

“The Battle of the Four Lenses.” EBMD Plus Irregular Corneal Astigmatism, Which Lens Will Come out on Top?

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BACKGROUND

Epithelial Basement Membrane Dystrophy (EBMD) is caused by an irregular formation of the corneal epithelial basement membrane leading to map, dot, and fingerlike patterns on the cornea as well as irregular astigmatism. Patients with EBMD commonly experience recurrent corneal erosions (RCE), which lead to ocular pain, photophobia, hyperemia, and blurred vision.¹ Fortunately, there are various treatment options for EBMD. Copious lubrication with artificial tears during waking hours along with a lubricating ointment at night are crucial to preventing and managing RCE.¹ For active corneal erosions, prophylactic antibiotic and bandage contact lens are recommended to protect the ocular surface and aid in healing. For recalcitrant cases, stromal puncture, epithelial debridement plus diamond buffing,² and phototherapeutic keratectomy³ are viable treatments. For patients with reduced best-corrected spectacle acuity due to irregular astigmatism, specialty contact lenses should be considered.

CASE DESCRIPTION

Purpose

To assess which of the following four lens types is best suited for an EBMD patient with irregular astigmatism.

Methods

A 49-year-old female with history of EBMD presented with a complaint of poor vision. She presented wearing commercially available soft toric lenses in a monovision modality (lens option #1). Corneal topography revealed irregular astigmatism in both eyes corresponding to EBMD seen upon slit lamp examination (Figure 1-4).

