

# Challenges in Fitting a Corneal Gas Permeable (GP) Lens and a Scleral Lens for a Patient with Limbal Dermoid and Keratoconus

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## Introduction

Limbal dermoids are benign congenital tumors containing histological tissue such as epidermal appendages, teeth, or bone. If enlarged, they can cause amblyopia due to induced corneal astigmatism. Keratoconus is an ocular disease that causes irregularity from progressive corneal thinning. Corneal GPs and scleral lenses are non-surgical devices indicated to improve vision for such irregular corneas by providing an optically regular surface for light to refract through. However, it is much more difficult to fit lenses for patients with both irregular corneas and irregular conjunctivas. Fortunately, these gas permeable lenses can be altered in size and fit to provide optimal vision. This case outlines techniques to best fit a patient with irregular corneas and a limbal obstacle.

## Case

MR, a 49 year old African American female, presented with an enlarged limbal dermoid in the right eye along with keratoconus in both eyes. She did not want to surgically remove the dermoid because it did not cause any discomfort or visual changes. MR had also never worn contact lenses before and her only form of correction was glasses.

## Clinical Findings

	Right Eye (OD)	Left Eye (OS)
Spectacle Rx	-2.50-2.75x026	Balance
Visual Acuity	20/50	Counting Fingers @ 5ft
Anterior Segment Findings	<ul style="list-style-type: none"><li>Vitiligo on upper/lower lids</li><li>6x7mm wide <b>limbal dermoid</b> temporally (Figures 1&amp;2), pinguecula nasally</li><li><b>No cone signs</b></li></ul>	<ul style="list-style-type: none"><li>Vitiligo on upper/lower lids, ptosis</li><li>Pingueculae nasal/temporal</li><li><b>40% thinning of cornea, Fleischer's ring, Vogt's striae, diffuse apical scarring</b></li></ul>
Pentacam Analysis	<b>Mild Keratoconus</b> due to: <ul style="list-style-type: none"><li>Mild Steep Ks: 41.3/46.2D x 42.6° along with focal anterior/posterior steepening (Figure 3)</li><li>Corneal thinning: <b>483 um</b></li></ul>	<b>Severe Keratoconus</b> due to: <ul style="list-style-type: none"><li>Severe Steep Ks: 64.7/69.2D x 18.5° along with focal anterior/posterior steepening (Figure 4)</li><li>Corneal thinning: <b>306 um</b></li></ul>

