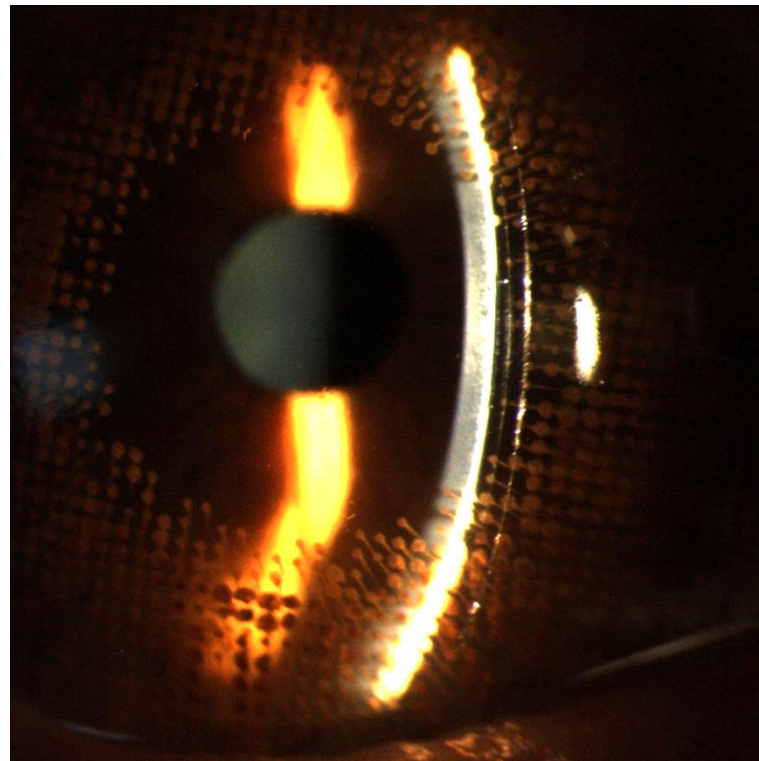


Figure 11

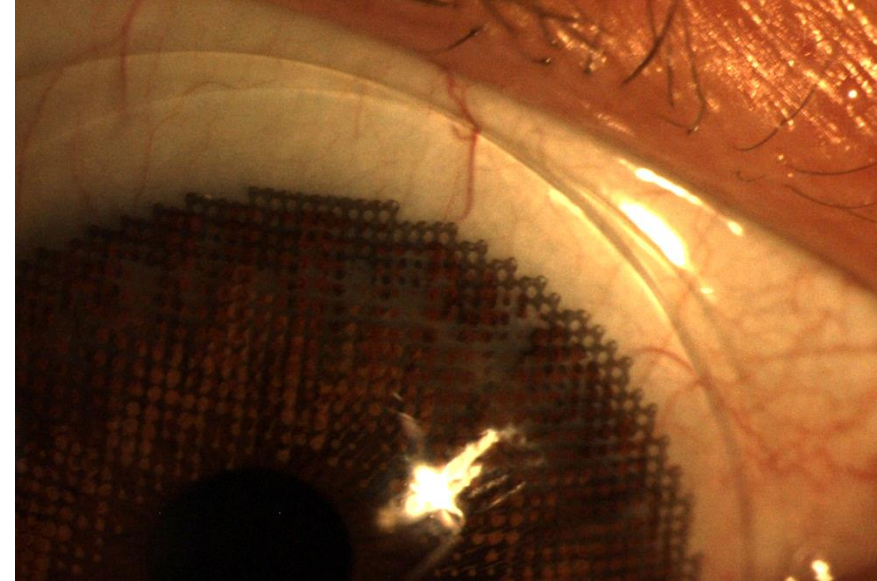


Figure 12

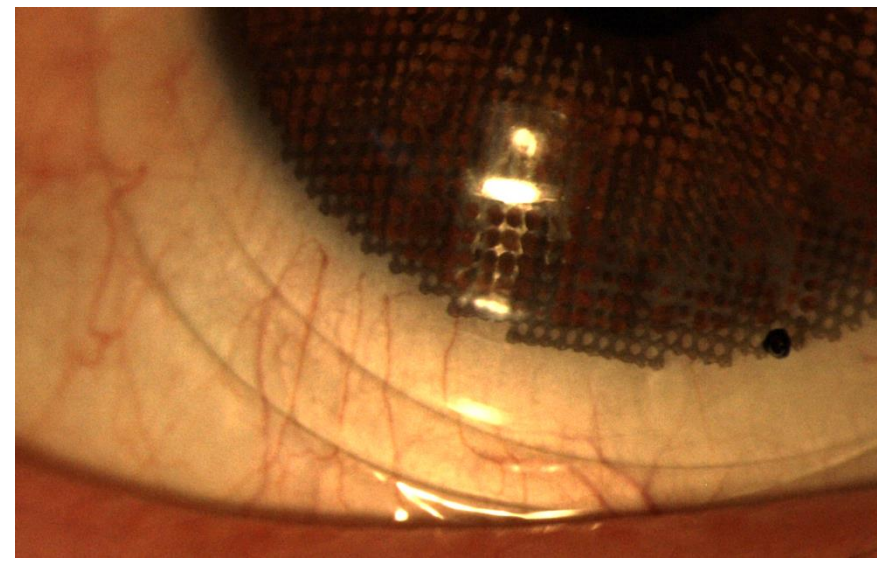


Figure 13

An overall photo (Figure 9) shows a piggyback system utilizing a scleral lens (Zenlens RC 15.4) and tinted soft lens (Air Optix brown 14.2) trialed in-office. There was overlapping of the lenses at the conjunctiva (Figures 10,12 & 13) because of similar diameters of the lenses, and the central clearance of the scleral (Figure 11) was minimal because the sagittal depth of the scleral that was optimally fit alone before did not account for the soft lens thickness. Thus, this fit was not finalized.

Discussion

PBCLS are utilized in order to improve comfort and stability over GPs. For this patient, the Kontur soft lens, used as a PBCLS, was too uncomfortable to wear all day because of its larger center thickness.

With thinner center thickness lens of the pre-tinted Air Optix soft lenses, the patient had significantly better comfort compared to the Kontur lens. He also experienced less ‘ghost images’ because the tint was able to cover the entire cornea limbus-to-limbus to block the excess light from entering the LPIs OU.

The scleral lenses were also finalized separately for the patient for better stability and comfort because he was a construction worker and had a history of getting debris underneath his GP lenses. Due to the high cost and limited availability of tinted scleral lenses, piggyback scleral lenses with the Air Optix brown soft lenses were trialed in-office with the previous finalized scleral. However, the scleral piggyback system was not an ideal fit; therefore, this modality was not prescribed.

Furthermore moving on posteriorly, the left eye fundus revealed lacquer cracks, or a break in Bruch's membrane, present in the macula. Thus especially for these highly myopic patients, monitoring for subretinal fluid is a high priority to avoid sight-threatening sequelae, such as choroidal neovascularization.