	OD	DVA	OS	DVA
Refraction	-3.00-2.00x 110	20/50	-1.25-6.00 x 060	20/60

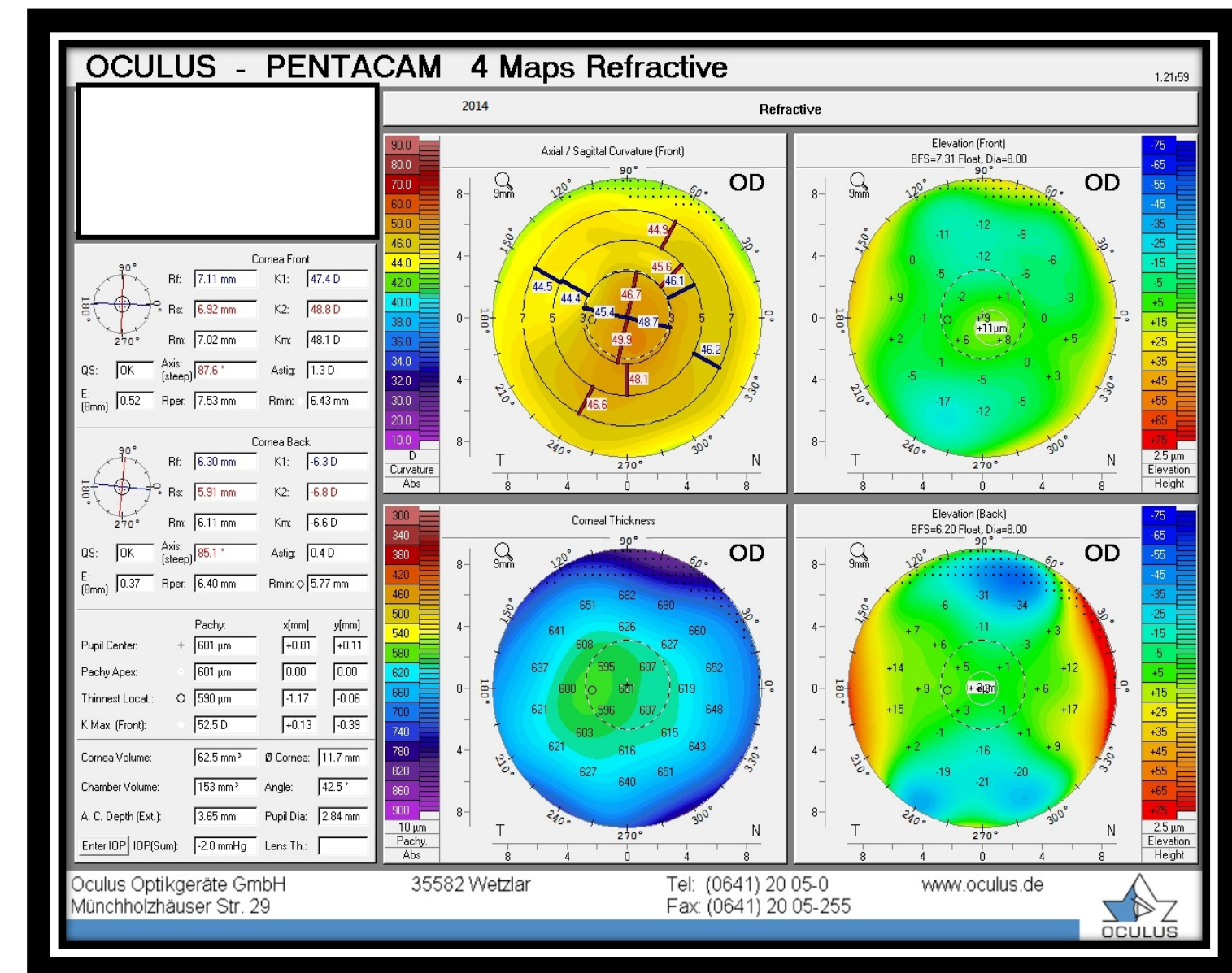


Figure 1: Corneal Topography OD – 4 Maps Refractive View.

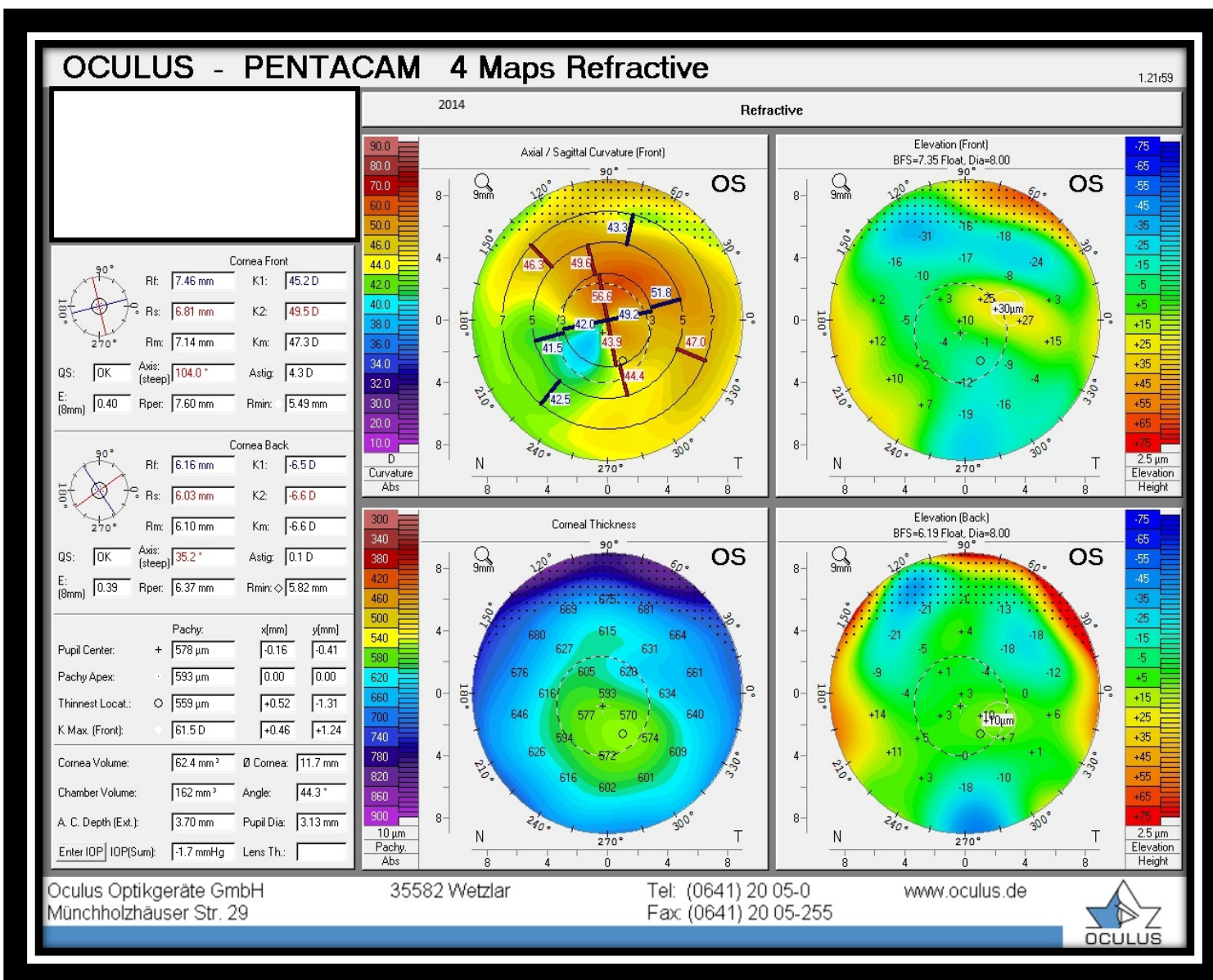


Figure 2: Corneal Topography OS – 4 Maps Refractive View.