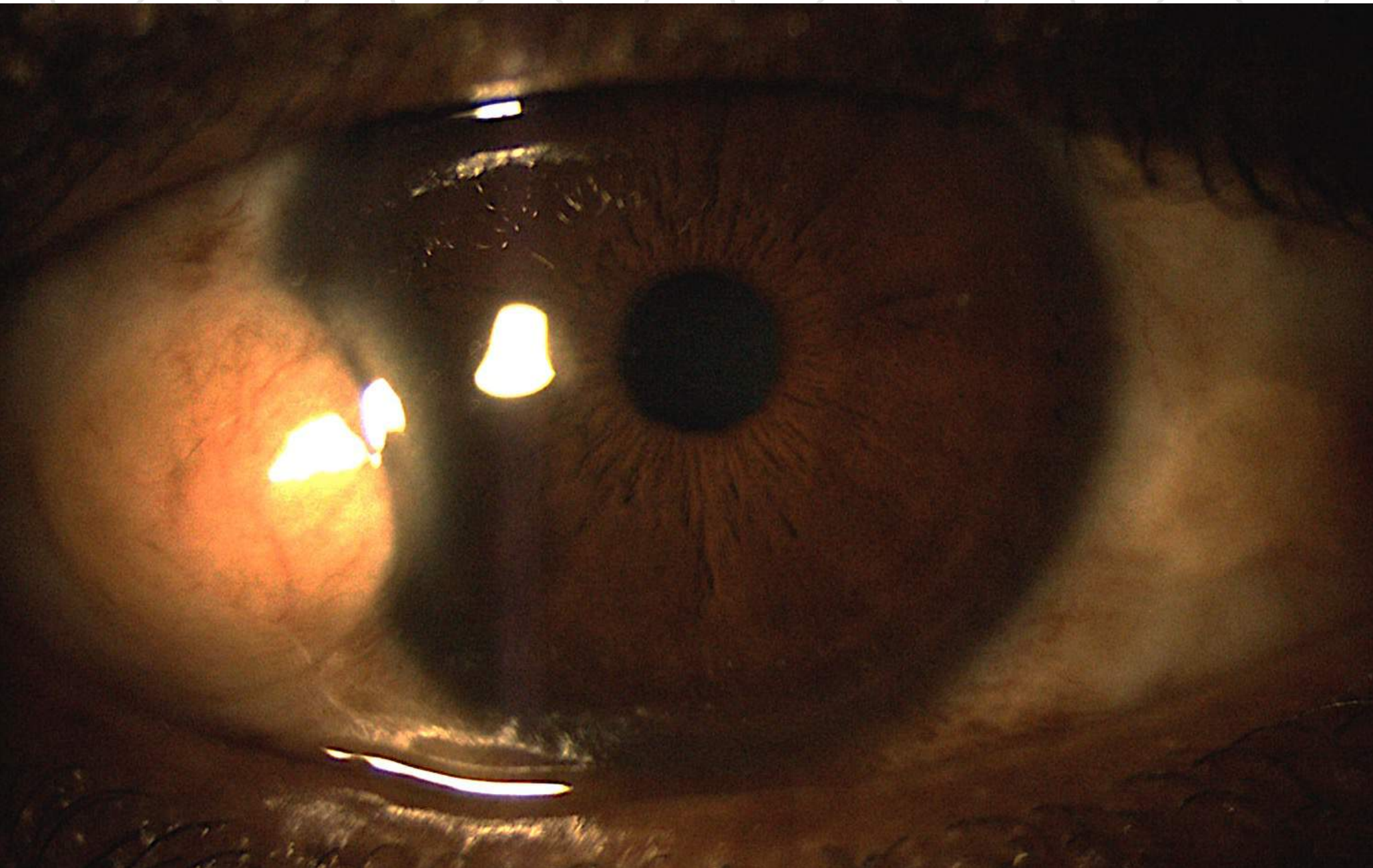


Figure 1) Enlarged limbal dermoid located temporally on the right eye

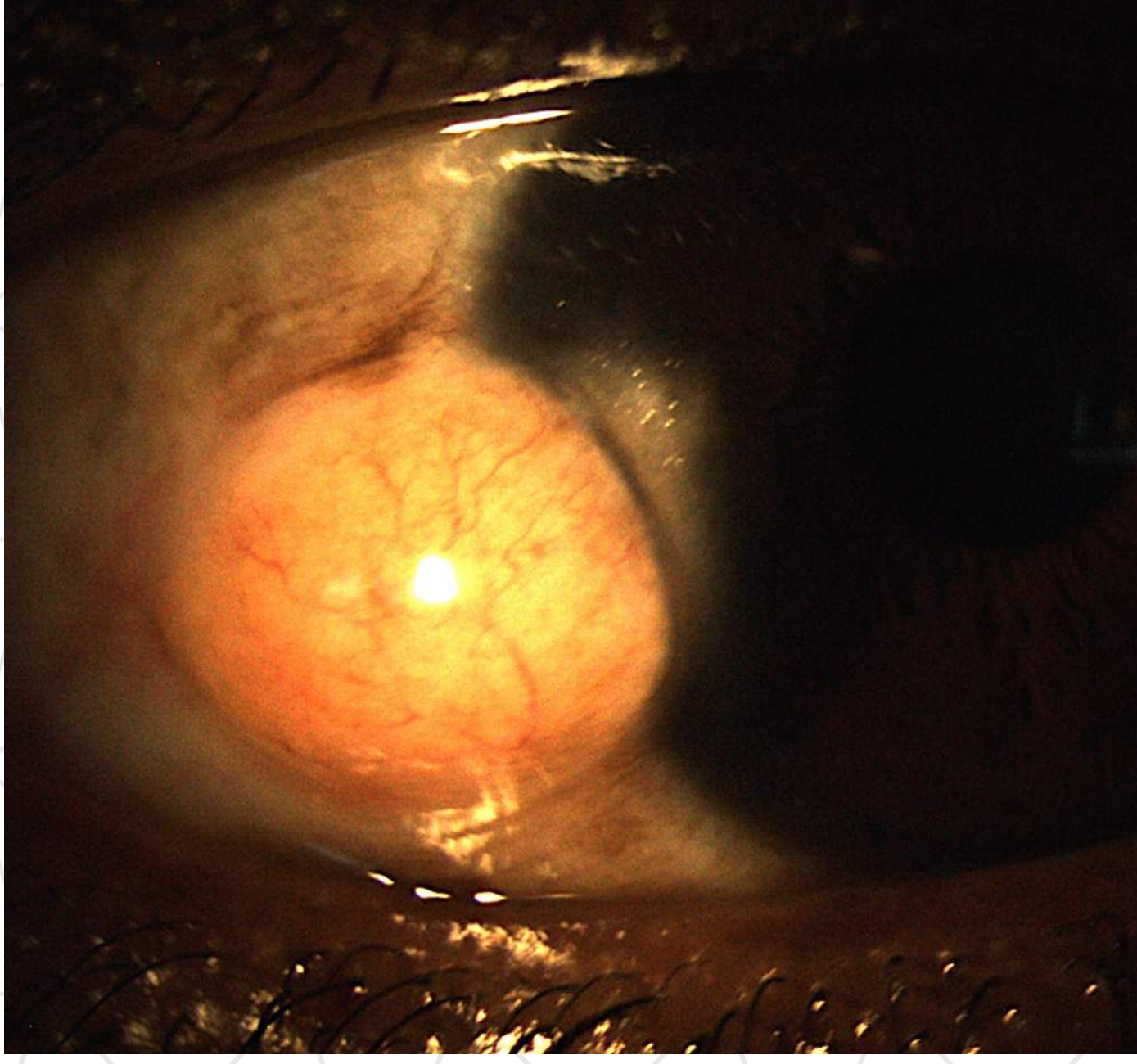


Figure 2) Temporal view of the limbal dermoid

