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Stick the Landing: The Importance of Scleral Lens Alignment

Dr. Karen Lee

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WELCOME!



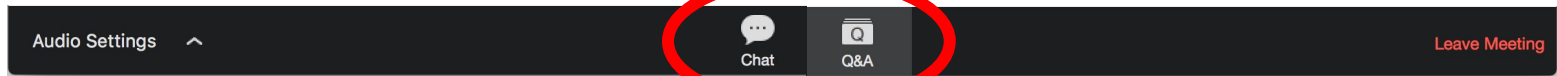
Host: Dr. Ariel Cerenzie



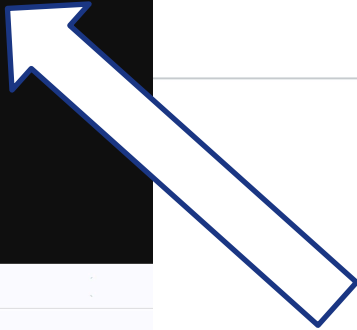
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Thank you to Bausch and Lomb
for exhibiting at this event.

- For each hour of CE units, attendees must be online for a minimum of 50 minutes
- For a COPE certificate, please fill out the survey link in the chat. Also, the survey link will appear when the webinar ends.
- CE certificates will be delivered by email and sent to ARBO with OE tracker numbers
- We will also display a QR code at the end of the event if you have the OE tracker app on your phone.
- **CE certificates will be emailed within 4 weeks**
- Ask questions using the zoom on-screen floating panel



REC



Opportunity to Partner

Optometrists are at the frontline to recommend treatment for cataract and glaucoma patients.



Speaker Bio –

Dr. Karen L. Lee is a Clinical Assistant Professor at the University of Houston College of Optometry. Prior to joining the University of Houston, Dr. Lee served as Director of the specialty contact lens clinic at the University of California, San Francisco Ophthalmology department. She is a regular contributor to Contact Lens Spectrum and is currently researching the sterility of scleral lens filling solutions. She is a reviewer for Contact Lens & Anterior Eye and enjoys lecturing both domestically and overseas. Dr. Lee is a proud recipient of the George Mertz Contact Lens Residency Award, Vistakon Clinical Excellence in Contact Lens Patient Care Award, and the Jack Bennett Humanitarian Award. Dr. Lee is a fellow of the American Academy of Optometry, an advisory board member of the Gas Permeable Lens Institute, a member of the Cornea & Contact Lens Section of the AAO, a member of the Ocular Surface Society and a Past President of the Scleral Lens Education Society.





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Stick The Landing: The Importance of Scleral Lens Alignment

Karen Lee, OD, FAAO, FSLs



Financial Disclosures

Alcon

Bausch & Lomb

Essilor

Scleral Lens Education Society

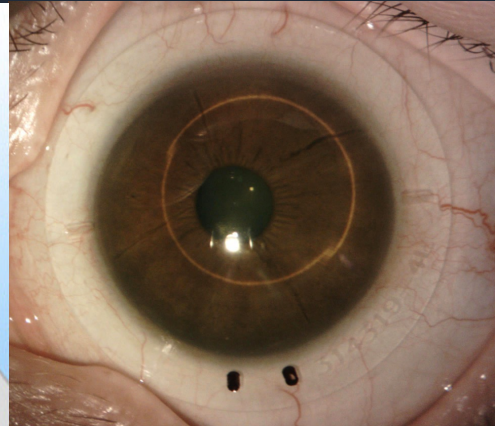
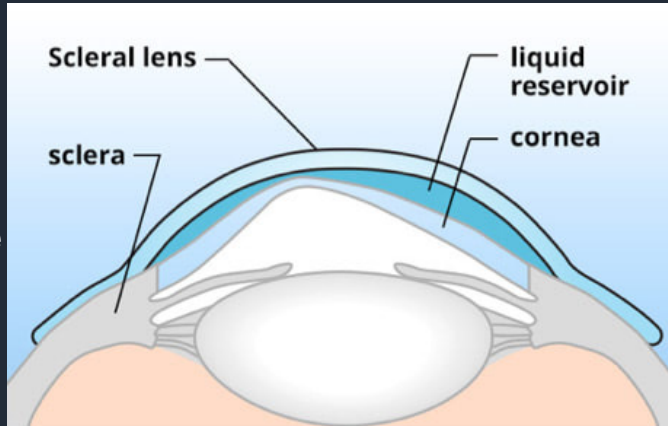
STAPLE Program

Woo University

Scleral Lenses: A Brief Introduction

Lathed with **high Dk gas permeable** plastics to provide crisp optics and maximum breathability.

A **preservative-free saline reservoir** bathes the **cornea** providing protection and comfort.



Designed to **vault the cornea** and **land on the sclera**.

Scleral alignment can be difficult! Especially if the scleral shape is rotationally asymmetric.

Fitting scleral lenses is incredibly rewarding and the **Scleral Lens Education Society** is a great **FREE** resource.

Learning Objectives

Improve our understanding of various scleral lens **landing zone presentations** and **associated complications**.

Increase awareness of available **landing zone customizations**.

Practical implementation of **scleral mapping technologies** in practice.

Utilization of landing zone customizations in the quest for scleral alignment.



Lecture Agenda



01

Landing Zone
Presentations

02

Potential
Complications

03

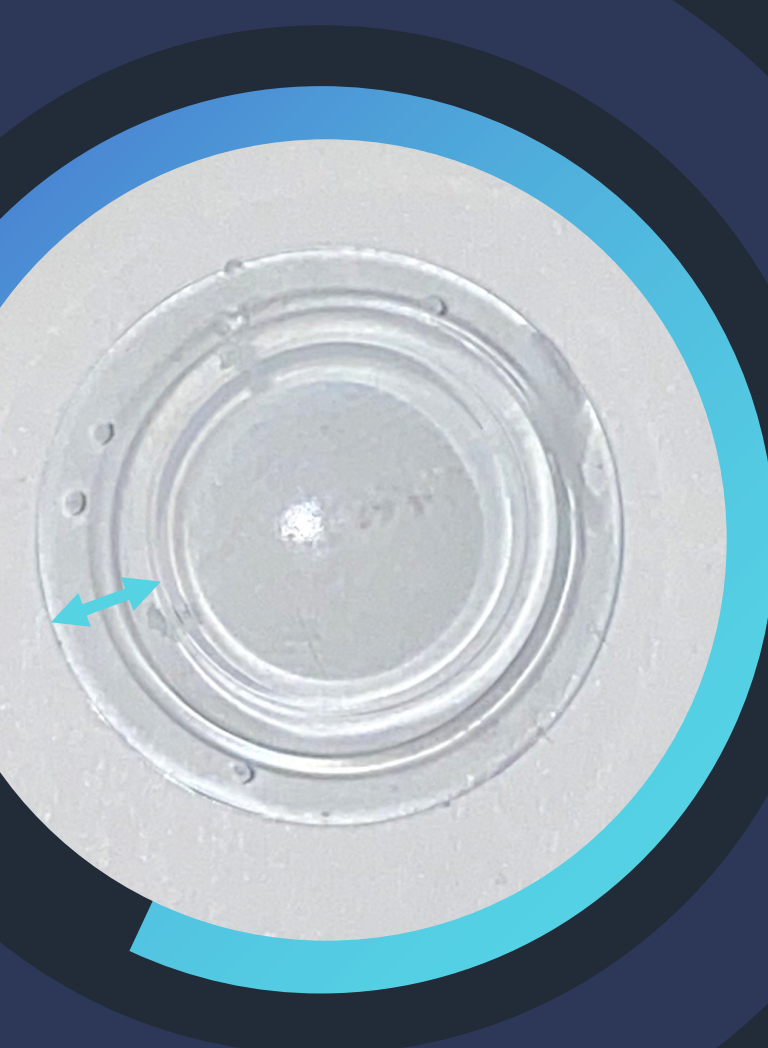
Landing Zone
Customizations

04

Mapping
Technologies

05

Clinical Cases



SL Landing Zone



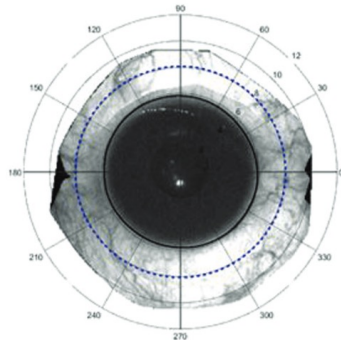
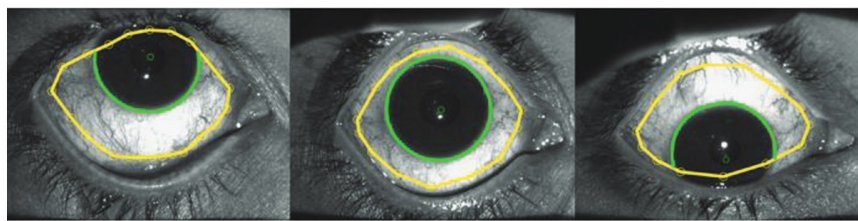
Portion of the scleral lens that aligns to the ocular surface and the scleral conjunctiva.

Can be designed to be rotationally asymmetric or symmetric .