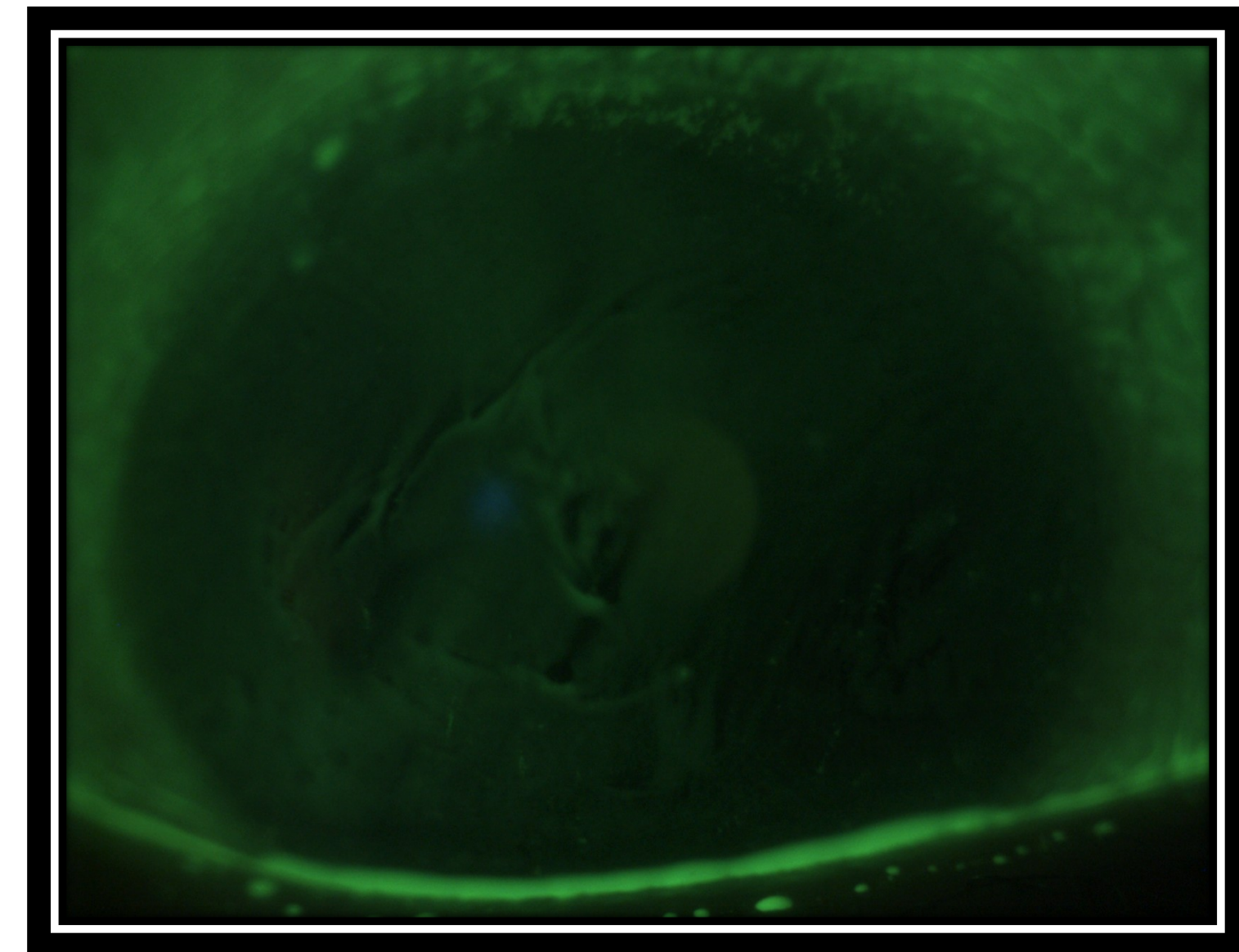


Figure 3: Anterior segment slit lamp photo with sodium fluorescein dye showing negative staining consistent with EBMD.

