



ASCRS
BUSINESS *of* REFRACTIVE
CATARACT SURGERY
— SUMMIT —

Diagnostics to Help Match the Advanced Implant to the Patient

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Financial Disclosures

- ACE Vision – A, C
- Alchemy Vision- C
- Alcon- A, C, R
- Allergan/Abbvie- C, S
- Bausch & Lomb – C, S
- Bruder - C
- Epion – R, C
- Eyesafe- A, O
- Eyenovia- C
- Glaukos- O, C
- iOR Partners - C
- Johnson & Johnson- C
- Lensar - C, R
- Lenstec- C
- NovaBay - A
- Oculotix – A, C, O
- Ocuphire - C
- Radius XR- A, C, O
- Santen – S
- STAAR- C
- Tarsus- C
- Trefoil Therapeutics - C
- Trukera – C
- Vialase - C
- Visus Therapeutics- C

A = advisor

C = consultant


S = speaker's bureau

R = research

O = stock owner/options

*All relevant financial relationships have been mitigated.

When do you perform diagnostic testing?

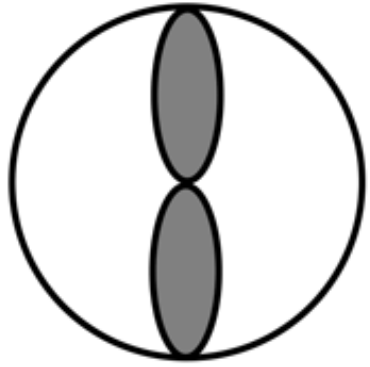
- Before seeing the doctor?
 - After seeing the doctor?
 - At a second visit?
 - What testing do you do?
 - Is there a way to do things better?
- 

Must-Have Diagnostics

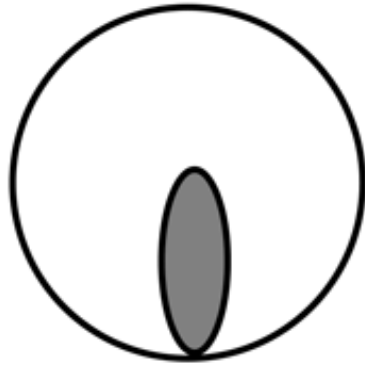
- Optical Biometer (spectral-domain vs swept-source)
 - Deeper light penetration: SS-OCT uses longer wavelengths (1055–1300 nm) to penetrate opaque lenses better than other methods.
 - Long-range imaging: SS-OCT can image the posterior segment of the eye.
 - Quality control: SS-OCT can perform a small central macular scan to assess the patient's fixation, which can affect the final IOL power calculation.
- A-scan (immersion) – now rarely needed
- Topographer
 - Placido disc topography detects regular vs irregular astigmatism
 - Tomography detects subclinical ectasia (Pentacam)
 - Tomography + placido disc topography (Galilei)
 - Topography + wavefront aberrometry (iTrace, OPD III)
 - AS-OCT + placido disc topography (MS-39)
 - Topography/tomography + biometry (Pentacam AXL, Galilei G4, Heidelberg Anterion)



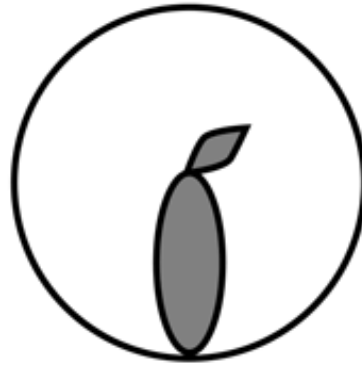
Topographic Patterns



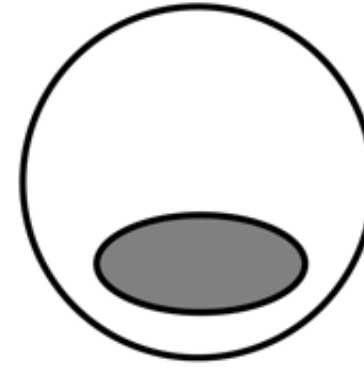
Symmetric Bowtie



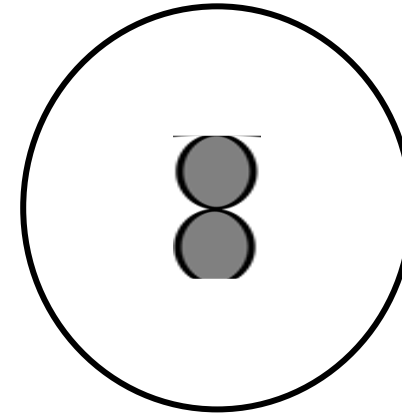
Asymmetric Bowtie



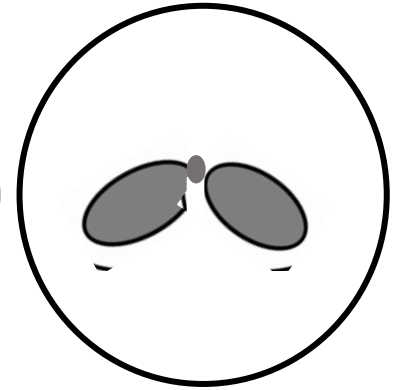
Asymmetric Bowtie
Skewed Radial Axis



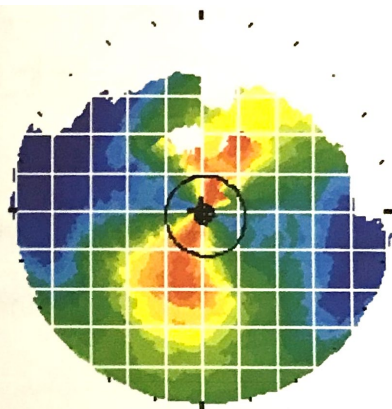
Inferior Steepening



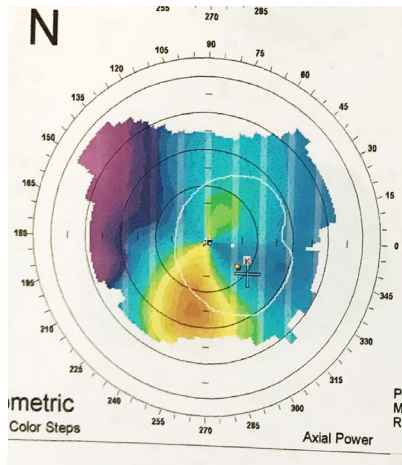
"scrunchy bowtie"