## Pentacam

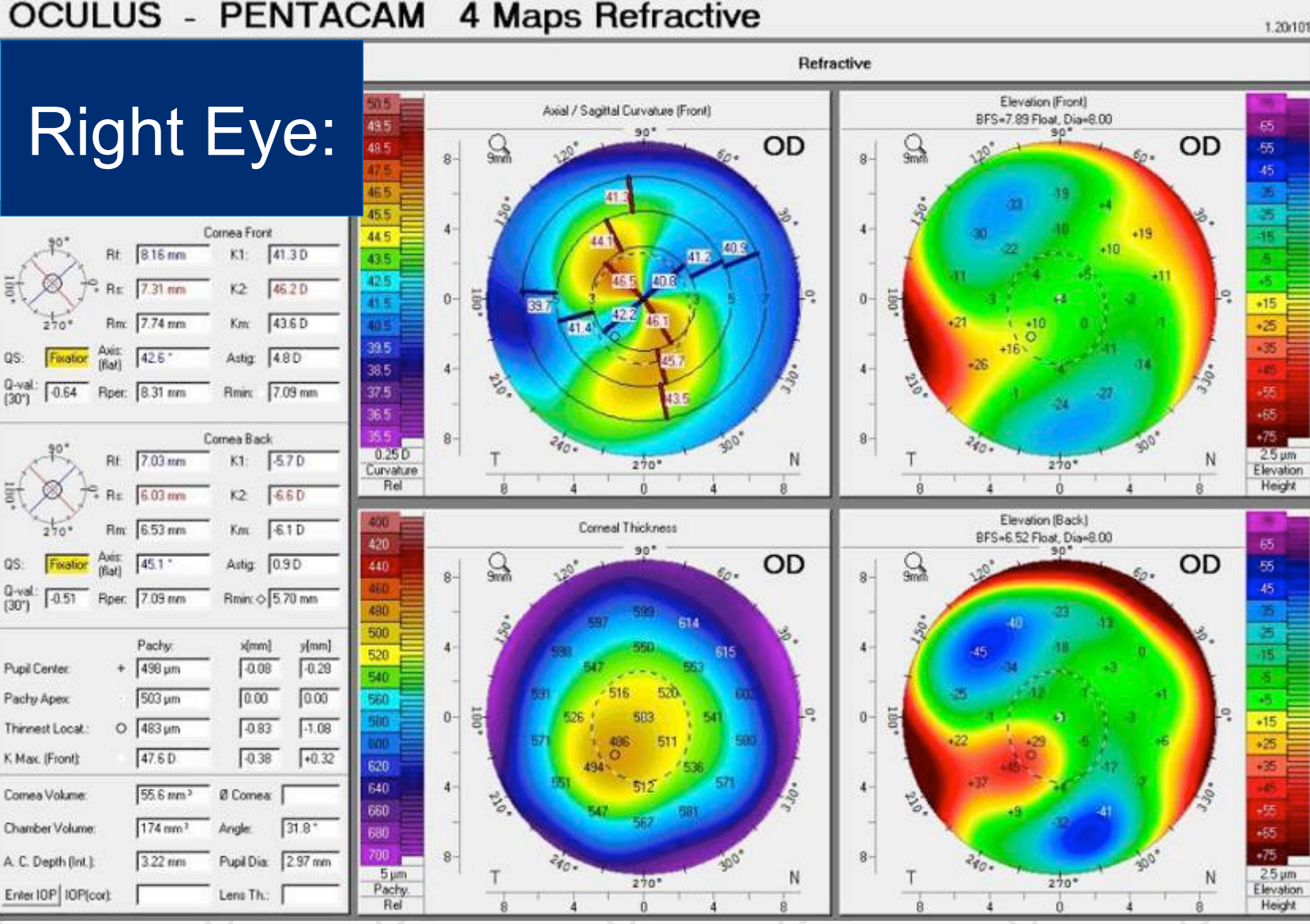


Figure 3) Pentacam analysis shows mild keratoconus OD from mildly steep Ks, thinning, and focal anterior/posterior steepening