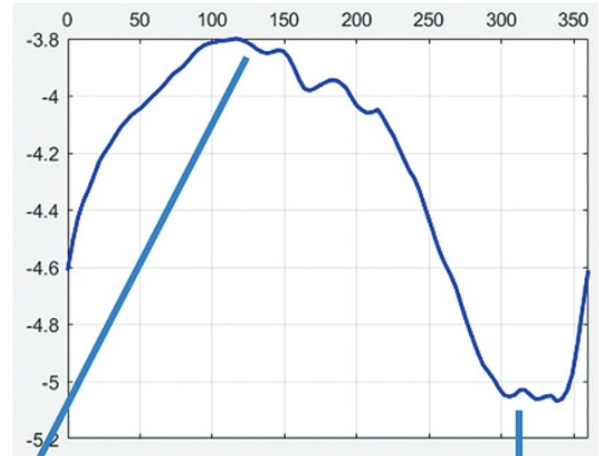
The image features a dark blue background with a large, light blue circle centered on the left side. Inside this circle, there are several concentric circles of varying shades of blue. The innermost circle is filled with a dense, diagonal hatching pattern. Overlaid on these circles is a spiral shape that starts from the center and moves outwards, composed of several curved segments. The text "Scleral Shape" is centered within the innermost hatched circle.

Scleral Shape

Data Acquisition Corneo-scleral Topography



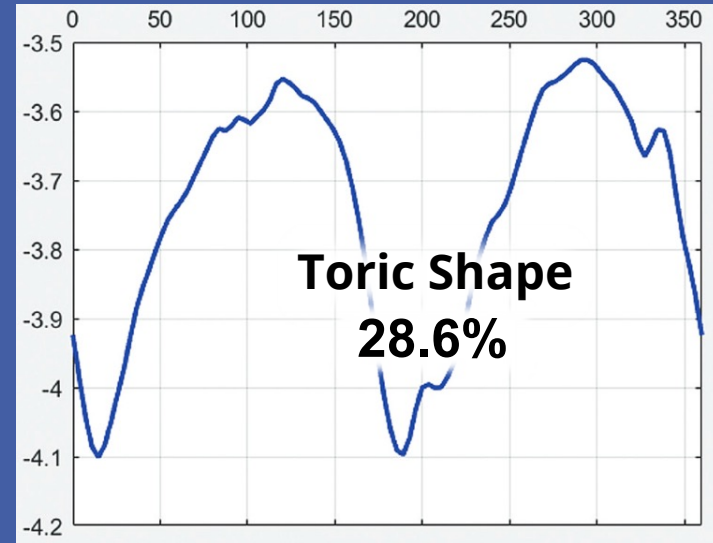
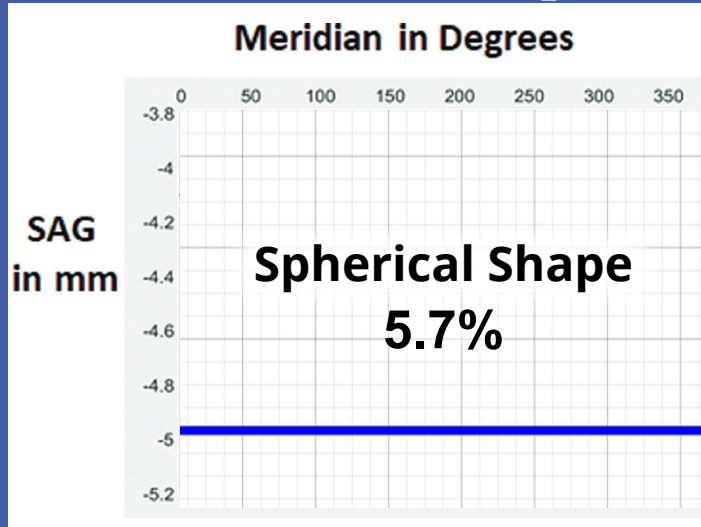
A



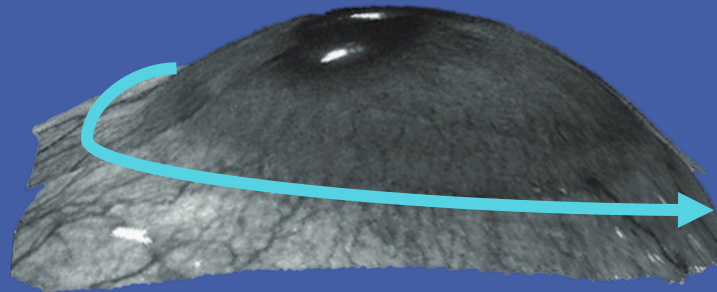
B



Scleral Shape

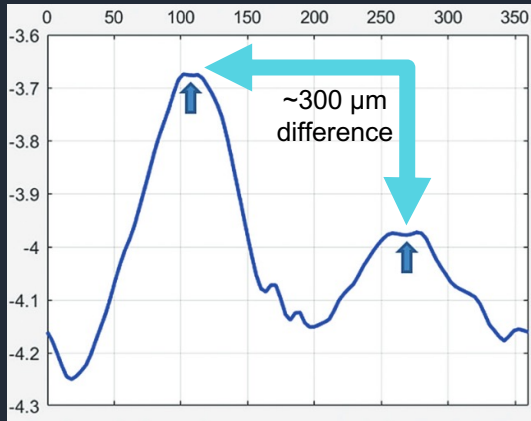
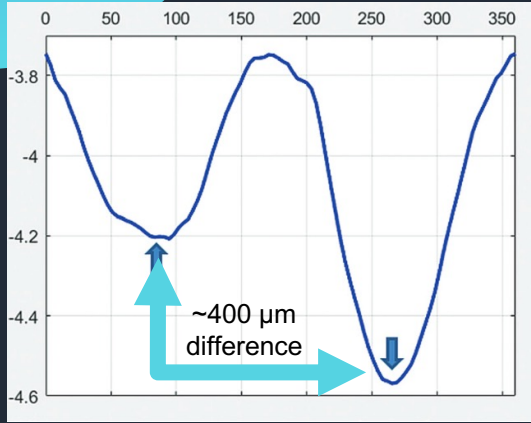


Low amplitude changes in sagittal height over the entire measured 360°



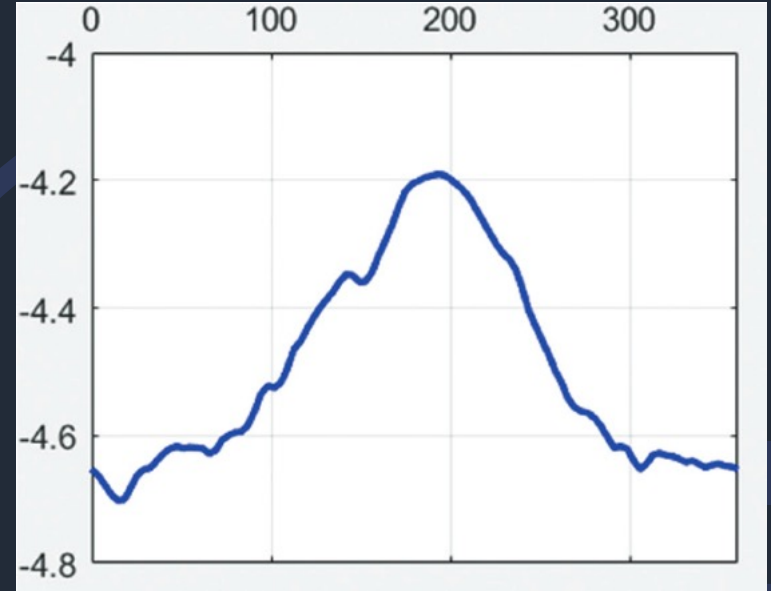
Circumferential scleral shape approximating a Sin 2 curve with a periodicity of 180°

Asymmetric High or Low Points



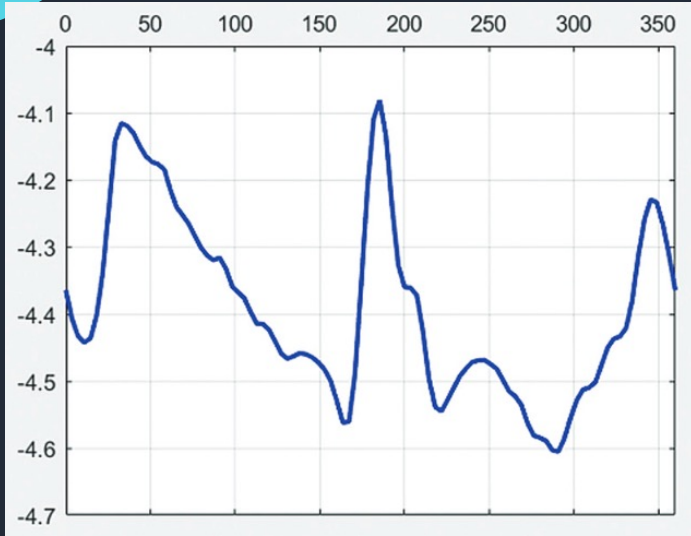
Circumferential scleral shape where the **depressions or elevations** were of **substantially different depths or heights**.

40.7%



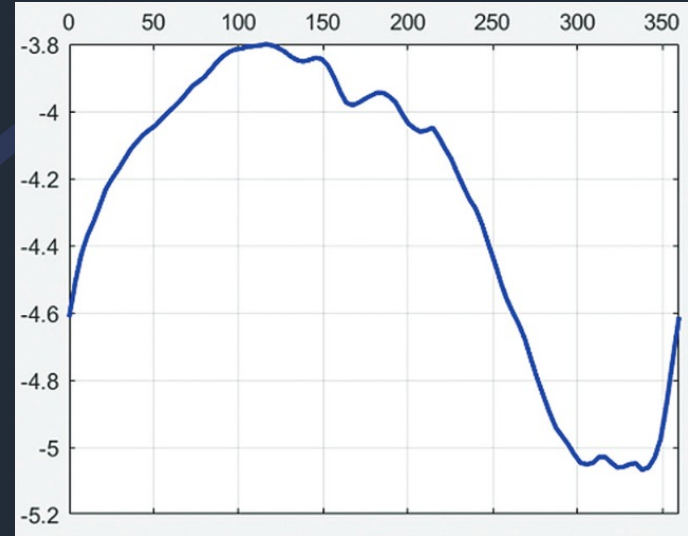
Circumferential scleral shape with a **single large elevation or depression**.