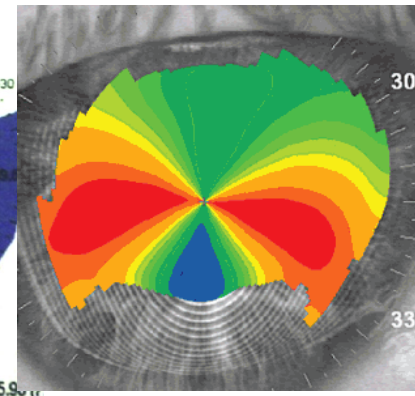
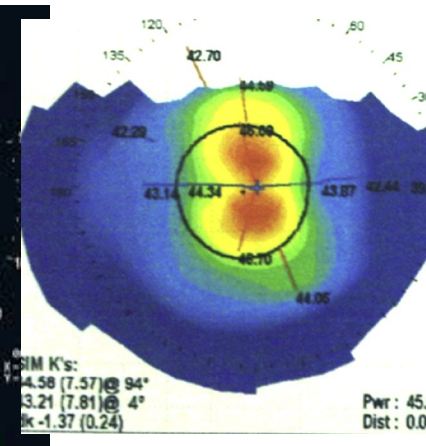
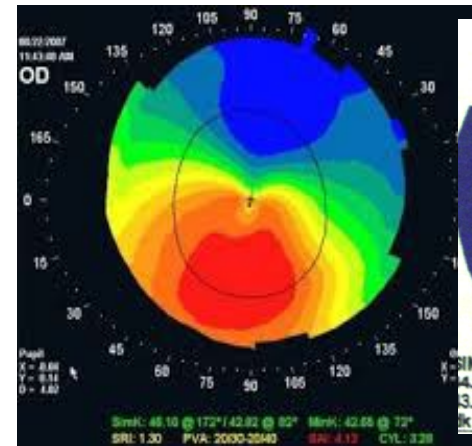
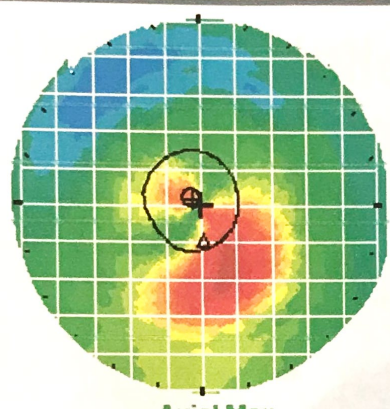
"saggy" bowtie