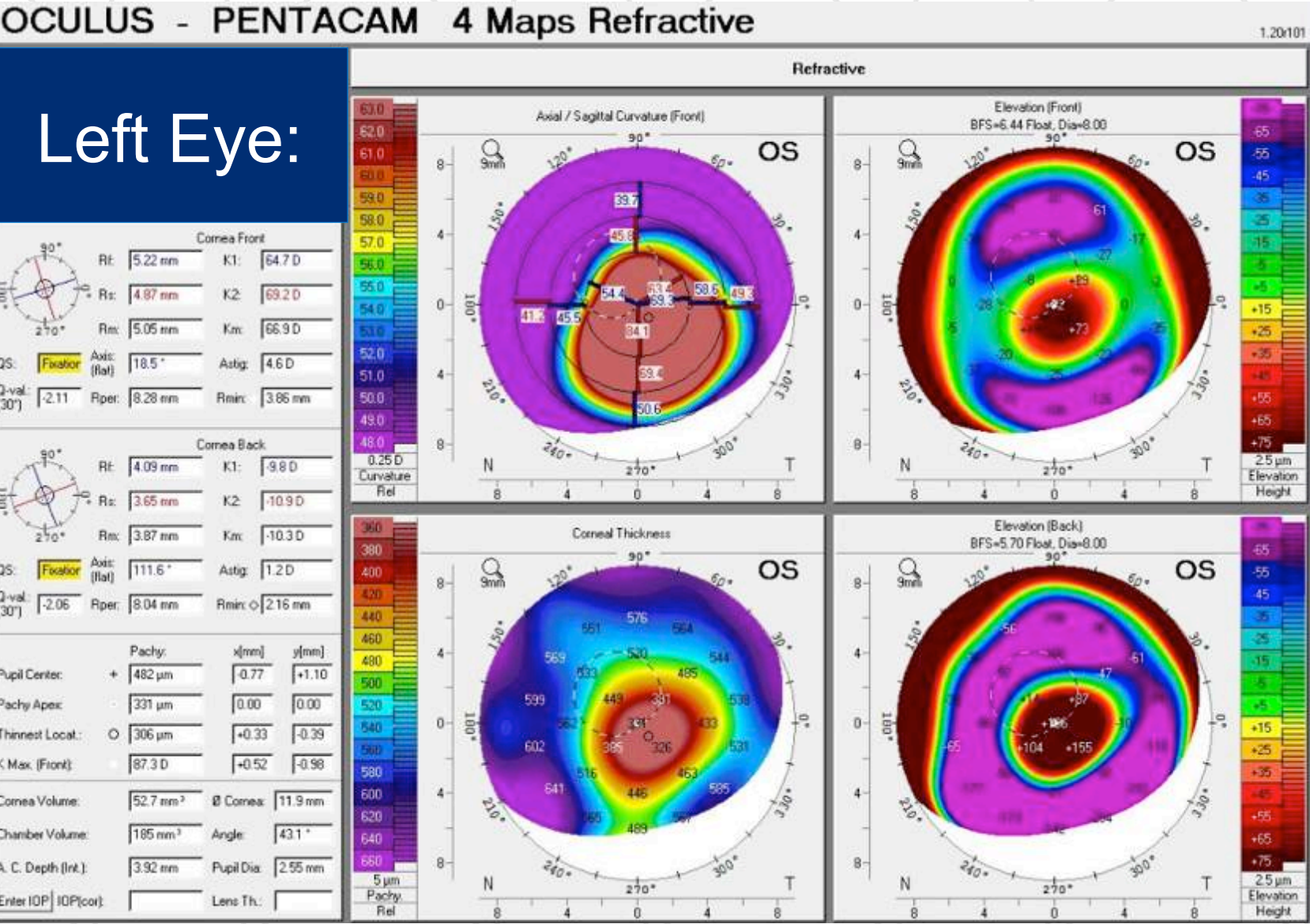


Figure 4) Pentacam analysis shows severe keratoconus OS from severely steep Ks, thinning, and focal anterior/posterior steepening