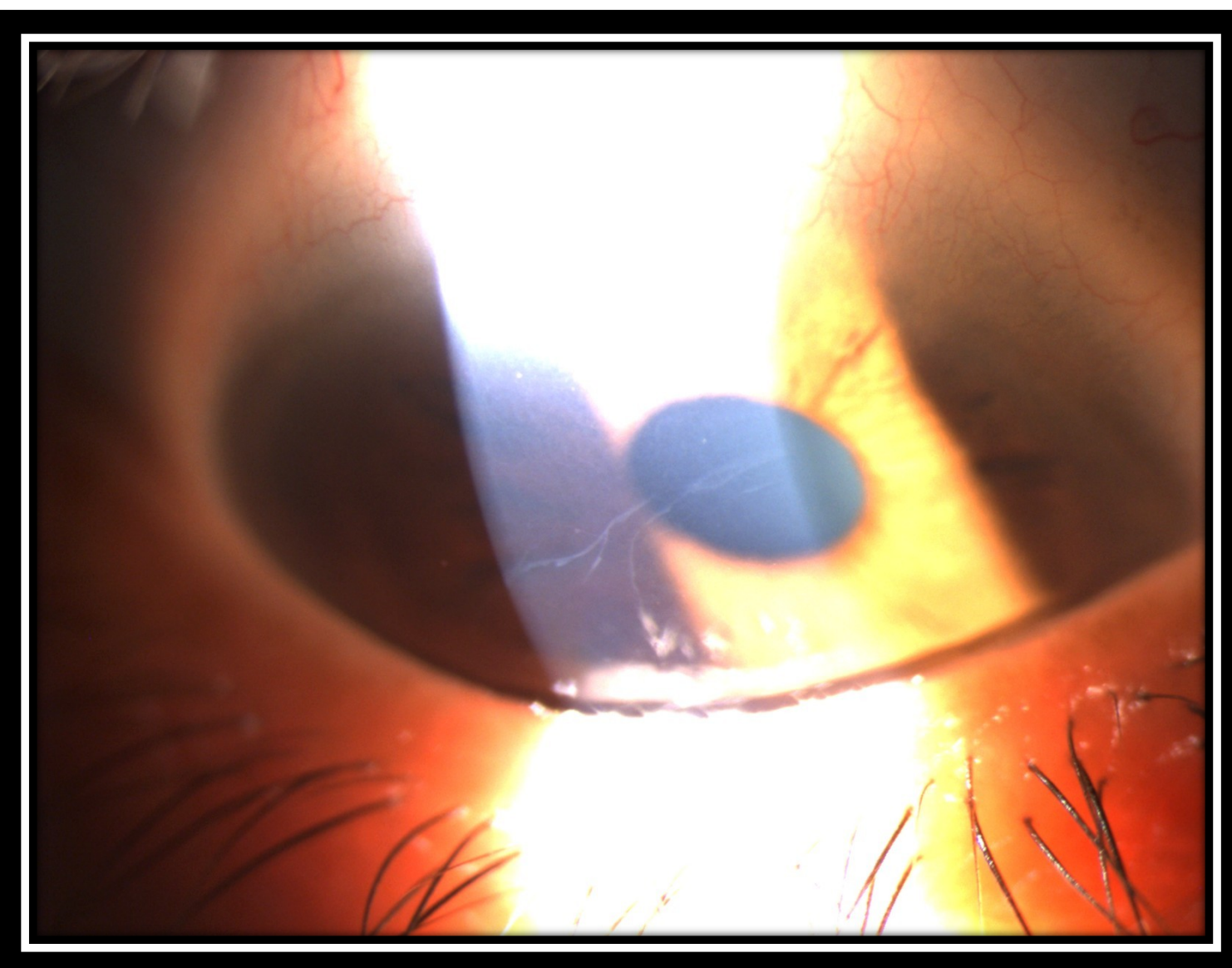


Figure 4: Anterior segment slit lamp photo with white light showing signs of map-dot fingerprint patterns consistent with EBMD.

Lens Option #1: Soft Toric Lens

OD DVA	OS DVA	Monocular Diplopia	Ocular Discomfort
20/50	20/80	Present	Present

Toric lenses fit well and were centered, stable, and had no rotation. The patient complained of monocular diplopia and blurry vision that did not improve with spherocylindrical over-refraction. Patient reported the monocular diplopia made everyday activities difficult and may have contributed to the nausea and balance issues she also experienced. Soft toric lenses have been discontinued and patient was refitted into specialty lenses.

RESULTS

Lens Option #2: GP Lens

OD DVA	OS DVA	Monocular Diplopia	Ocular Discomfort
20/30 +2	20/40	Minimal	Present

Corneal gas permeable (GP) lenses provided significantly improved vision and eliminated most of the monocular diplopia. Despite patient’s marked improvement in vision with GP lens, patient had a lot of lens awareness and was unable to adapt to the lenses. Piggyback system was introduced to aid with comfort.