Axial Map

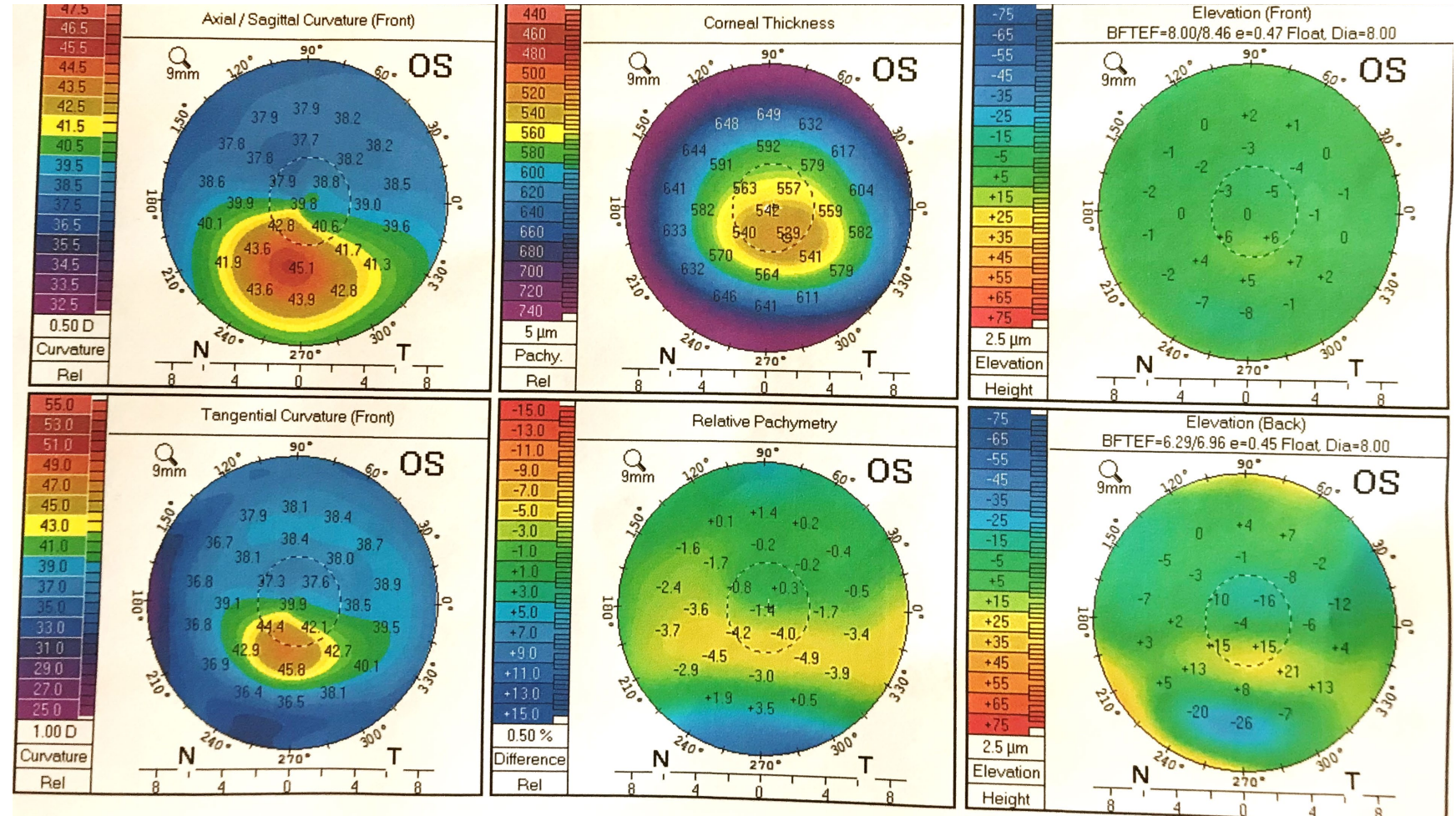


Axial Map



Gold Standard for Detecting Ectasia

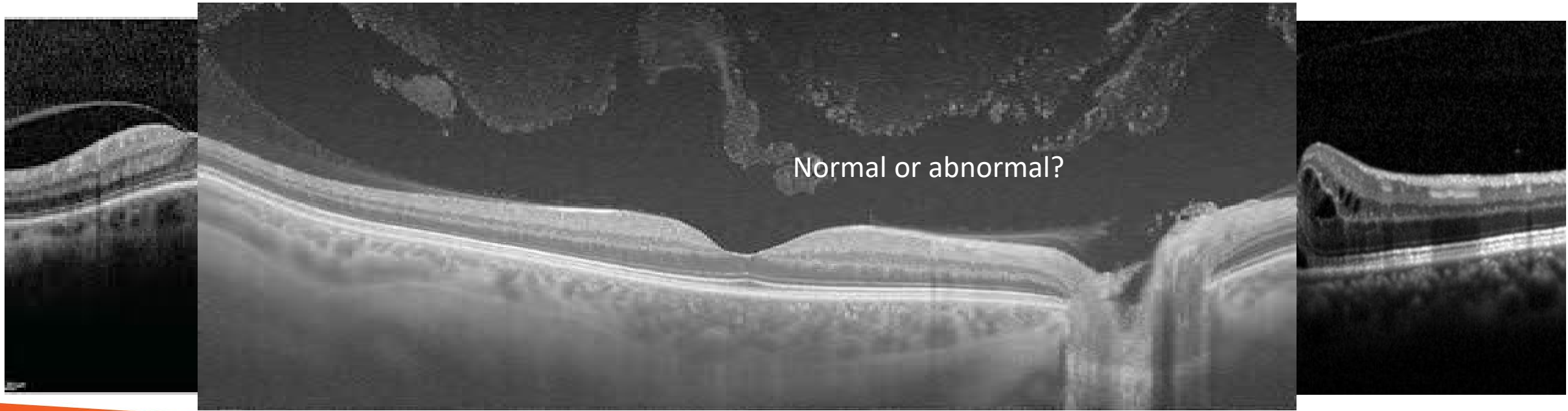
3 strikes!
You're OUT!



Must-Have Diagnostics: Posterior Pole Imaging