## Corneal GP Lens Fitting (OD)

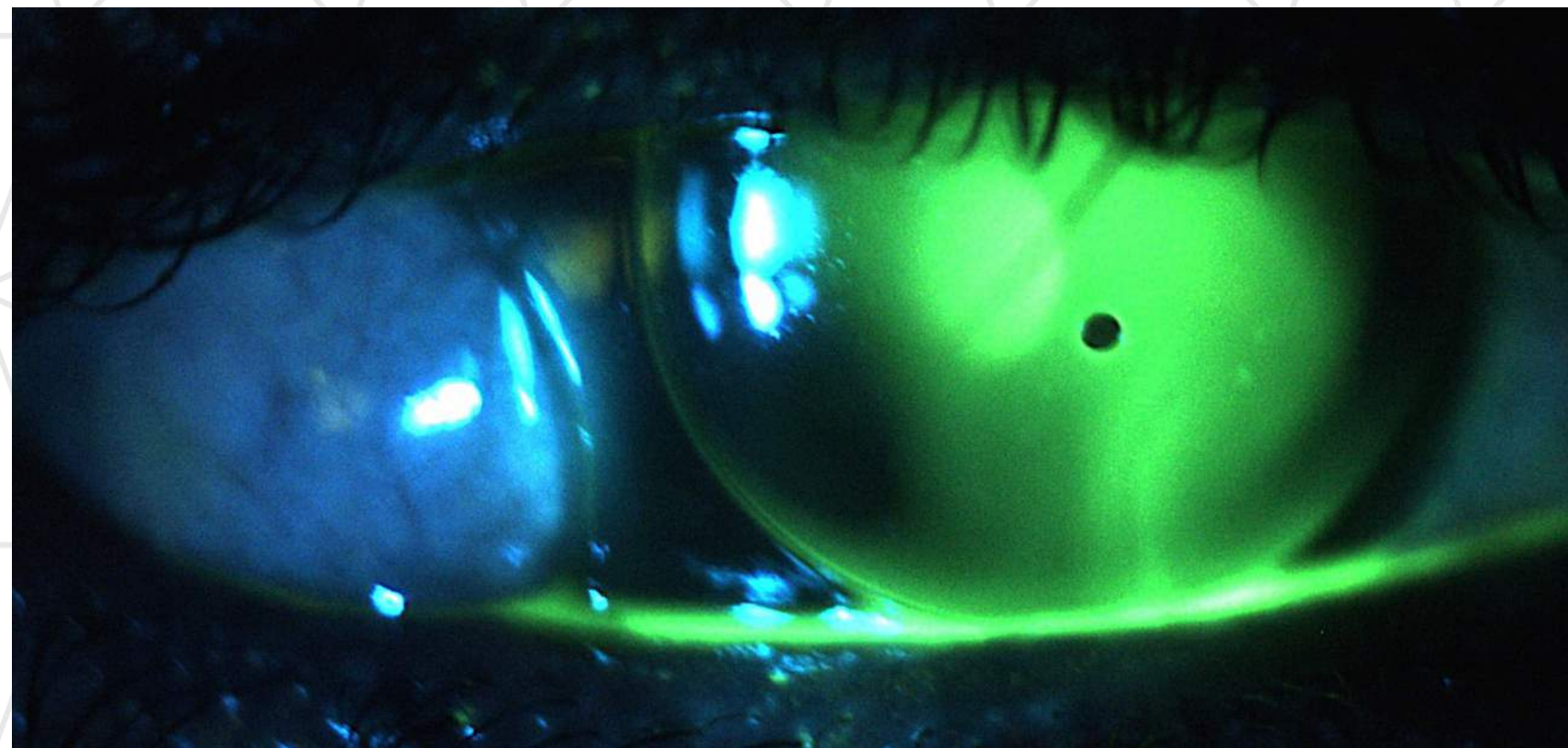


Figure 5a) Diagnostic lens shows moderate apical clearance with central small bubble, moderate temporal mid-peripheral bearing from nasal decentration

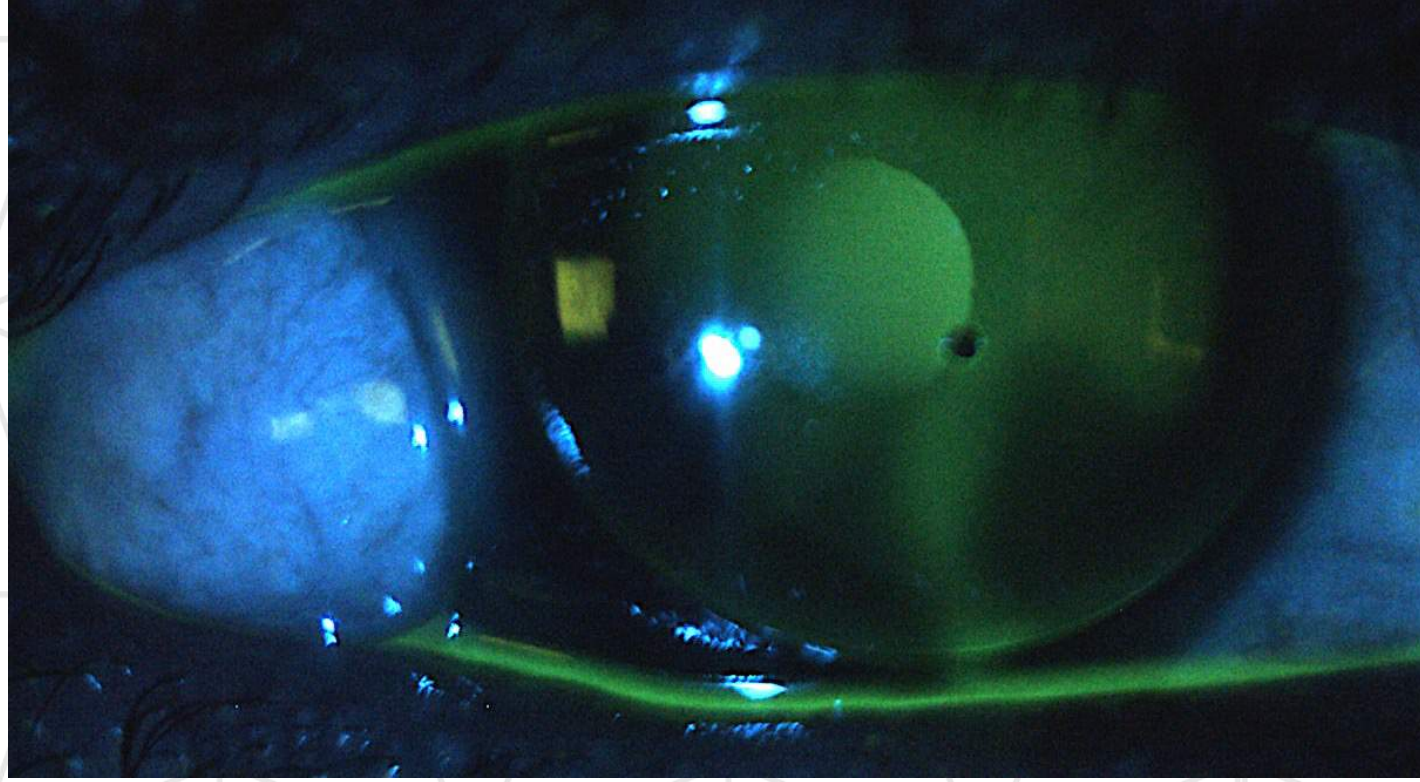


Figure 5b) Ordered GP lens was modified and shows less apical pooling with an insertion bubble, however lens still slightly decentered nasally due to limbal dermoid