Lens Option #3: Hybrid Lens

OD DVA	OS DVA	Monocular Diplopia	Ocular Discomfort
20/20-	20/30+1	None	Minimal

The following year, the patient was refitted into hybrid lenses to provide visual benefits of a GP lens with the comfort of soft lenses and ease of handling a single lens vs PBS. Although hybrid lenses provided resolution of monocular diplopia and good vision, they had to be discontinued. Even with the flattest skirt option available, the lenses exhibited a tight fit which affected the patient’s wear time and ocular health.

Lens Option #4: Scleral Lens Monovision Modality

OD DVA	OS DVA	OU DVA	OU NVA	Monocular Diplopia	Ocular Discomfort
20/20	20/200*	20/20	20/20	None	None

*Non-dominant eye fit for near. Potential distance acuity with OR was 20/20

Scleral lenses provided a successful fit, excellent vision and all-day lens comfort. The patient has been in this modality for over 3 years and has not experienced any corneal erosion events. However, at the time of the initial scleral lens fitting, the patient was fit with a monovision modality to meet her visual demands as multifocal scleral lenses were not yet available. Spectacles were prescribed over scleral lenses for sustained tasks like driving and computer work. To improve binocularity and intermediate vision demands, the patient was recently transitioned into multifocal scleral lenses and is doing quite well. The patient was ecstatic about the improved binocularity and intermediate vision without the need for additional spectacles.

Lens Option #4.1: Multifocal Scleral Lens

OD DVA	OS DVA	OU DVA	OU NVA	Monocular Diplopia	Ocular Discomfort
20/20	20/20 -2	20/20	20/20	None	None