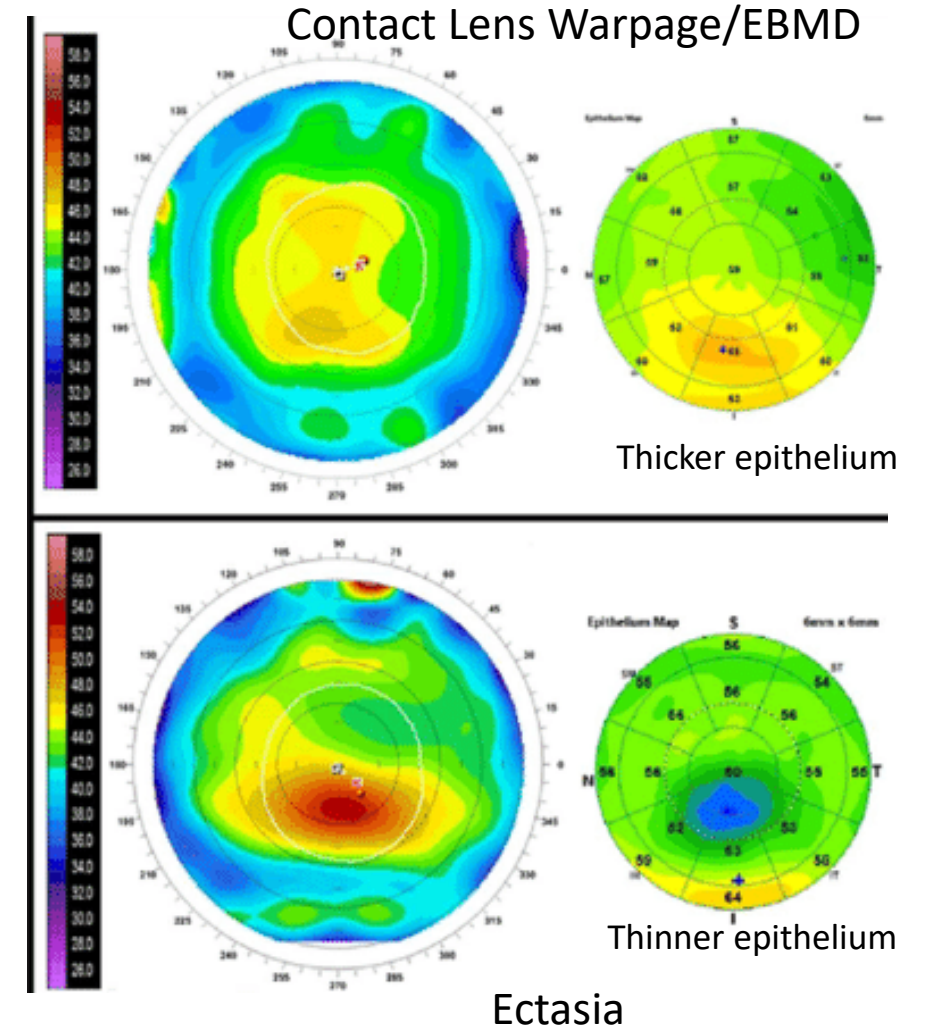
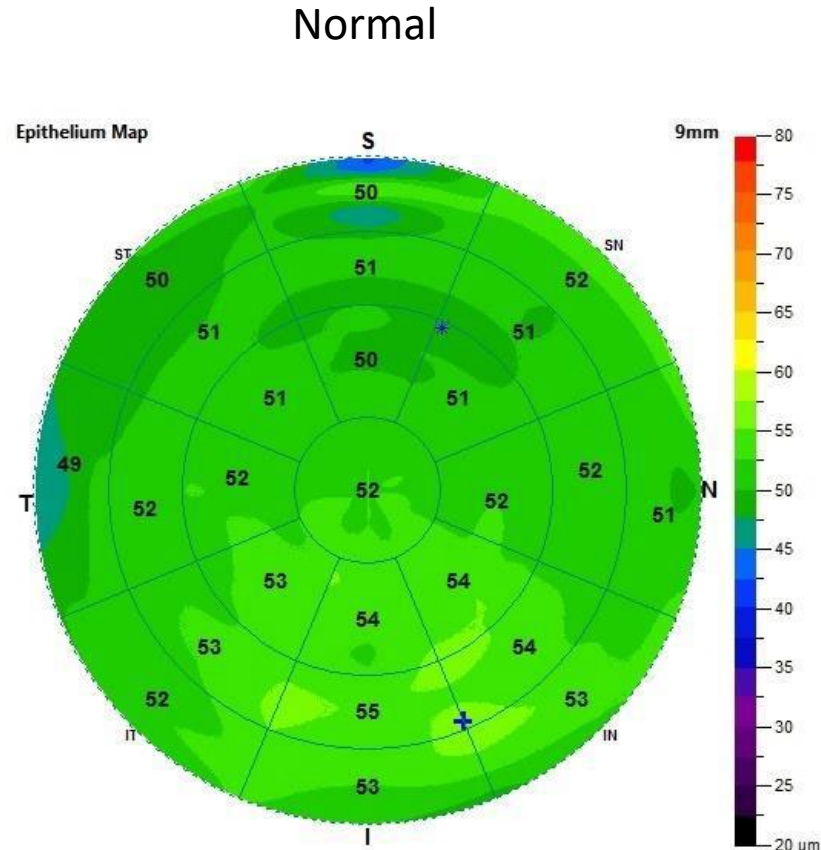
- OCT optic nerve (RNFL, GCC) and macula
 - Assess for subclinical glaucoma and macular disease
 - Assess vitreous macular interface