Periodicity different from 180°



25%

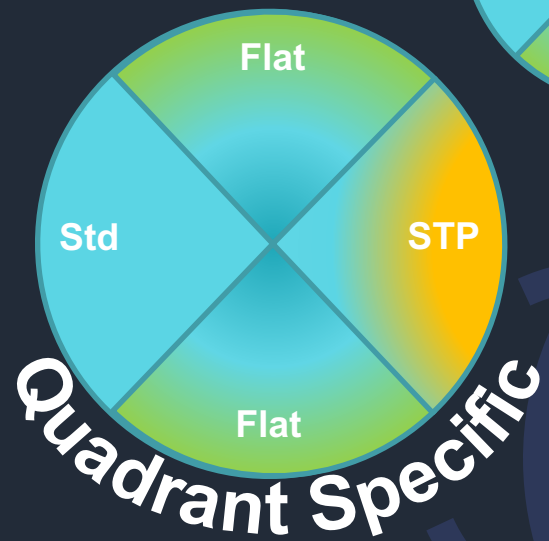
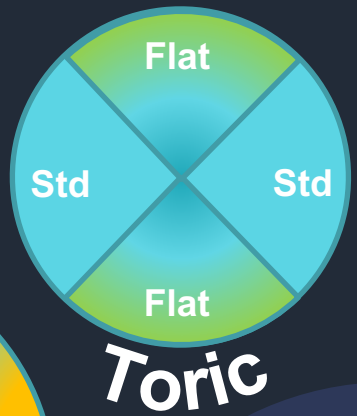
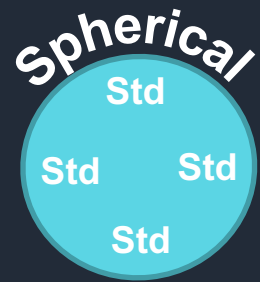
Circumferential scleral shape plot demonstrating **multiple elevations and depressions over 360°**



Single elevation and single depression over 360° thus the periodicity is twice that seen in a regular toric

“Roughly **1/3** of eyes could be fit with a **spherical or toric scleral lens**. But **2/3** showed an **irregular pattern**.”

Clinical Impact



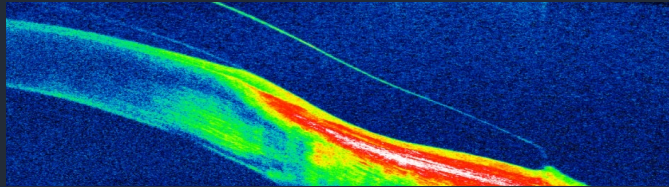
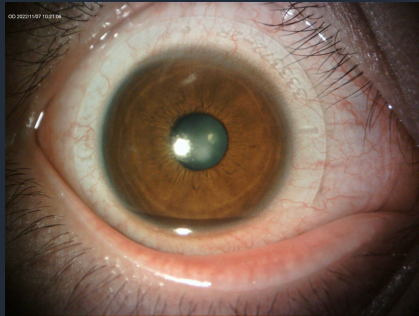
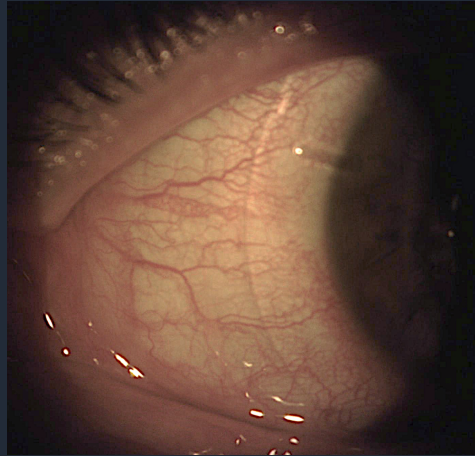
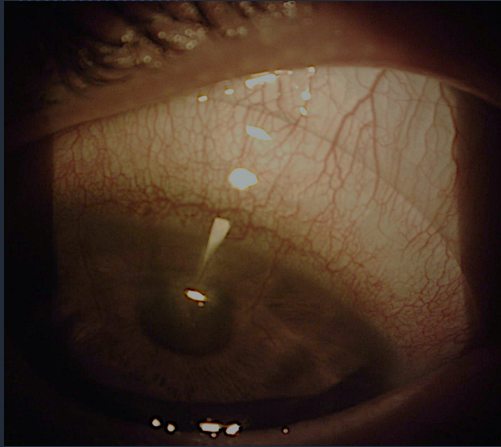


Diagnostic Scleral Lens Fitting

Consider **toric** starting lens!

Dynamic vs **Static fit**

Edge Alignment



Alignment

- Large and small vessels flow evenly under lens edge
- Minimal shadowing

Primary vs Extreme Gaze

- Blanching in extreme gaze is common and might be unavoidable

Anterior Segment OCT

- Conj/sclera bisects the lens edge



Compression



Compression & Blanching

-Lens presses on vessels and impedes blood flow causing areas of blanching

Blood Vessels Involvement

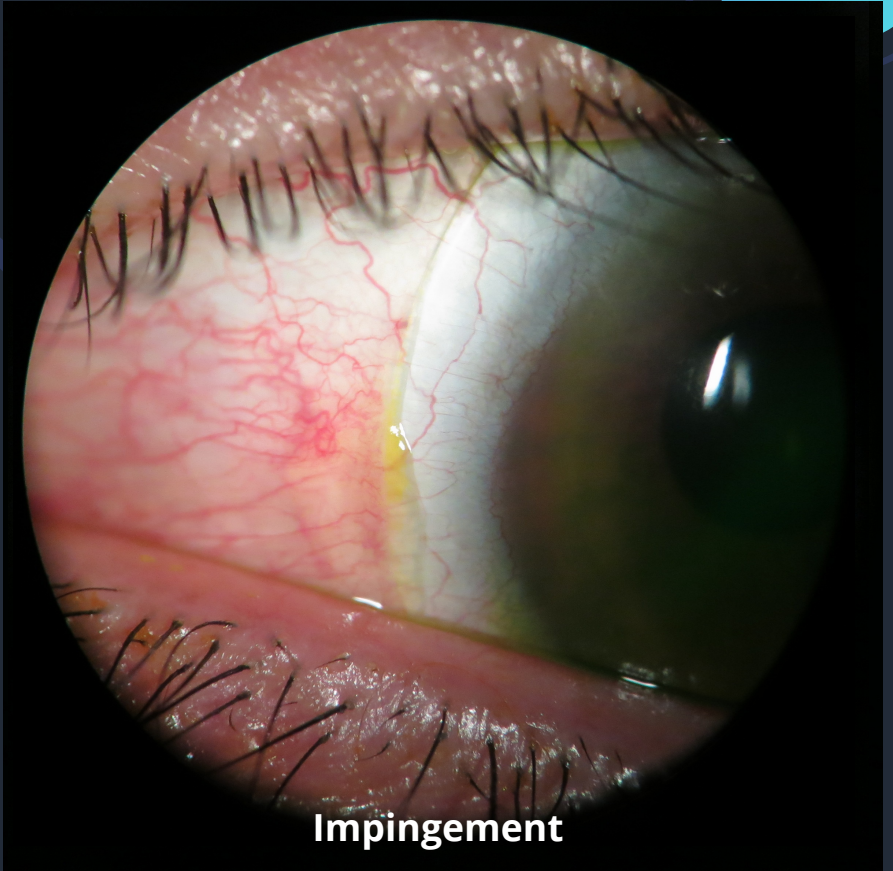
-Large caliber vessels affected with **greater** amounts of compression

Anterior Segment OCT

-Can highlight exact cause/curves causing tightness

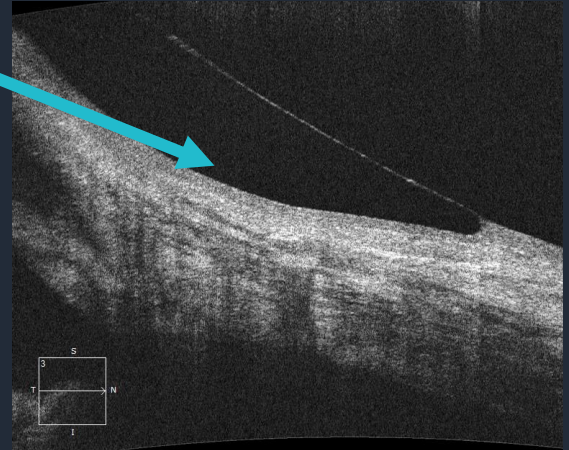
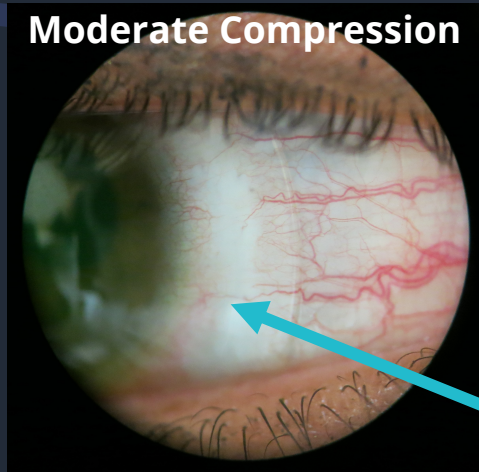
Signs and Symptoms