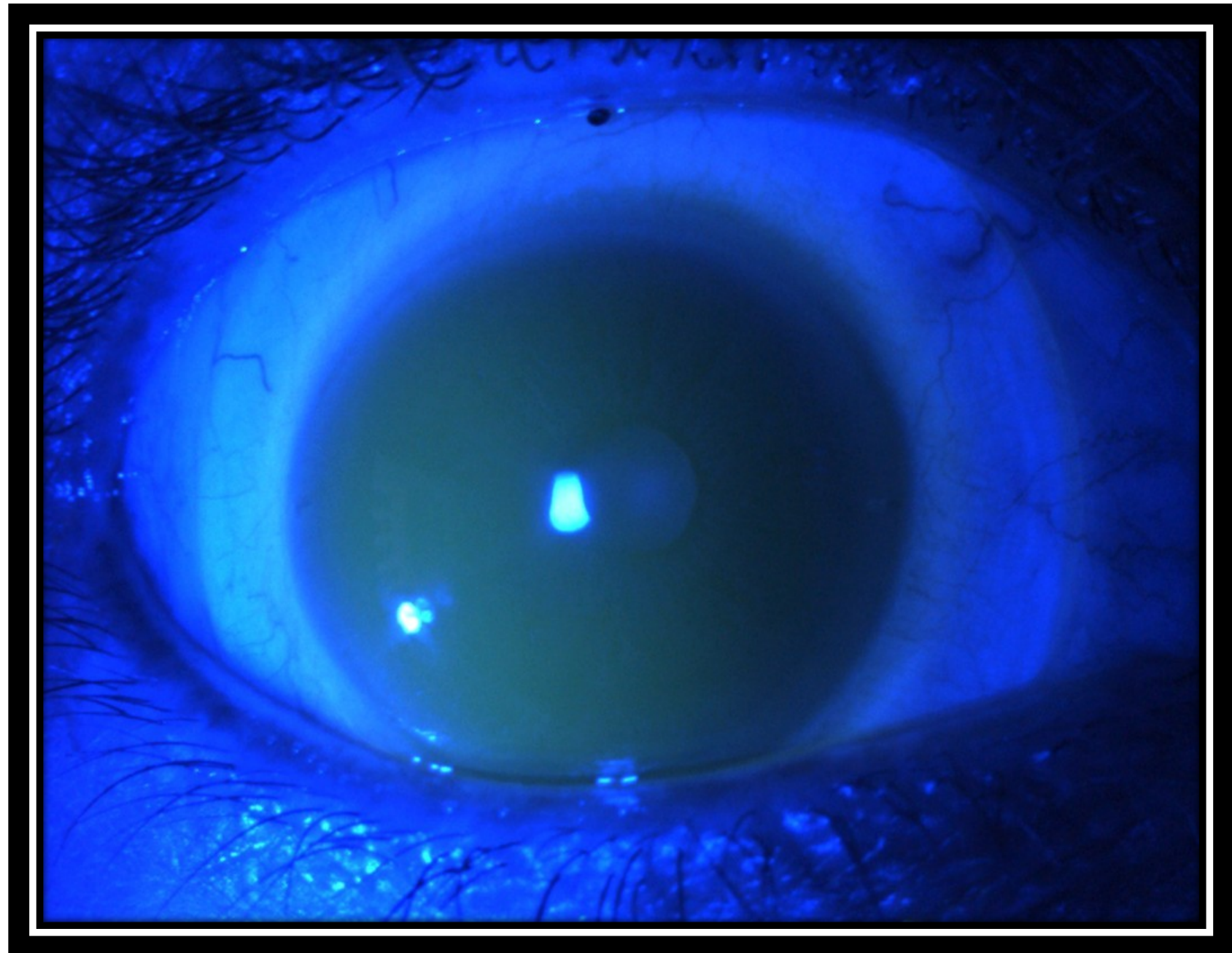


Figure 5: Scleral lens with sodium fluorescein under cobalt blue light.

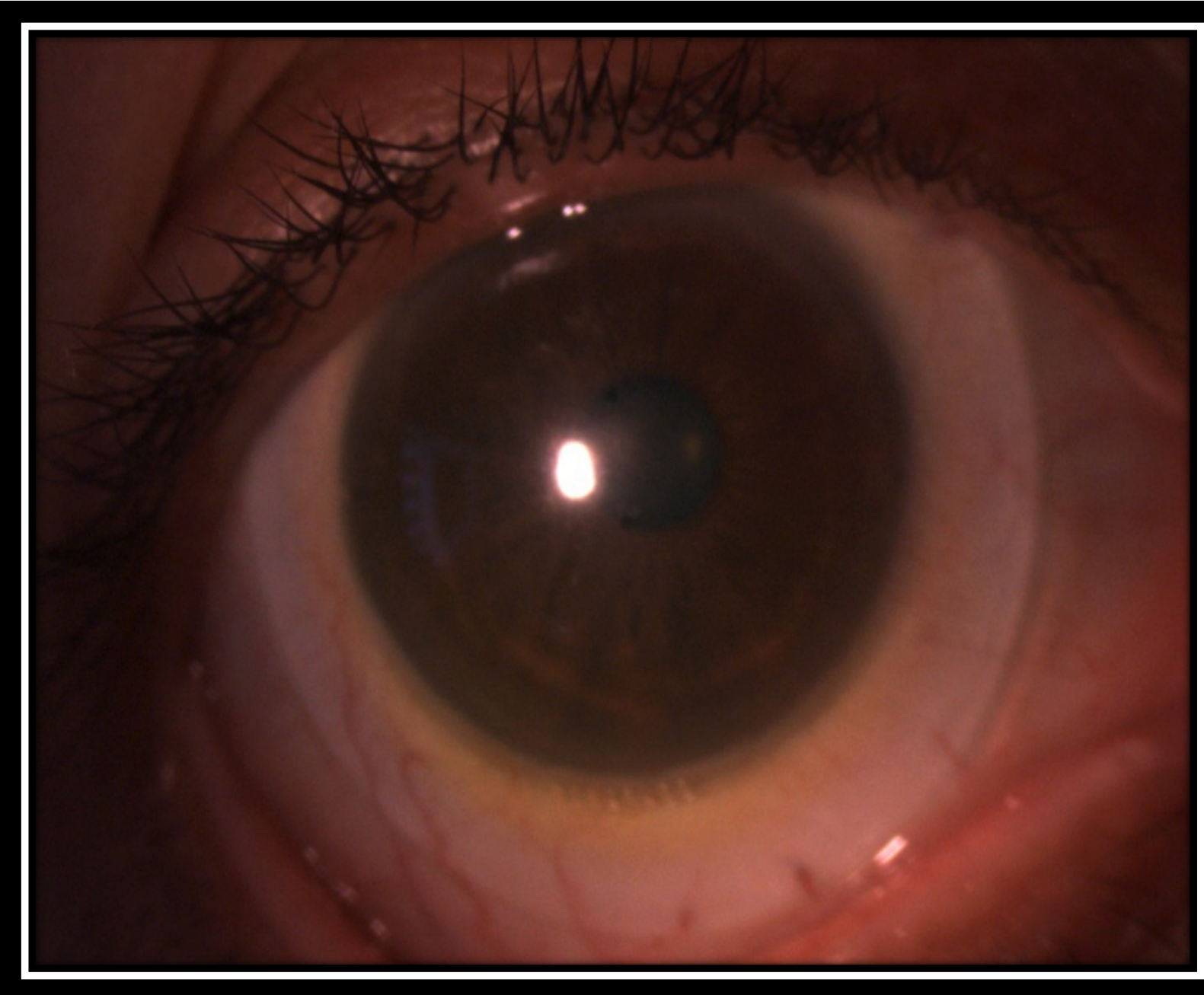


Figure 6: Scleral lens with white light showing no signs of vessel blanching.