Which IOL would you use?

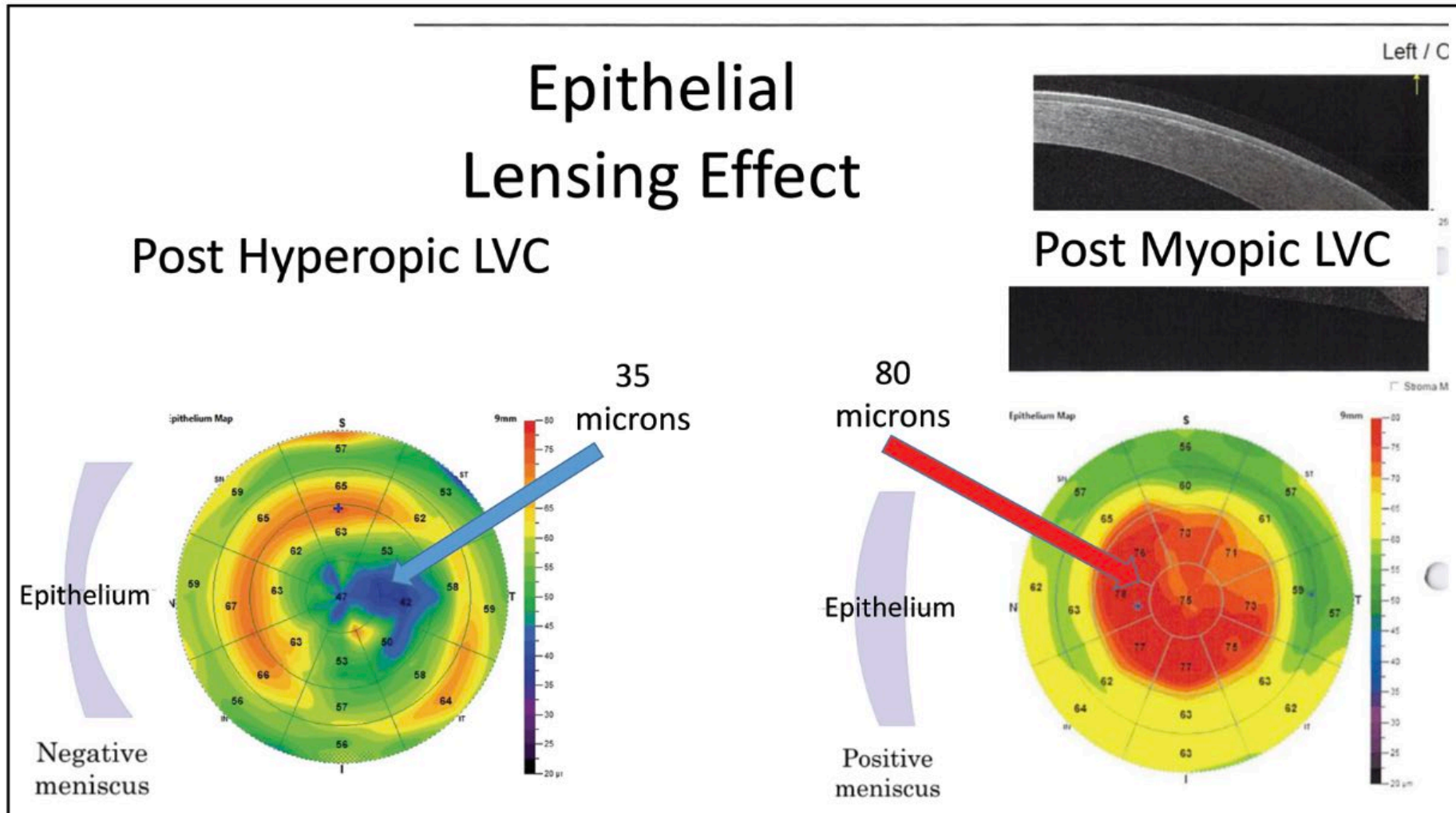


Must-Have Diagnostics: Epithelial Mapping

OCT Epithelial Thickness



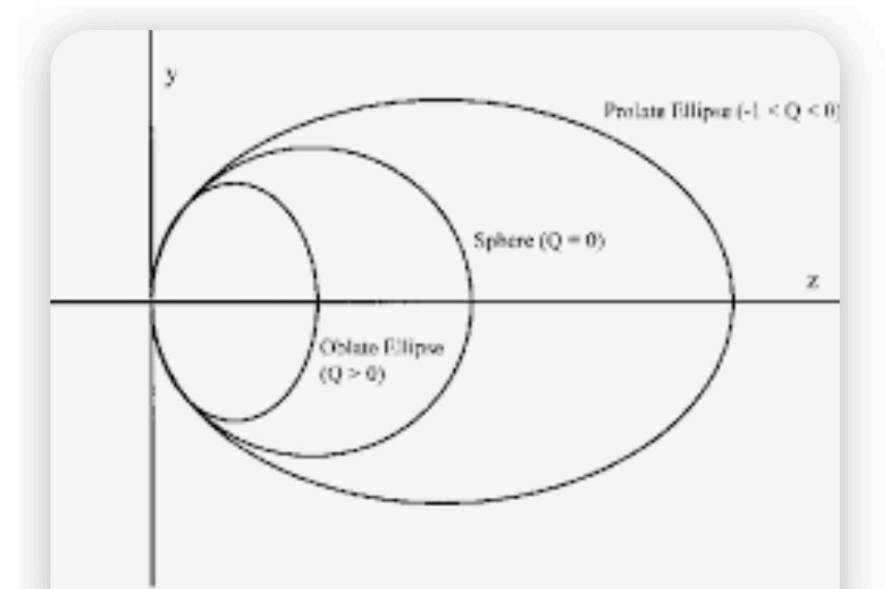
Post-Hyperopic or Myopic LVC?



Post-Hyperopic or Myopic LVC?

A Prolate cornea is steeper in the center and flatter in the periphery

An Oblate cornea is flatter in the center and steeper in the periphery



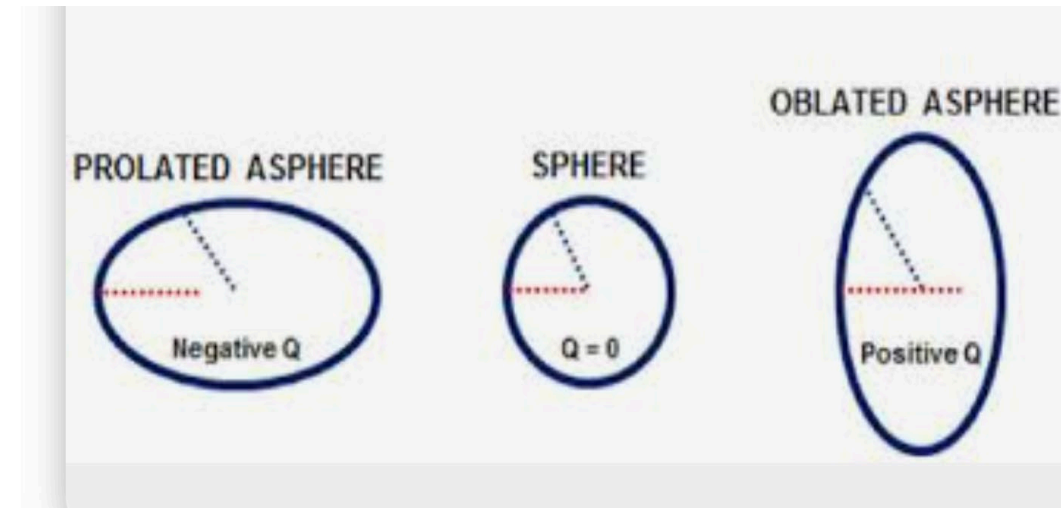
Post-Hyperopic or Myopic LVC?

Q value describes the rate of radial curvature of the cornea and can be used to determine whether myopic or hyperopic LVC has been performed

Average Q value is -0.27

After hyperopic ablation the Q value becomes more negative

After myopic ablation the Q value becomes more positive

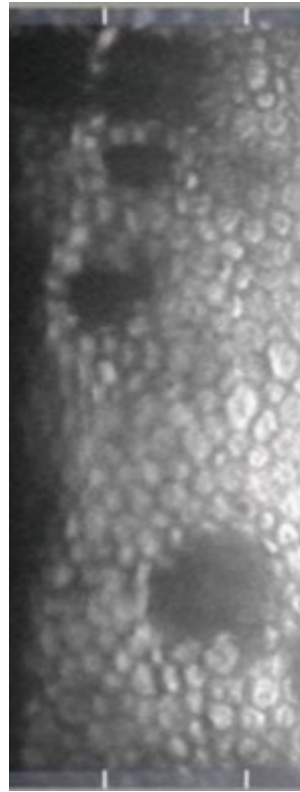


Must-Have Diagnostics: Endothelial Imaging

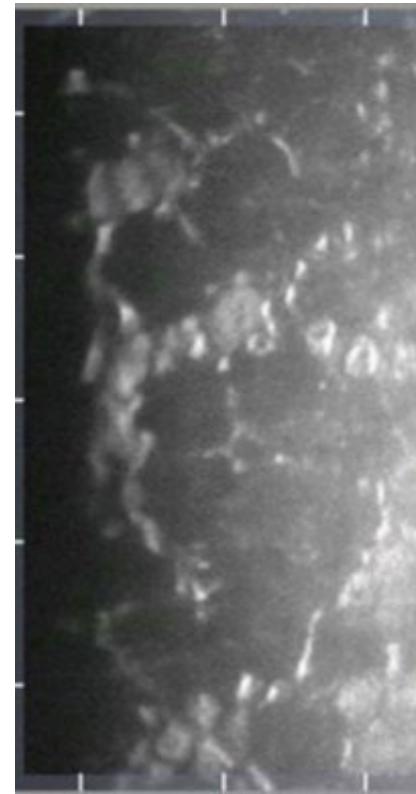
Which IOL would you use?