- Rebound injection
- Conjunctival staining/impression
- Ocular pain/tenderness

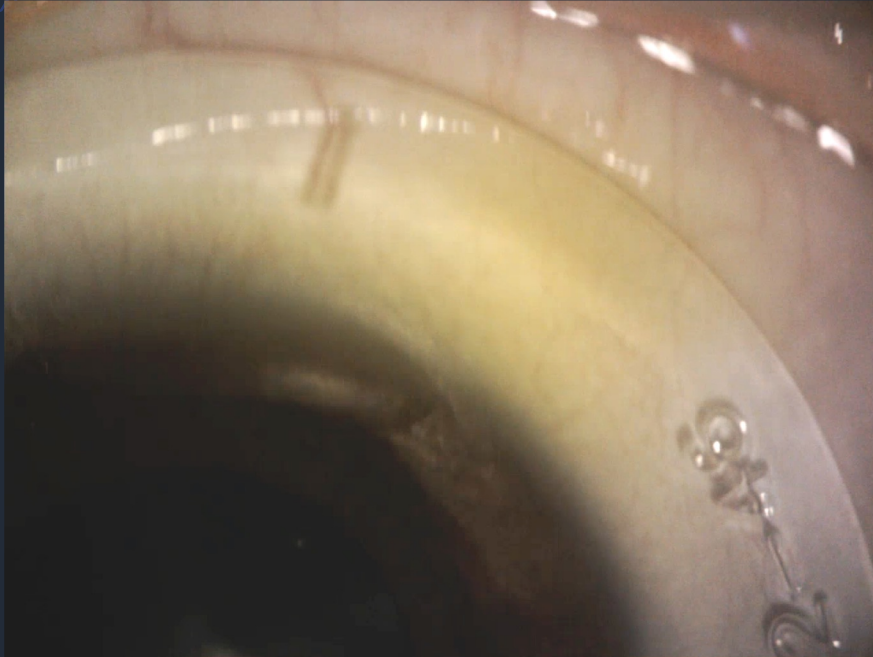


Impingement

Compression



Edge Lift



Faint area of shadowing at 12 o'clock with occasional breaks in tear meniscus

Toric Marking Correspondence

Edge Lift

-Lens edge is flatter than sclera

Shadowing Only

-Lens edge is mildly too flat

Breaks in Tear Meniscus

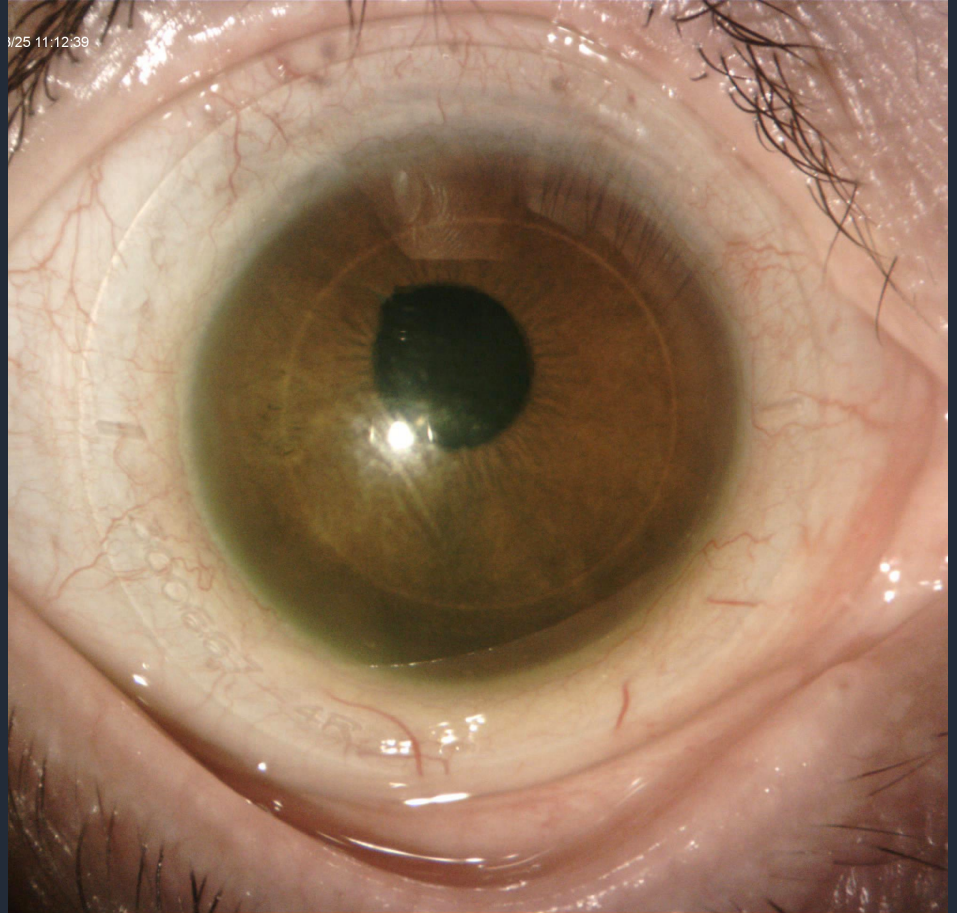
-Lens edge is moderately too flat

Signs & Symptoms

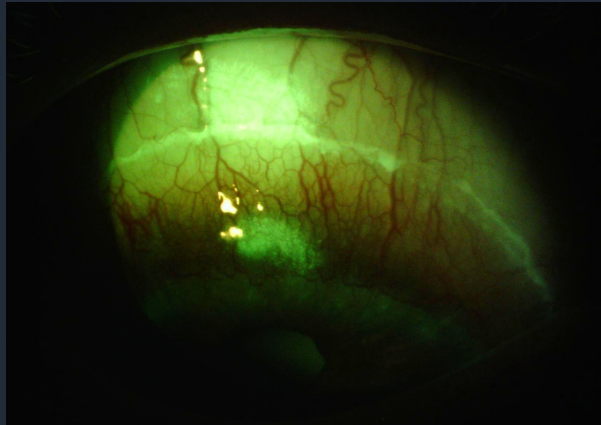
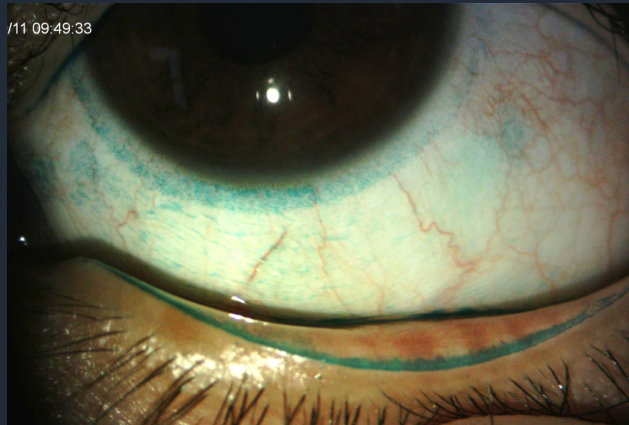
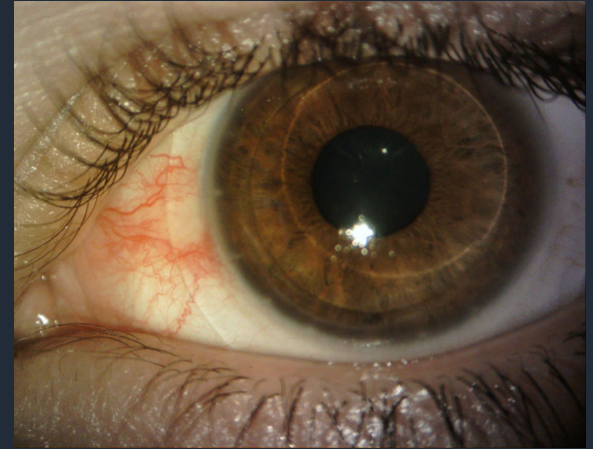
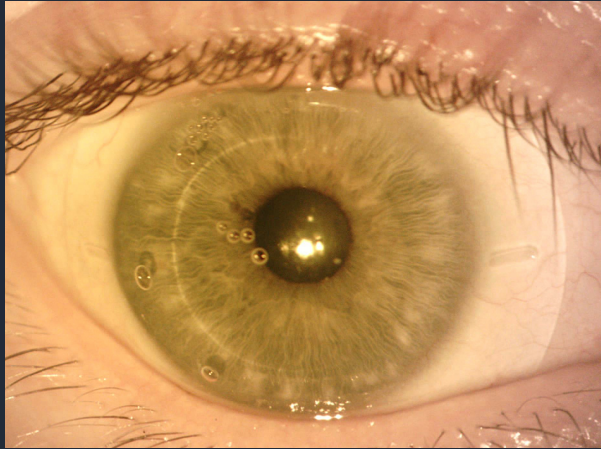
-Eyelid discomfort
-Reservoir debris/bubbles



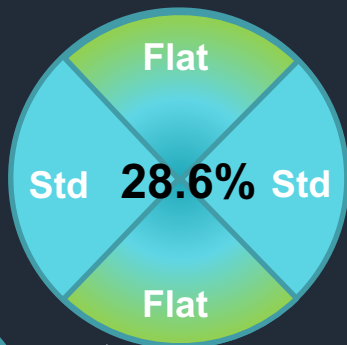
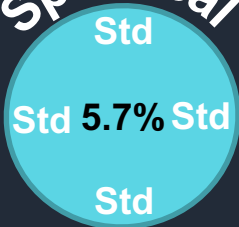
**Minor
Imperfections
Acceptable**