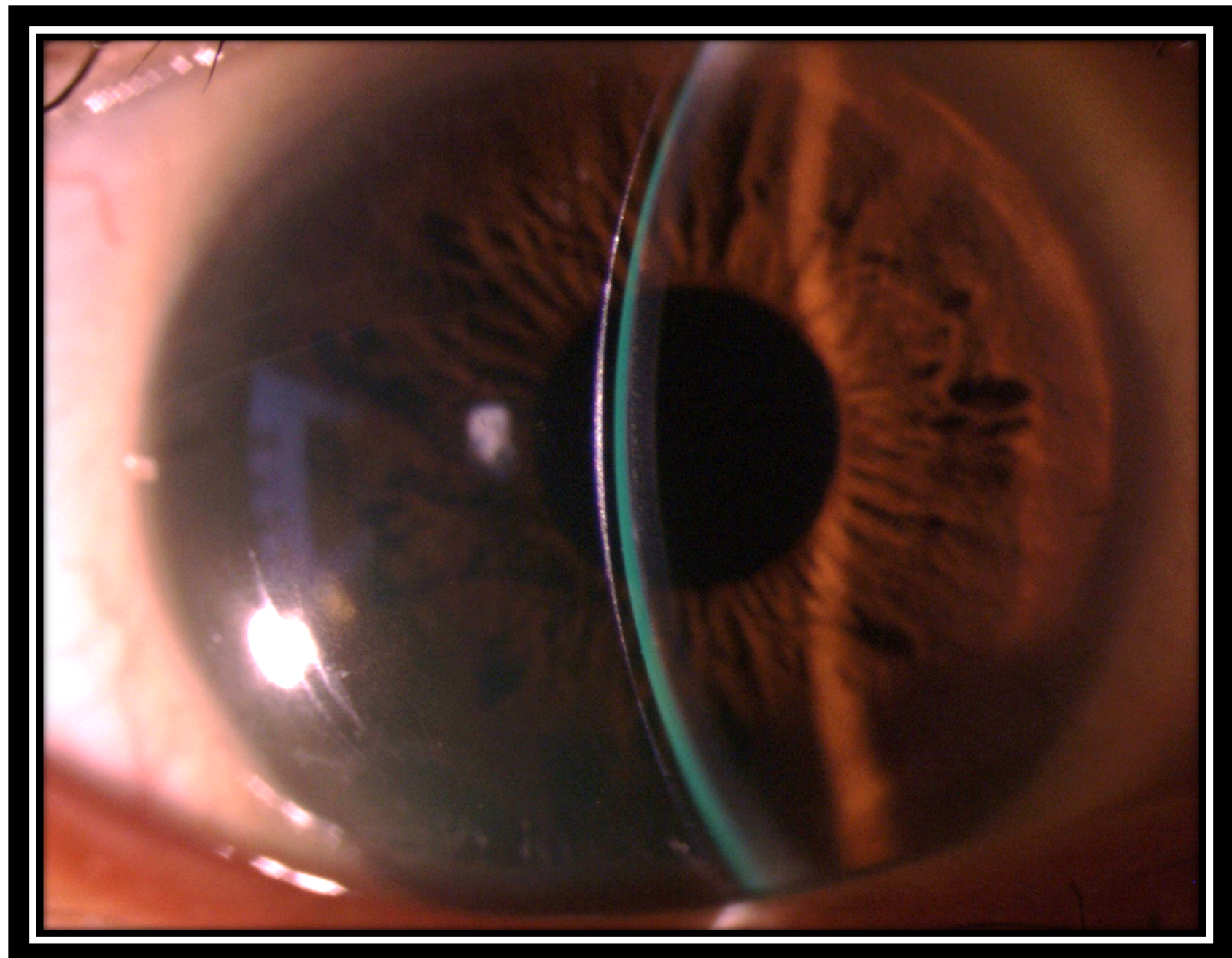


Figure 7: Scleral lens with optic section showing adequate central vault.