Specular microscopy

- To detect subclinical guttata and assess endothelial cell health/count



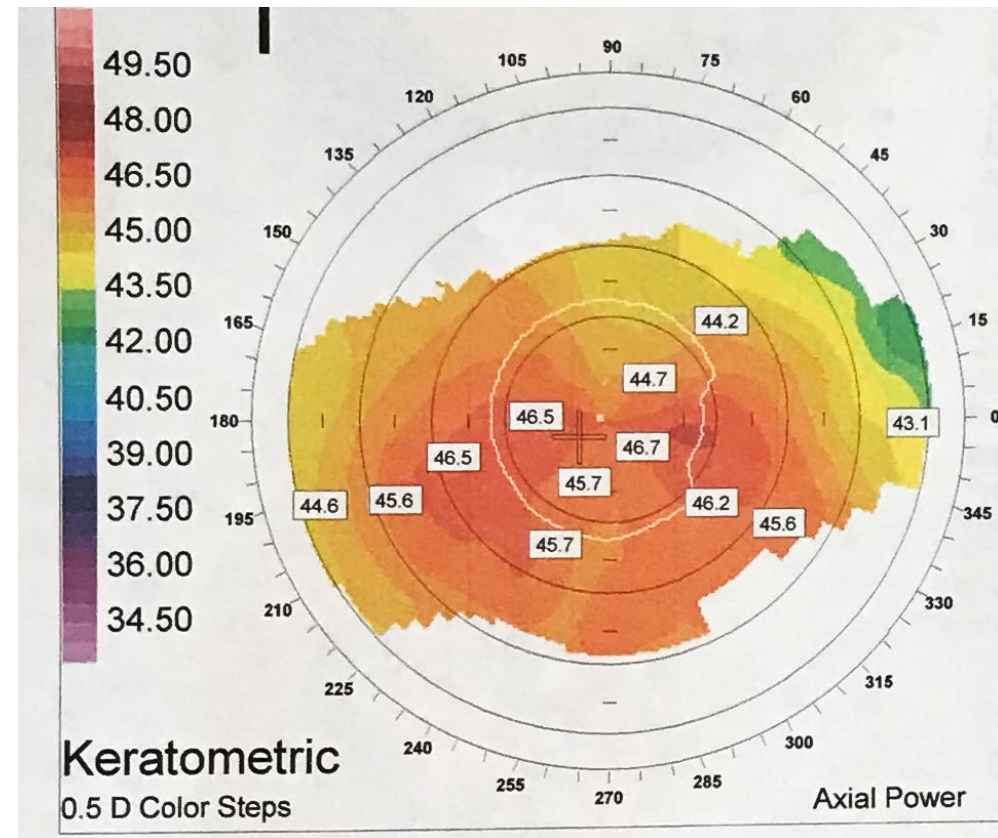
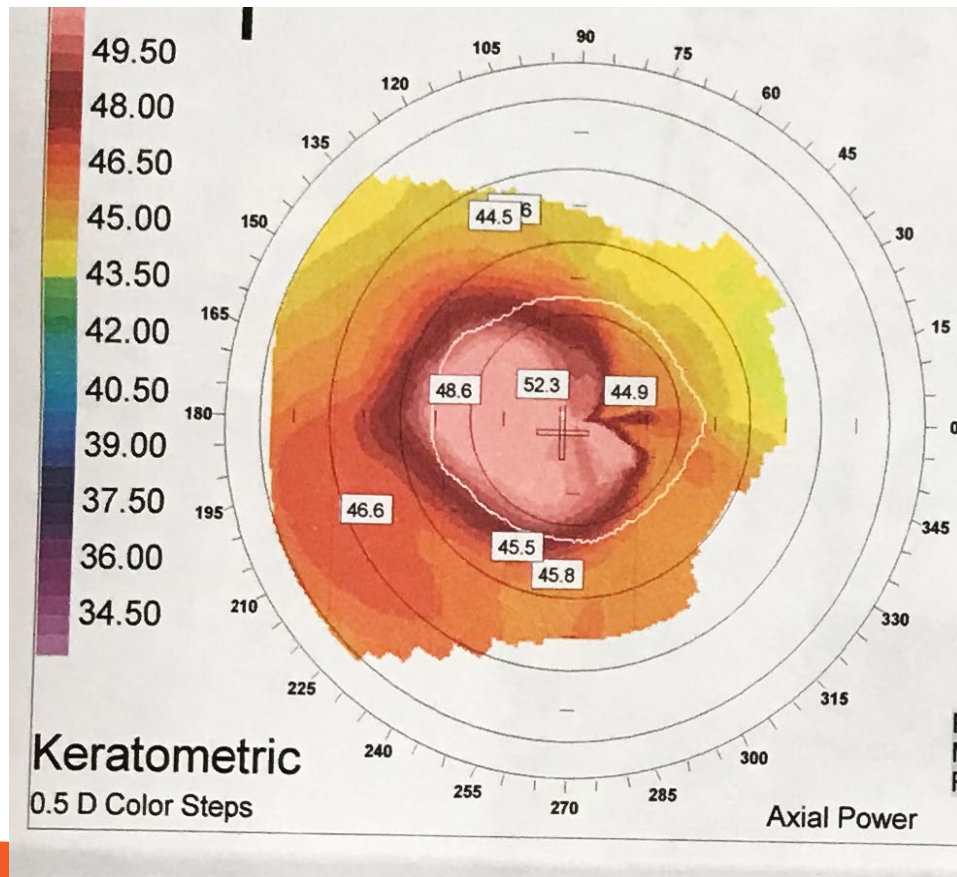
versus



Case study: 53 yo M plano presbyope (J16) wants to be glasses free

How would you proceed?

2 weeks after aggressive lubrication




When in doubt...