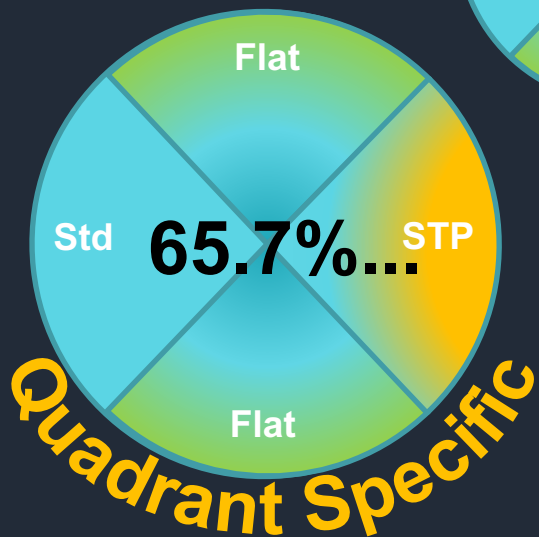
Modifications Needed



Spherical



Toric



Quadrant Specific

Benefits of Quadrant Specific SLs

Clinical Outcomes of Scleral Lens Fitting with a Data-driven, Quadrant-specific Design: Multicenter Review

Melissa Barnett, OD, FAAO,^{1*} Karen G. Carrasquillo, OD, PhD, FAAO,² and Muriel M. Schornack, OD, FAAO³

Improved vision
Decreased MDF
Shorter fitting process when utilizing a quadrant-specific fit set

Tear Exchange, Intraocular Pressure, and Wear Characteristics of Quadrant-specific Versus Spherical Haptic Scleral Lenses

Cherie B. Nau, OD, Muriel M. Schornack, OD, Jay W. McLaren, PhD, Alexander P. Hochwald, MS, and Karen G. Carrasquillo, OD, PhD

Improved comfort

Decreased tear exchange

eye.¹⁻³ These studies showed that the sclera is neither spherical nor has predictable rotational symmetry. The earliest SL designs had spherical landing zones, but increasing appreciation of the non-spherical shape of the sclera led to the introduction of SLs with toric, quadrant-specific, or custom (impression-based or image-based) landing zones. More advanced SL designs, which have non-spherical landing zones, may provide improved fit and visual acuity and may require less frequent midday removal than other



**Advanced
Landing Zone
Customizations**

Conjunctival Obstacles

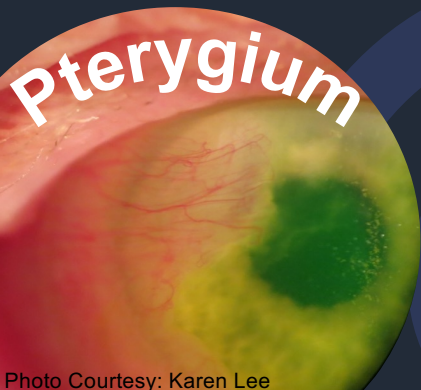
Commonly seen:

Pinguecula

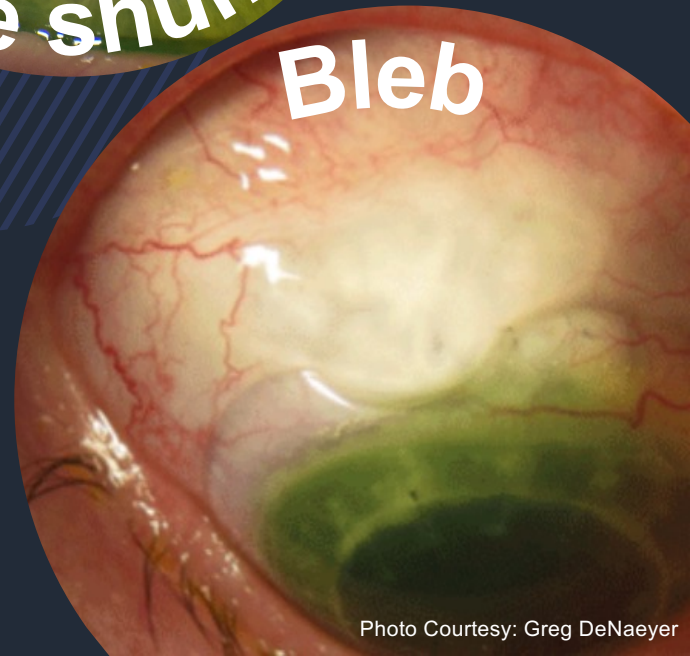
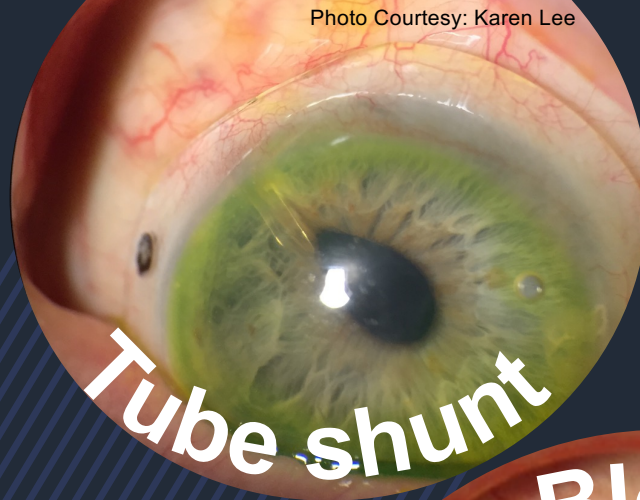
Pterygium

Symblepharon

Glaucoma blebs or tube shunts



Goal: Minimize SL interaction and ocular irritation.



Avoidance Tactics

Localized vaulting:

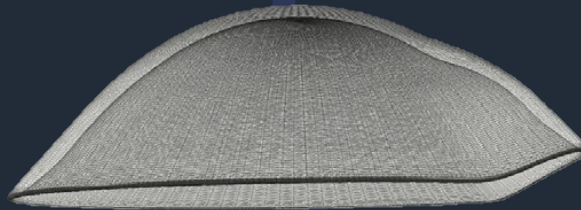
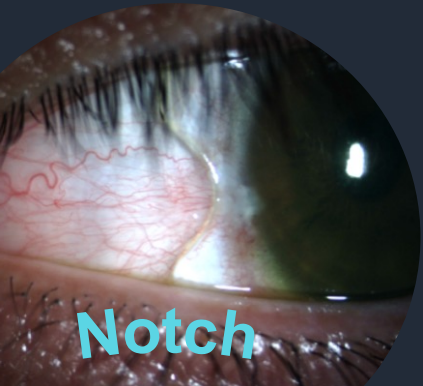
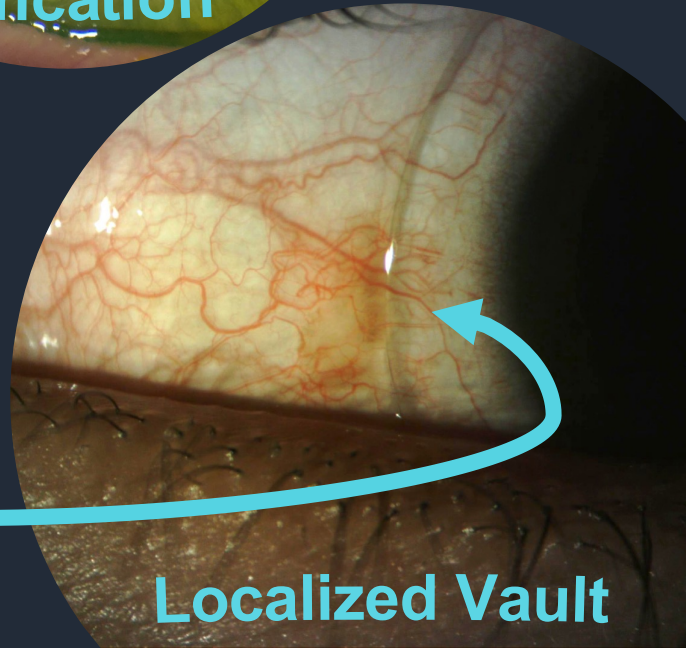
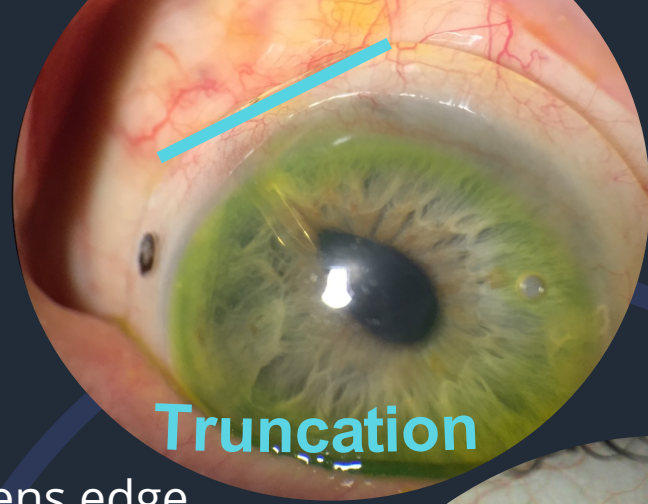
- Variation of vault in one area

Notch:

- Sculpting and removing portion of lens edge

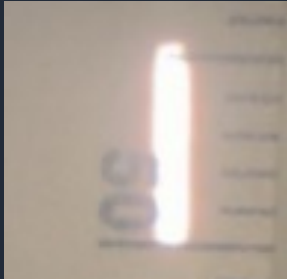
Truncation

- Removal of portion of lens edge



Measuring Elevations

1. Lens on
2. Manual lens centration
3. Gauge w/slit lamp beam

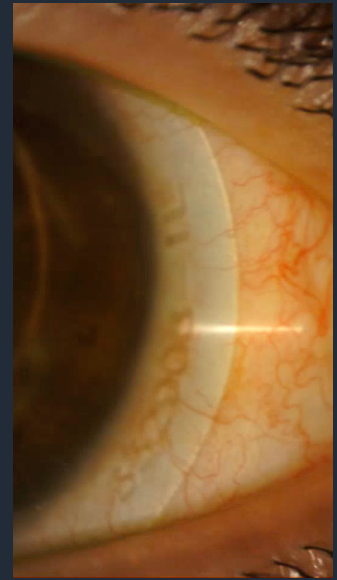


~1:1 on 10x mag!