## Scleral Lens Fitting (OS)

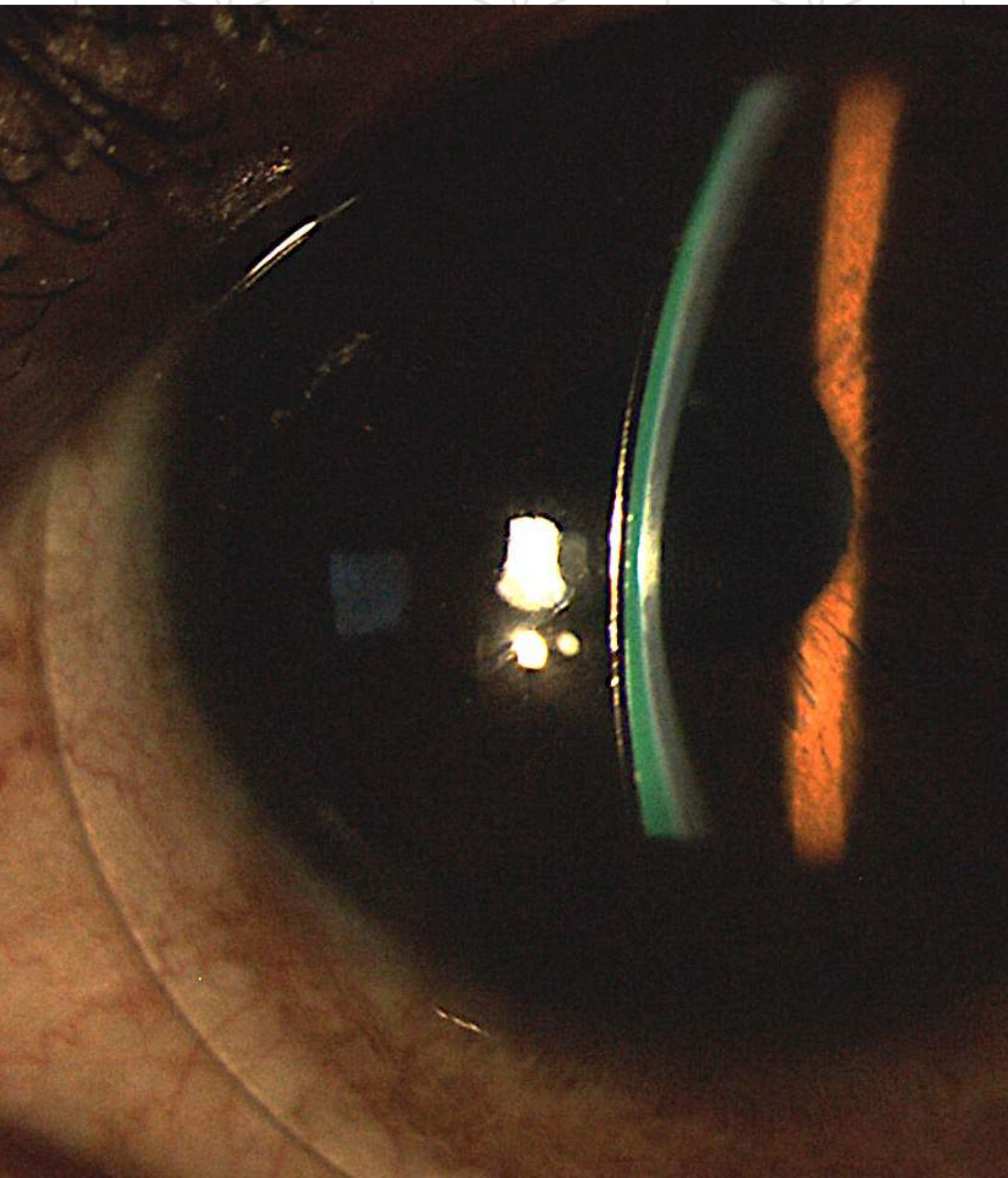


Figure 6a) Optic section slit lamp view of ordered scleral lens on eye

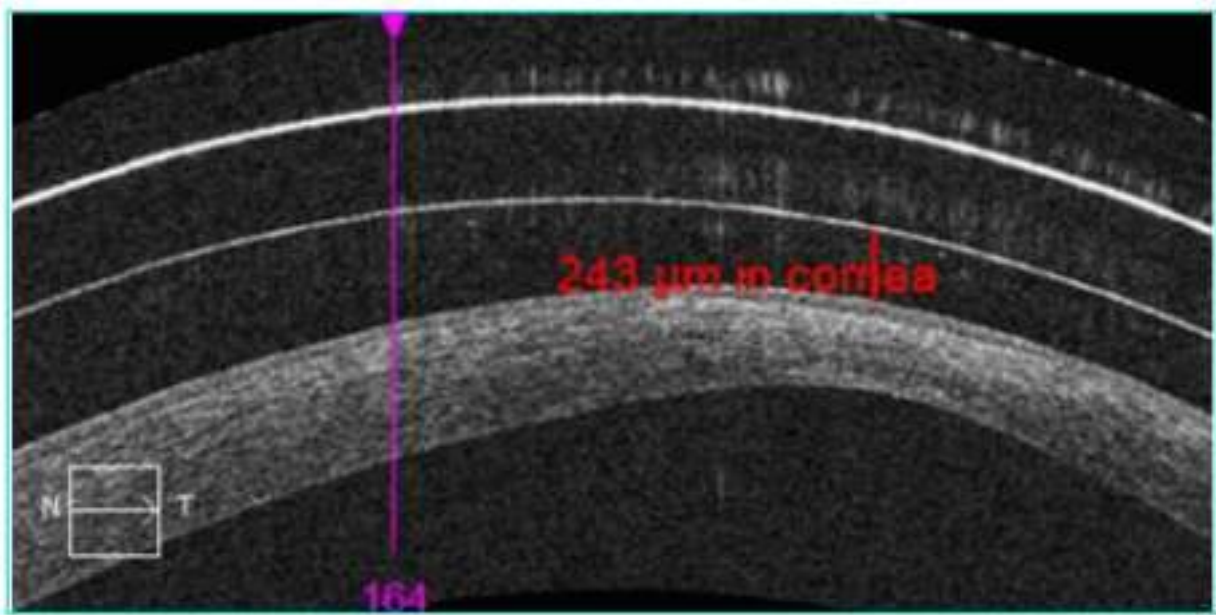


Figure 6b) OCT showing central corneal clearance of scleral

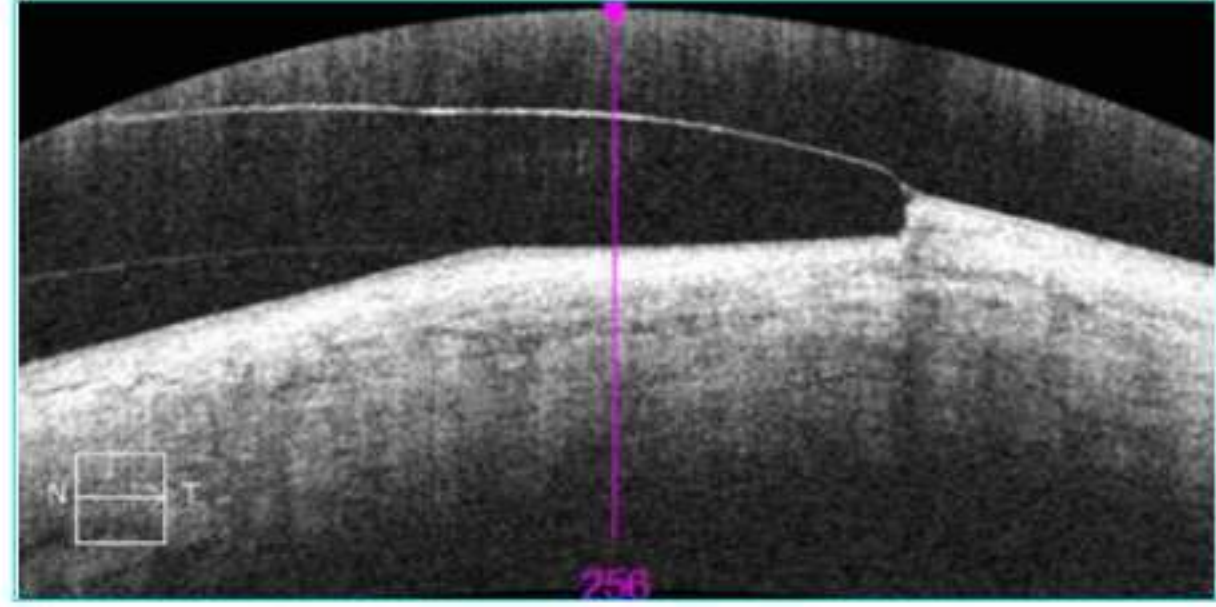


Figure 6c) OCT showing temporal scleral alignment

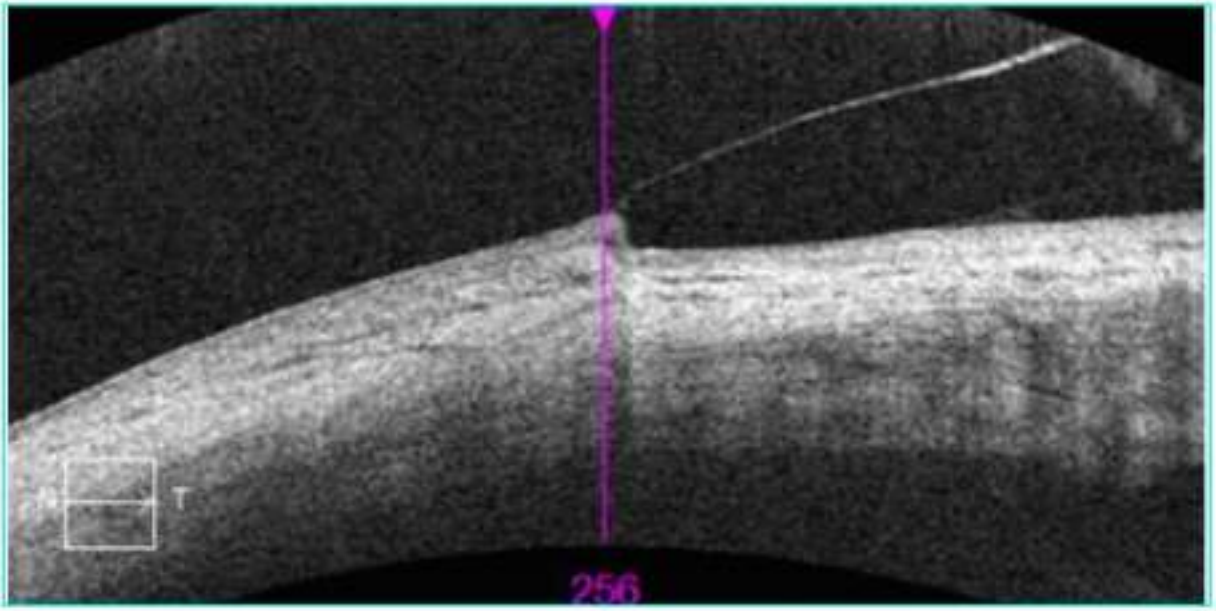


Figure 6d) OCT showing nasal scleral alignment

	Initial Lens Parameters	Initial Lens Evaluation	Lens Modifications
OD Corneal GP	OAD: 8.8mm, BC: 7.20 Power: -7.75DS OZ: 6.4 SCr: 8.6/0.6 PCr: 10.5/0.4  VA 20/20-2	Moderate apical clearance & small central bubbles (Figure 5a)  Mid-peripheral bearing temporally due to inferonasal decentration  Adequate edge clearance, good movement on blink	<u>Flattened BC to 7.30</u> — <b>Decreased apical clearance</b> , but small insertion bubble still present (Figure 5b)  Patient reported improved comfort and less lens awareness
	OAD: 15.6mm BC: 7.67 Power: -4.00DS OZ: 8.6 PC1 7.03/1.7 PC2 8.7/0.9 PC3 12.75/0.5 PC4 14.25/0.4  VA 20/40-2	<b>Central clearance 100 um</b> , full limbal clearance (excessive superior and inferiorly), good scleral alignment, no blanching, decentered inferiorly	<u>Made 2D reverse geometry and Steepened BC to 7.50</u> — <b>Increased vault 243um</b> (Figure 6b)  <b>No change to PCs due to good alignment</b> (Figures 6c & 6d)