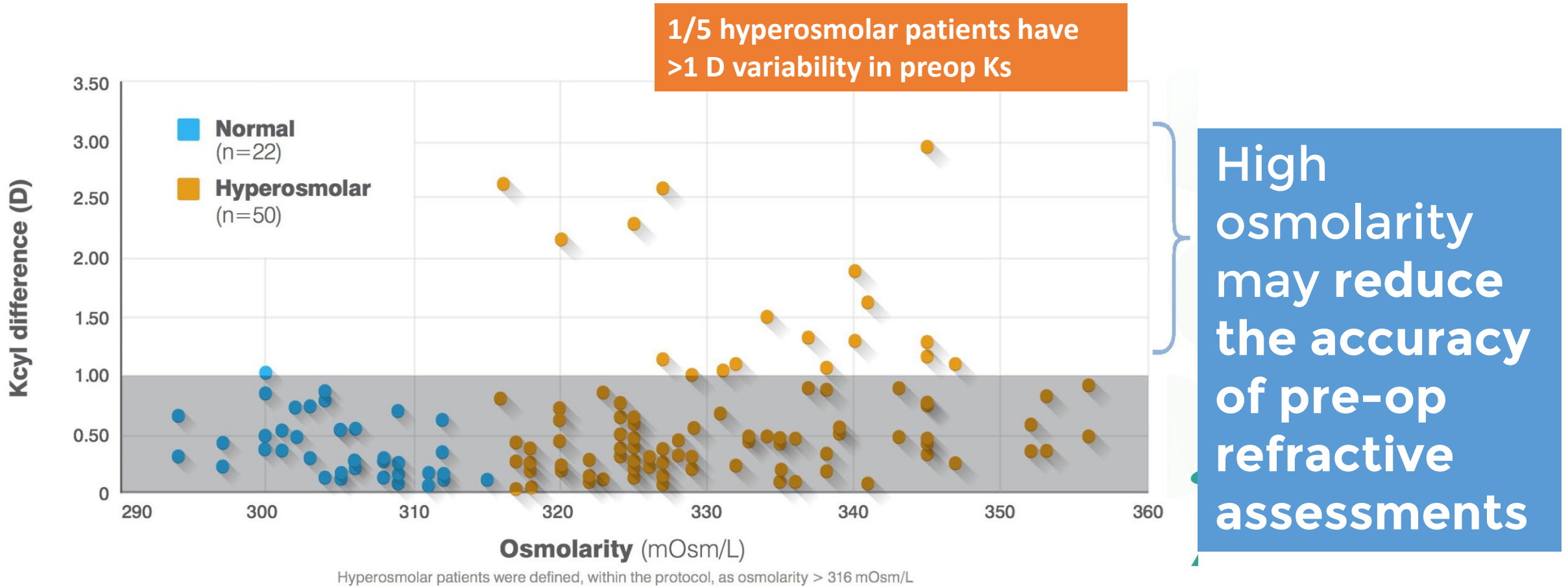
REPEAT REPEAT REPEAT!



Diagnostic Testing & The Tear Film

- What testing modalities do you utilize?
 - What do you say to the patient who says “I have dry eye – will that affect my cataract surgery or will my dry eye get worse?”
 - What is your approach to managing a patient with a poor preoperative tear film?
- 

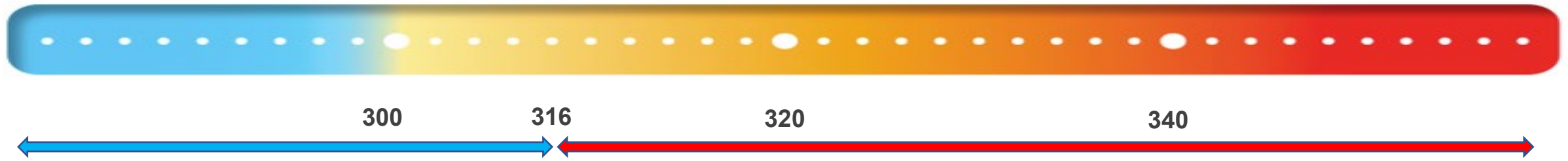
Must Have Diagnostics: Tear Osmolarity



Decrease Your Postop “Unhappy” Rate

**Confirm
Normal Osmolarity**

**Confirm
Abnormal Osmolarity**

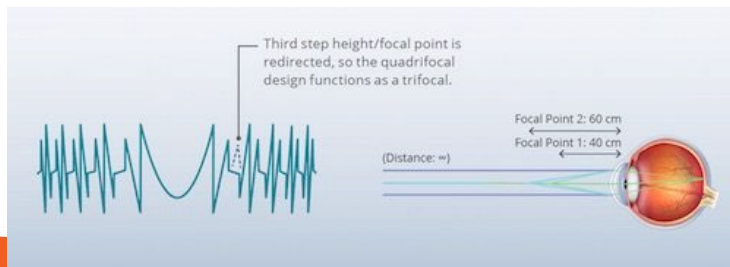


**Increased Confidence:
ATIOL Recommendation**

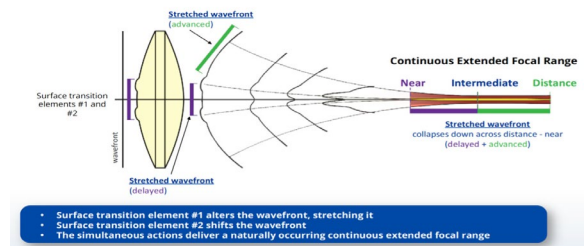
Therapeutic Candidates: Recurring Maintenance

- Plugs (test / treat / re-test)
- In-Office MGD Treatment (test / treat / re-test)
- IPL Treatment (test / treat / re-test)

Diffraction IOL



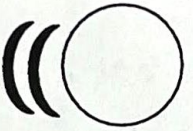
Extended Depth of Focus IOL or monofocal IOL



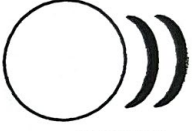
When You Miss Dry Eye at the Slit Lamp...

Which IOL would you use?