Length



Width



Necessary Details

Location ($^{\circ}$)

Length (mm)

Width (mm)

Distance from lens edge (mm)

Ex: 3.5x1mm @ 355 $^{\circ}$
0 mm from lens edge



eaglet-eye



Scleral Topographers

- Each topographer is compatible with specific scleral lens designs
- All scleral shape data is helpful, especially before starting the fitting process



Freeform Scleral Lens

- **Corneo-scleral topography data driven**

- Highly dependent on image quality
 - Initial in-office over-refraction required
 - Temporary D/C of habitual SL wear

- **Highly customized lenses**

- Easier fitting process
 - Decrease chair time
 - Modifications may still be required

- **Tricky lens removal?**



Tricky Lens Removal?

Parallel planes theory...

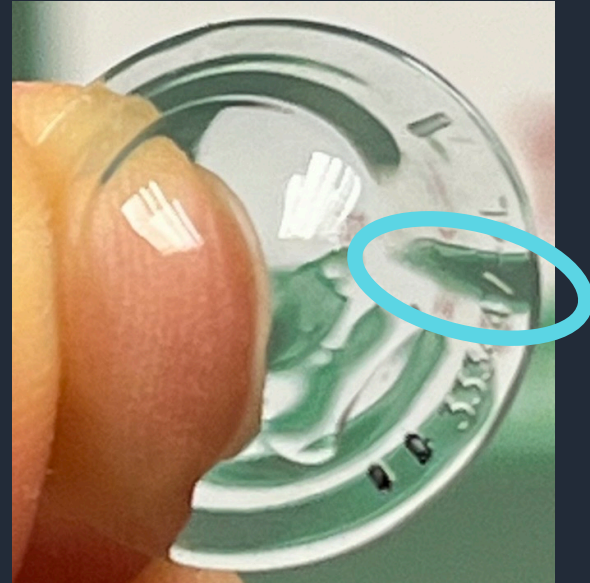
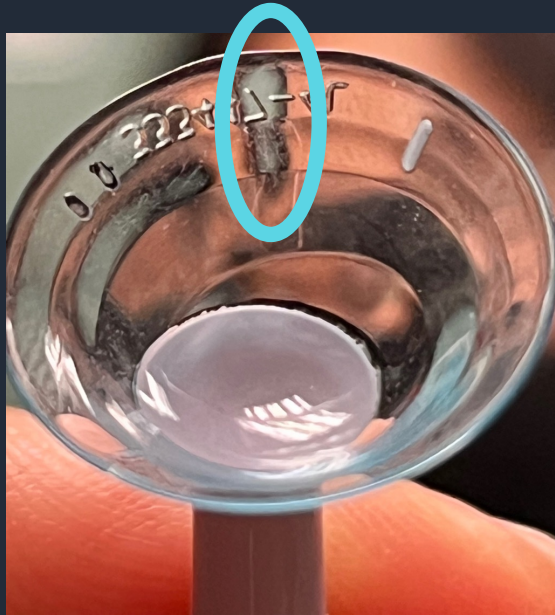
Poor plunger adherence...

Channels

Manual creation of tear
reservoir bubbles



Channel



Clinical Case

— —
70 yo Hispanic female



Clinical Case

— —
40 yo Hispanic female



Initial Exam Findings

History

Blurry & fluctuating vision with contact lenses at all distances OU.

Keratometry

OD: 48.1@066 / 52.9@156
OS: 53.1@123 / 57.7@033

Autorefraction

OD: 0.00-2.00X106
OS: +0.25-1.25x045

Manifest Refraction

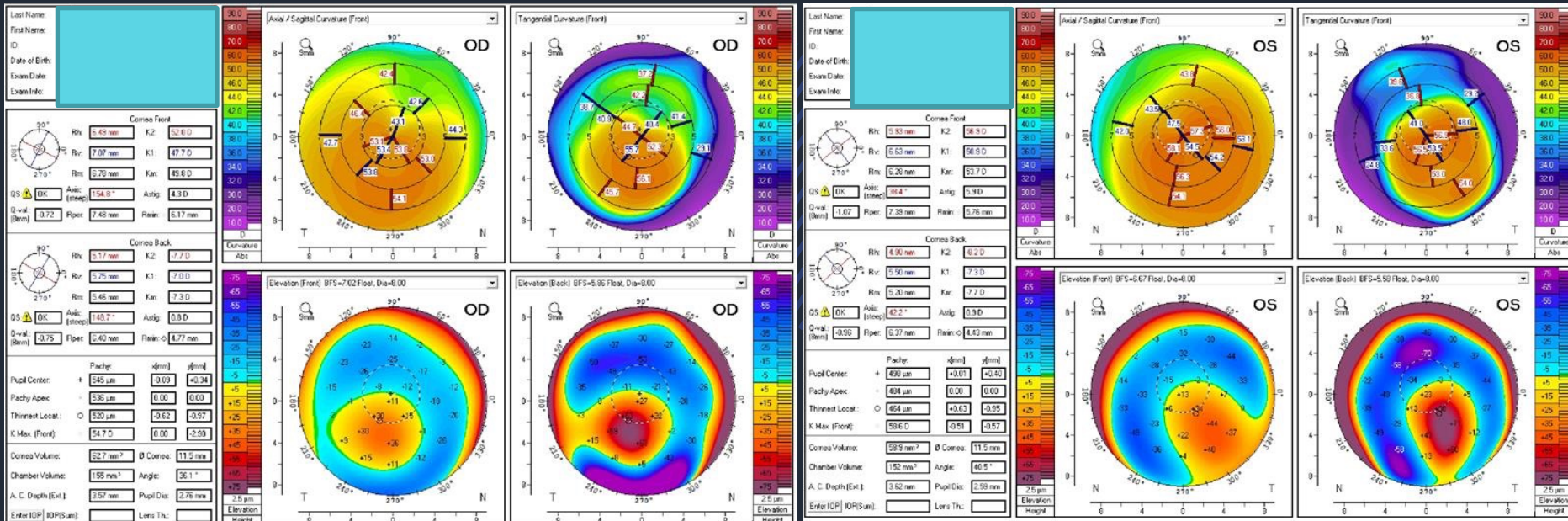
OD: +1.00-6.00x006, 20/25
OS: -6.00-6.00x127, 20/25

Presenting CLs & Entering VAs

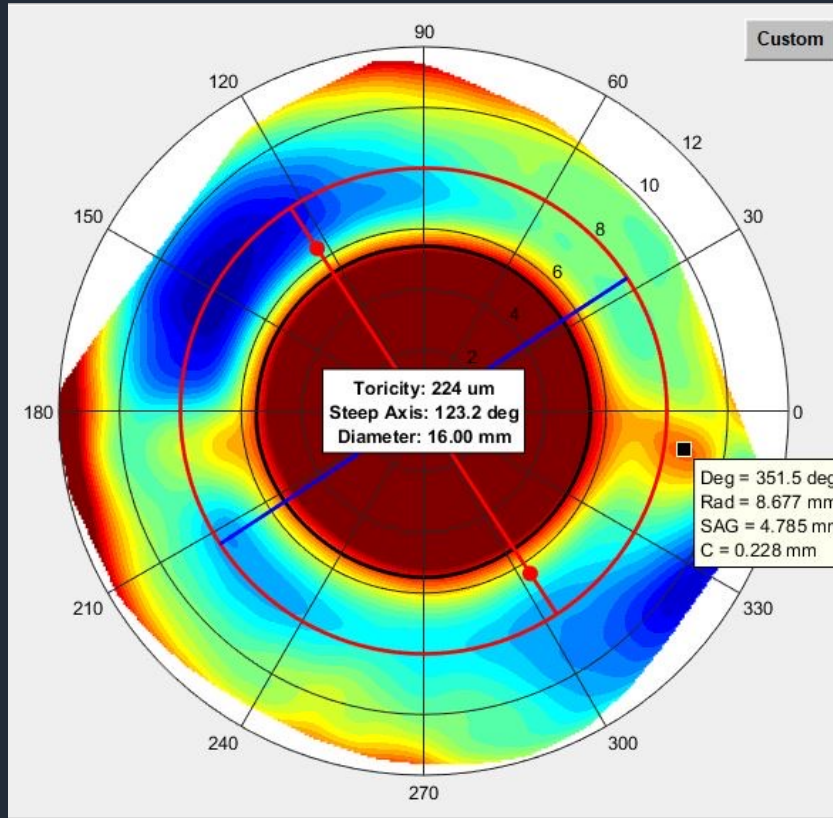
OD: 54% Hioxifilcon D / 14.4/8.0/-0.25-4.50X062, 20/30-
OS: 54% Hioxifilcon D / 14.4/8.0/-2.00-6.00x126, 20/30-

One of many many attempts!