Posterior Pole Evaluation



Figure 14) Displays a posterior pole photo revealing a myopic fundus appearance of the right eye.



Figure 15) Displays a posterior pole photo of the higher myopic left eye showing lacquer cracks across the macula and a posterior staphyloma temporal to the optic nerve.

Conclusion

Overall, availability of colored/tinted scleral lenses is generally very scarce and expensive compared to tinted soft lenses. However, scleral and GP contact lens often provide superior optics and vision compared to soft lens. Thus, patients who may need those specific lenses for their superior optics and also have complaints of glare or ghosting could be treated with a modified PBCLS utilizing a tinted soft lens.

Another alternative for this patient would be utilizing a piggyback scleral lens with a tinted soft lens, however more research needs to be conducted to test the safety and oxygen transmissibility for this type of modality.

References:

1. Fadel, Daddi. "Scleral Lens Issues and Complications Related to a Non-Optimal Fitting Relationship Between the Lens and Ocular Surface." *Eye & Contact Lens: Science & Clinical Practice*. 45(3): 2019. pp. 152–163.
2. Jager, Rama D., and Jeffrey C. Lamkin. *Massachusetts Eye and Ear Infirmary Review Manual for Ophthalmology*. Wolters Kluwer Health. 2015.
3. Pearson, Richard M. "Comments on 'Modern Scleral Contact Lenses: A Review' [Van Der Worp Et Al. (2014)]." *Contact Lens and Anterior Eye*. 38(1): 2015. pp. 73–74.
4. Sengor, T., et al. "High Dk Piggyback Contact Lens System for Contact Lens-Intolerant Keratoconus Patients." *Clinical Ophthalmology*. (5): 2011. pp. 331–335.
5. Spaeth, G.I., et al. "The Effects of Iridotomy Size and Position on Symptoms Following Laser Peripheral Iridotomy." *American Journal of Ophthalmology*. 141(2): 2006. pp. 427–428.