OS Scleral			

## Discussion

Scleral lenses have increased in popularity over the last decade and have often become the primary lens option for patients with keratoconus due to their superior initial comfort and ability to fit a wide range of disease severity. This case, however, demonstrates a patient where a scleral was not ideal for the right eye.

For this patient, using a small diameter corneal GP in the right eye provided an adequate fit that avoided the dermoid and was a non-surgical option. Scleral lenses or hybrid lenses are larger in diameter and would not be able to avoid the dermoid. However, for the other eye with the more advanced keratoconus and no conjunctival or limbal obstacles, using a scleral lens achieved good vision and full vault over the steep cornea. In cases where vaulting corneas with more advanced disease cannot be achieved with a corneal GP, scleral lenses are a good option as they have greater sagittal depth.

Corneal GPs are not without their own challenges. Lens awareness and dislodging are among the most common, and this patient reported improvement in both these symptoms after two weeks. Additionally there may be application and removal difficulties. We advised the patient to use a plunger to remove the GP lens because using lid manipulation would have been difficult. Not only was the GP lens slightly decentered, but the lids did not provide sufficient tension against the lens edge due to the presence of the limbal dermoid.

This case illustrates the need for different types of specialty lenses to overcome irregular ocular obstacles and provide the patient with the best vision and comfort. Each lens has its own pros and cons; however it is possible for patients to have a different lens for each eye as long as they have the motivation.

## References

- Bennett, Bennett, Edward S., and Vinita Allee Henry. *Clinical Manual of Contact Lenses*. Lippincott Williams & Wilkins, 2014.
- Henkind, Paul, et al. "Bilateral Corneal Dermoids." *American Journal of Ophthalmology*, vol. 76, no. 6, 1973, pp. 972–977.
- Rathi, Varsham, et al. "Contact Lens in Keratoconus." *Indian Journal of Ophthalmology*, vol. 61, no. 8, 2013, p. 410.
- Walker, Maria K., et al. "Complications and Fitting Challenges Associated with Scleral Contact Lenses: A Review." *Contact Lens and Anterior Eye*, vol. 39, no. 2, 2016, pp. 88–96.