Corneal Tomography Findings OU



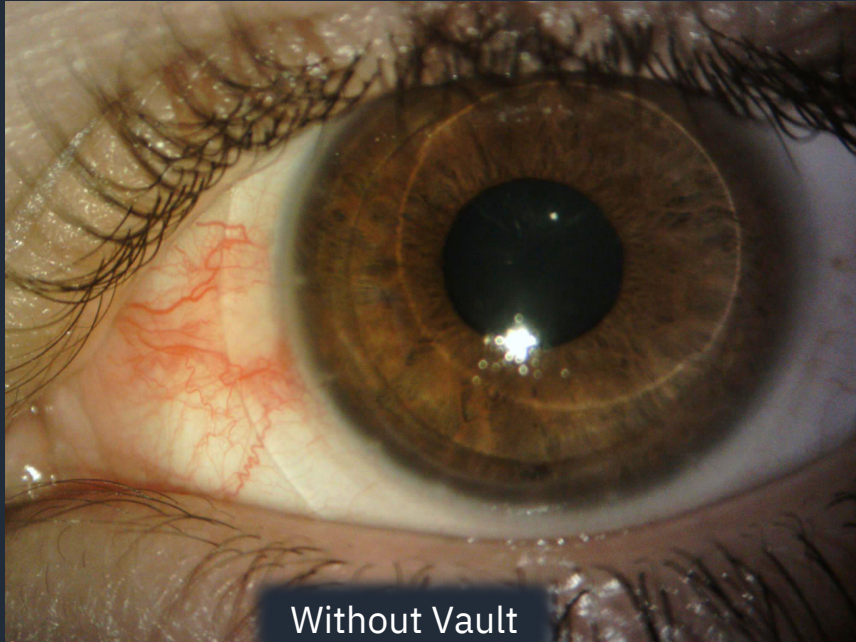
Scleral Elevation Map OS



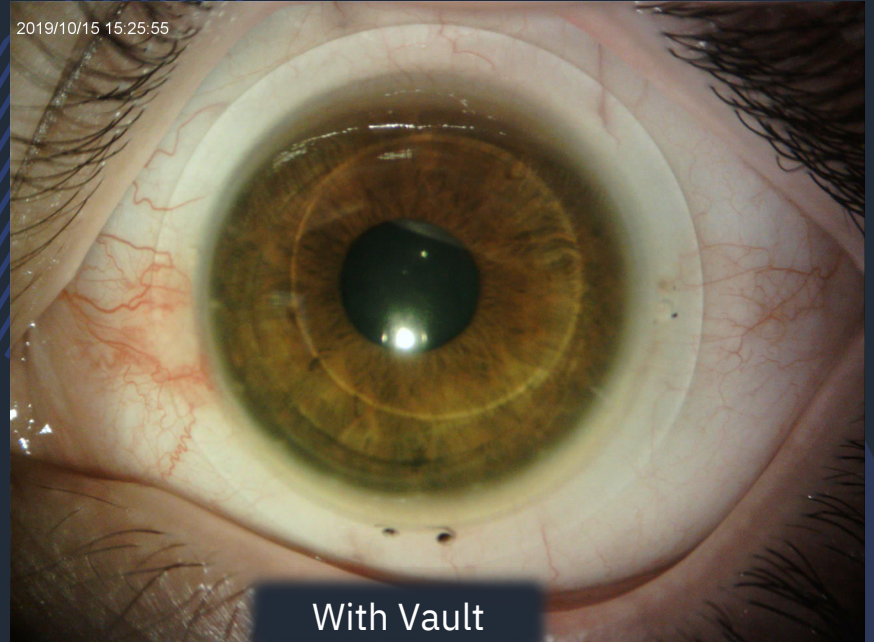
Initial Observations

“Toric” scleral shape
Two conjunctival elevations

Single Elevation: Straight foward



Without Vault



With Vault

Initial Lens Design Considerations

What are non-negotiables?

Back surface toric landing zone

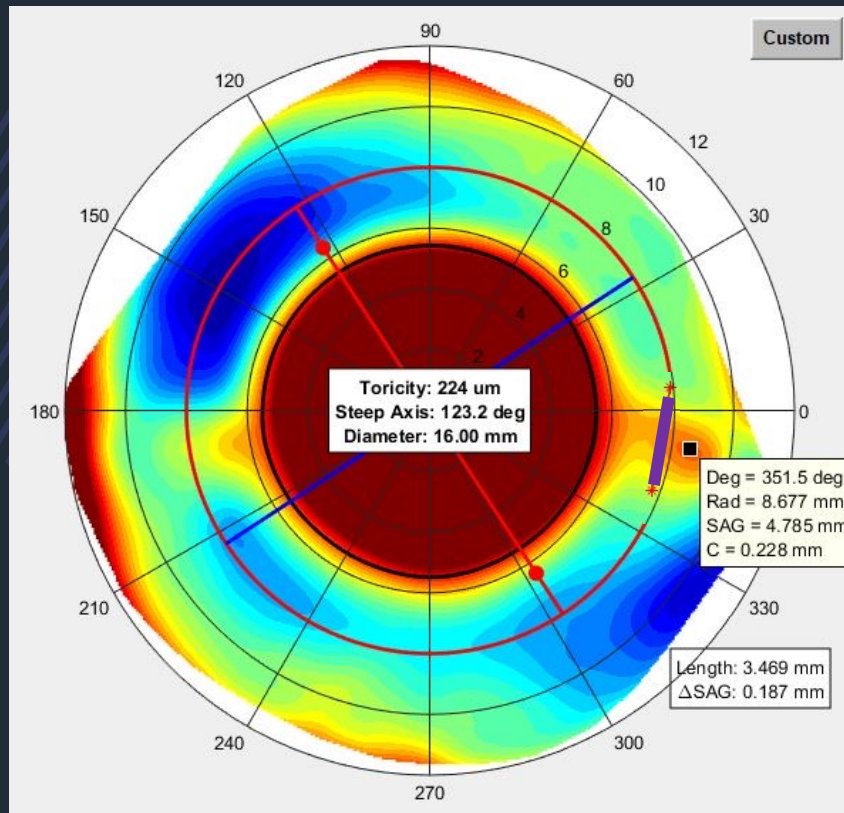
One localized vault

At 352 degrees

3.5 mm tall

1.5 mm wide...

0 mm from lens edge



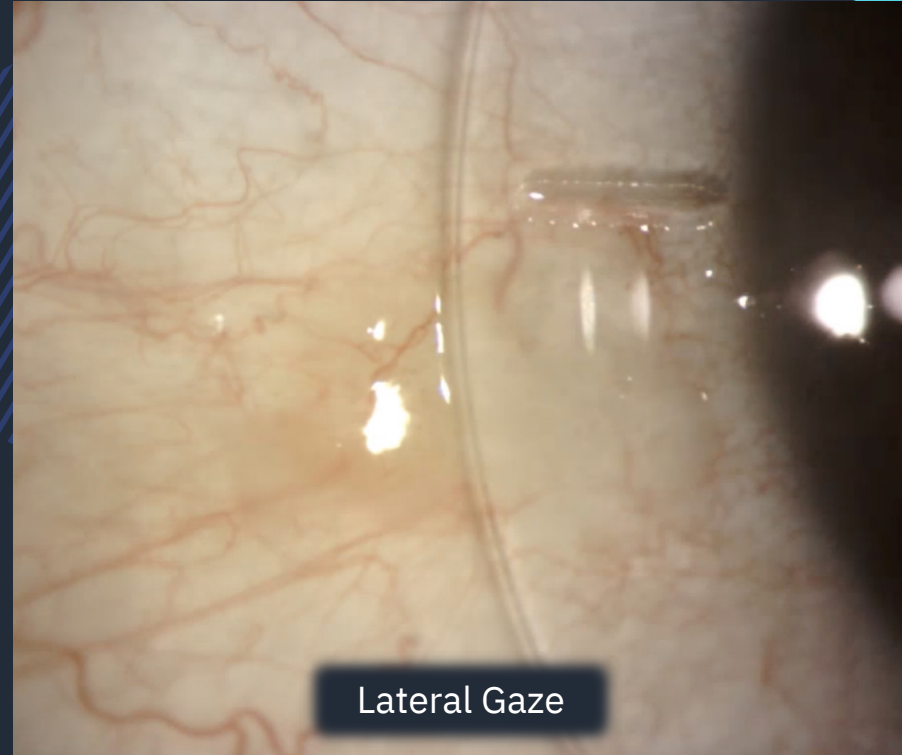
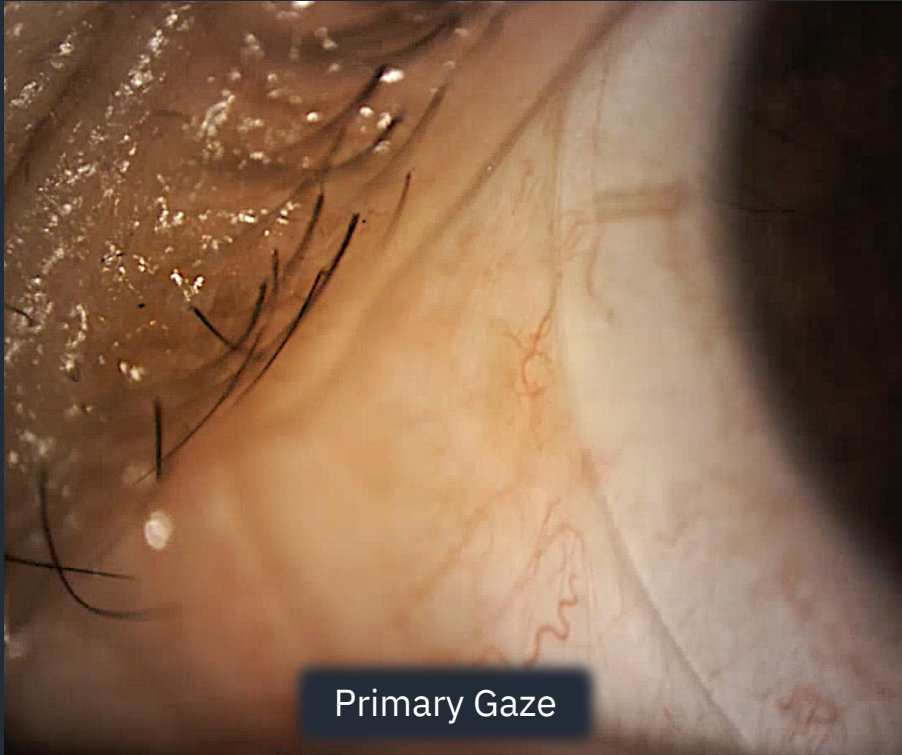
Temporal Vault Only

Toric Diagnostic Lens

Trial Lens "1"

First lens lost in transit.