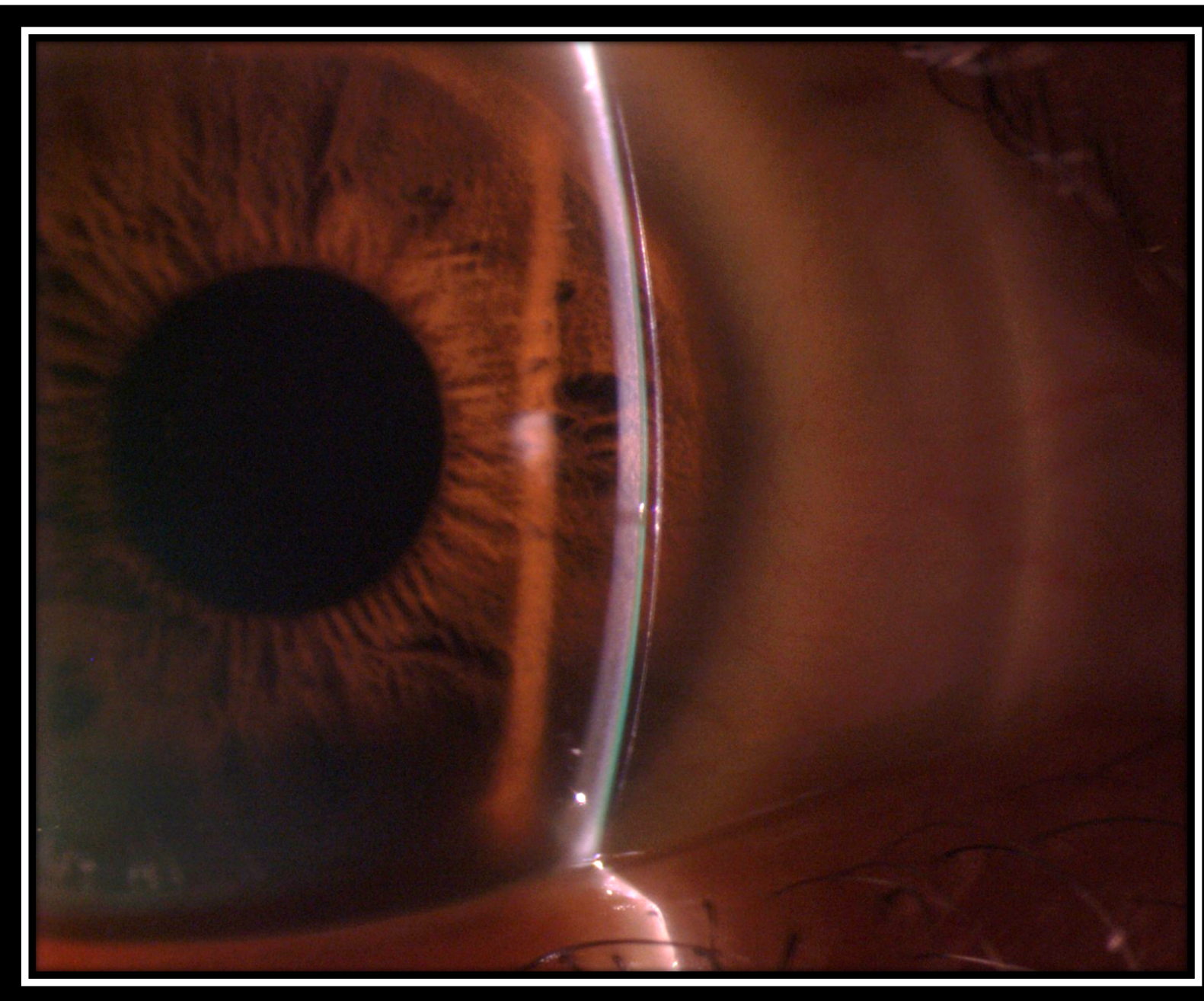


Figure 8: Scleral lens with optic section showing adequate mid-peripheral vault.

DISCUSSION

EBMD is a common corneal dystrophy that appears in clinical practice. Patients may present asymptomatic or complain of decreased vision due to induced irregular astigmatism. For patients with irregular astigmatism, corneal GP, hybrid, or scleral lenses should be considered to restore visual function. This case study highlights the difficulties that may arise when fitting contact lenses for EBMD patients due to their irregular corneas. Additionally, it is important to follow these patients closely as they may develop RCE, which may cause ocular pain and photophobia.

CONCLUSIONS

GP, hybrid, and scleral lenses are excellent options to consider for optimal visual correction in patients with irregular astigmatism secondary to EBMD. Scleral contact lenses are not only an excellent lens modality for achieving improved best-corrected visual acuity in EBMD, but also provide enhanced corneal protection and comfort for those with compromised corneas.

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