Trial Lens "1": Nasal Pinguetula



1 Week Follow-up Visit

Chief Complaint

Decreased VAs
Eye gets red
Removes and reapplies every 5-6 hours

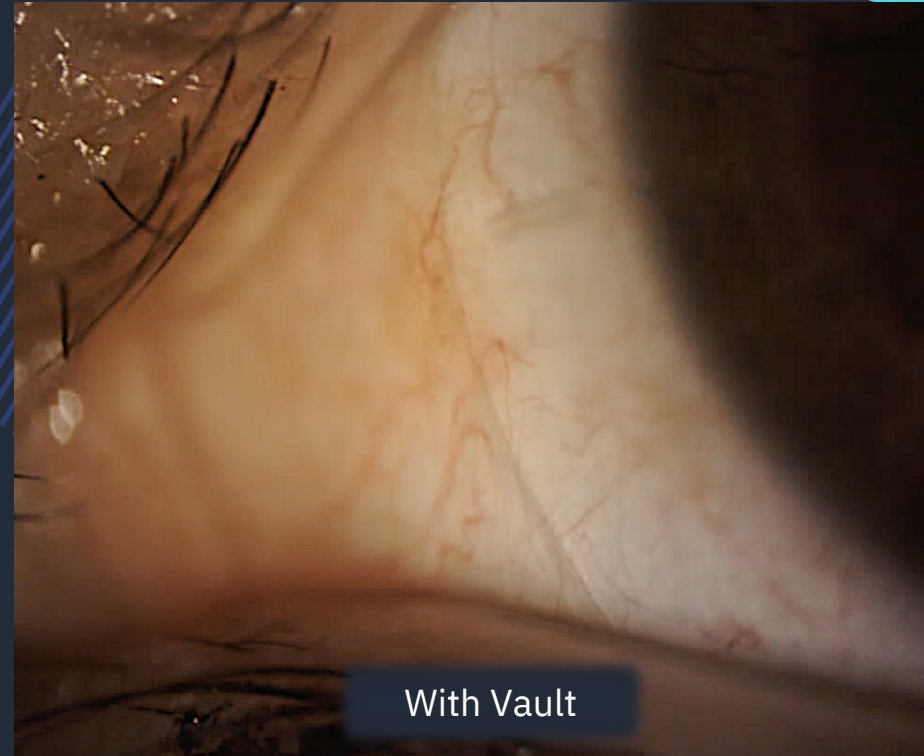
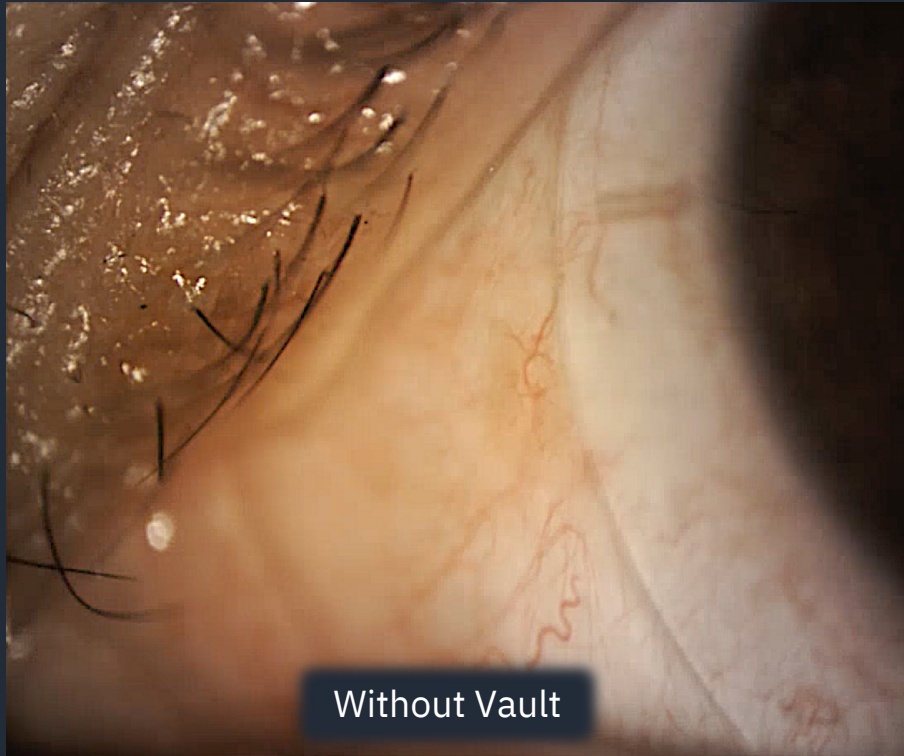
Midday Fogging
Nasal Irritation: injection, staining

Consultation

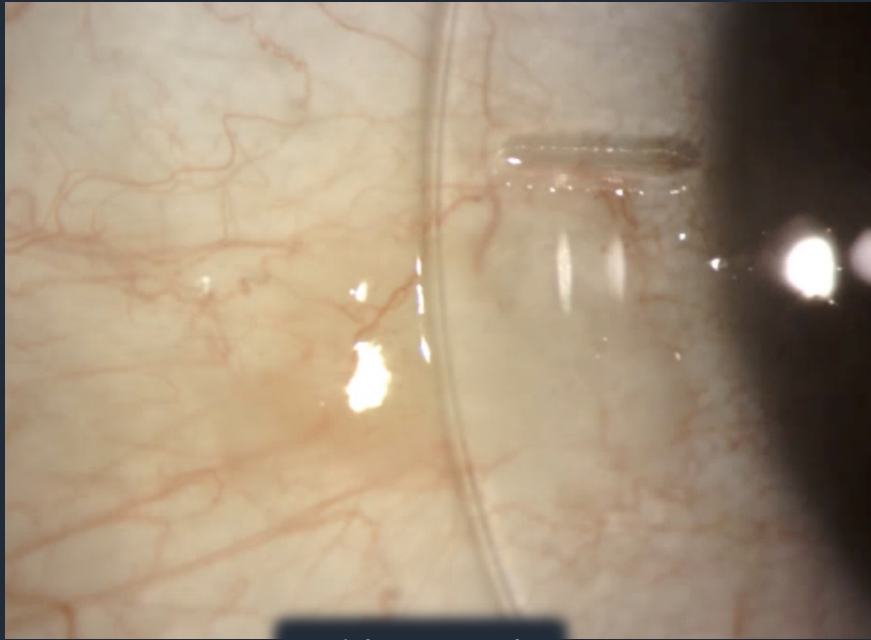
Strongly advised **against** two localized vaults.

Incorporate a **notch**

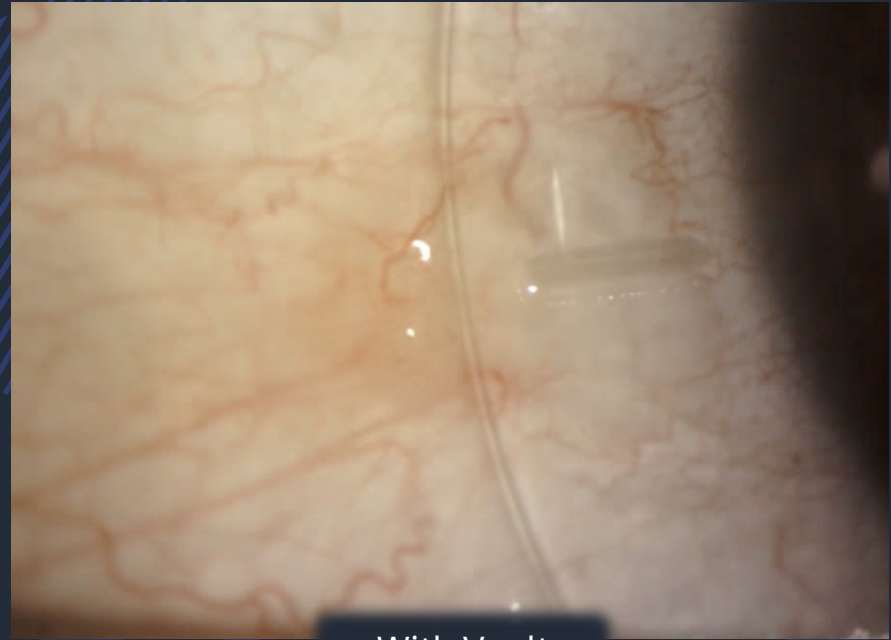
Trial Lens 2: Nasal Pinguecula in Primary Gaze



Trial Lens #2 Nasal Pinguecula in Lateral Gaze



Without Vault



With Vault

Trial Lens #2

Notch Parameters

At 350

4mm length

3D:

Patient Feedback

Difficult application

Lens awareness

Less midday fogging

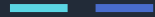
Corneal Molding Technology





Thanks!

Do you have any
questions?



klee3@central.uh.edu
kleeoptometry@gmail.com

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THE CHALLENGES OF THE CORNEA

Dr. Schweitzer

 **December 1, 2022**
5:35 pm – 6:25 pm PST

COPE accredited CE credit



 WOO UNIVERSITY

 **Sat, 3 December 2022**
9:30 AM - 12:30 PM PST

OPIOID UPDATE

Speaker **DR. EISSA HANNA**

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Title: *Stick the Landing: Troubleshooting Scleral Lens Alignment*