ANT SEGMENT

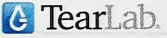
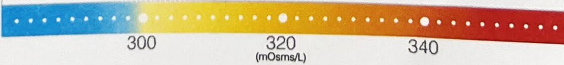
OD: 

fr. NLD BCL
 L/L
W44
 Conj
[Signature]
 K's
FTA
 Iris
(+ MSC on Lens

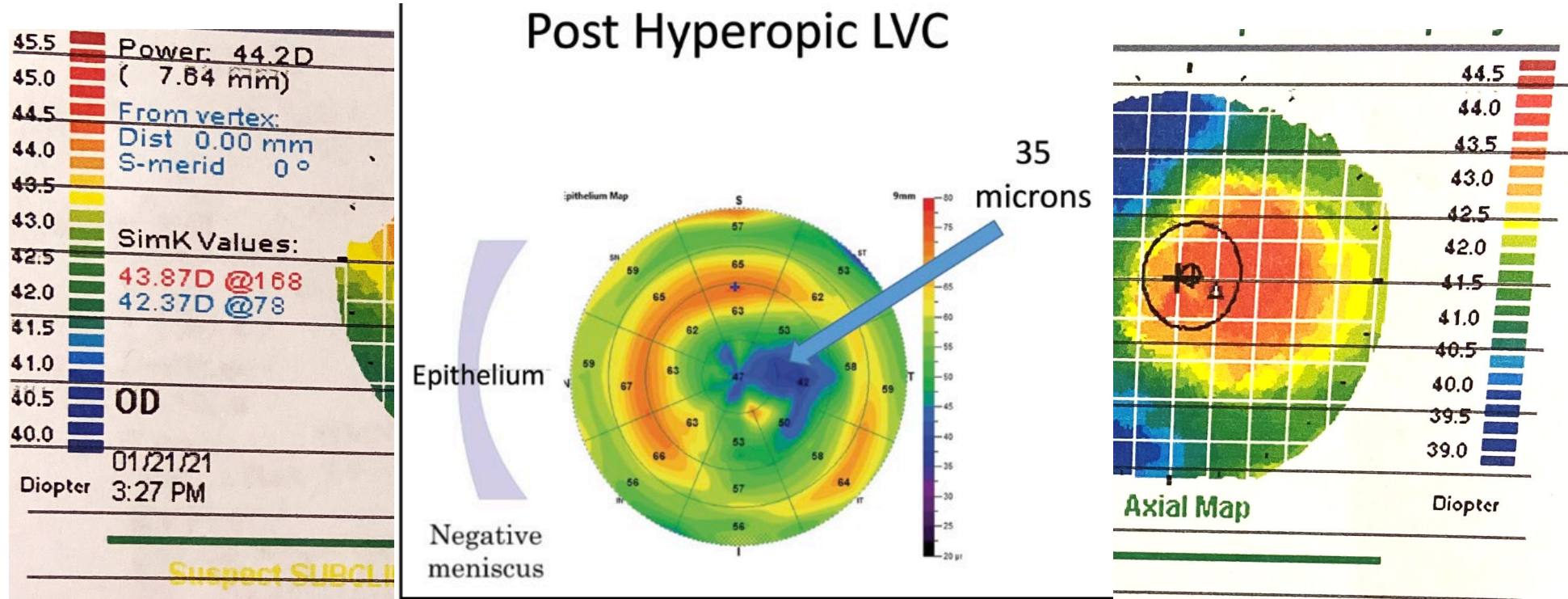
OS: 

TBU 7: 5-6 sec
(1) scars 04

Preop SLE

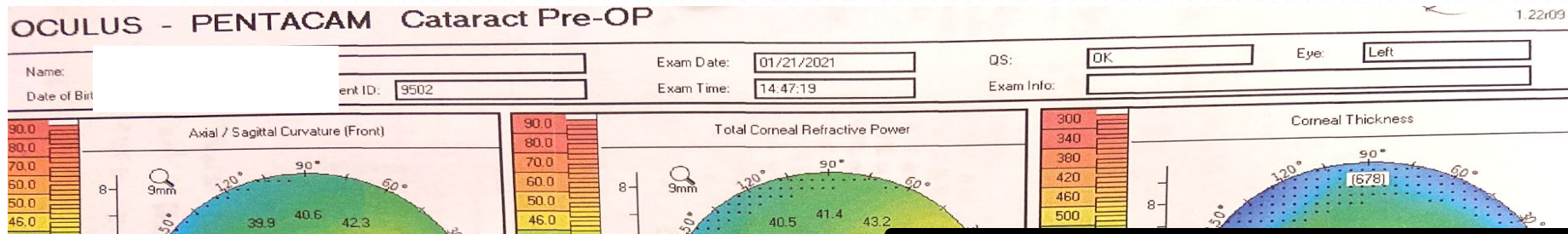
ANESTHESIA: Topical Tetracaine/1% MPF Lidocaine/MAC	Ocular Surface Health Questionnaire  NAME: [REDACTED] Check all symptoms experienced since last visit. <input checked="" type="checkbox"/> Dry Eyes <input checked="" type="checkbox"/> Blurry Vision <input type="checkbox"/> Redness <input type="checkbox"/> Burning <input type="checkbox"/> Itching <input checked="" type="checkbox"/> Light sensitivity <input type="checkbox"/> Excessive tearing/watery eyes <input type="checkbox"/> Tired eyes/eye fatigue <input type="checkbox"/> Stringy mucous in or around the eyes <input type="checkbox"/> Foreign body sensation <input type="checkbox"/> Contact lens discomfort <input type="checkbox"/> Scratchy, feeling of sand or grit in eye <input type="checkbox"/> Fluctuating Vision Have you ever treated yourself for dry eyes? <input type="checkbox"/> Yes <input type="checkbox"/> No Have you used any eye drops in the last 2 hours? <input type="checkbox"/> Yes <input type="checkbox"/> No FOR OFFICE USE ONLY Doctor's Order Initials _____ Date <u>3/23/23</u> Osmolarity Measurements Right Eye (OD) <u>355</u> (mOsm/L) Left Eye (OS) <u>311</u> (mOsm/L) Inter-eye difference is > 8mOsm/L <input type="checkbox"/> Yes <input type="checkbox"/> No Osmolarity <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal Patient Dry Eye Severity <input type="checkbox"/> Mild <input type="checkbox"/> Moderate <input type="checkbox"/> Severe Schedule for Dry Eye Workup <input type="checkbox"/> Yes <input type="checkbox"/> No  <small>©2020 TearLab Corp. 920032 Rev H</small>
ANESTHETIST: None	
SURGEON:	
ASSISTANT:	
INDICATIONS: Decreased VA to _____	
FINDINGS:	
PROCEDURE: Phaco/IOL	
PATHOLOGY (Specimen removed)	
ESTIMATED BLOOD LOSS: Minimal	
COMPLICATIONS:	
JOB#:	

Case Study: Cataract patient desires spectacle independence



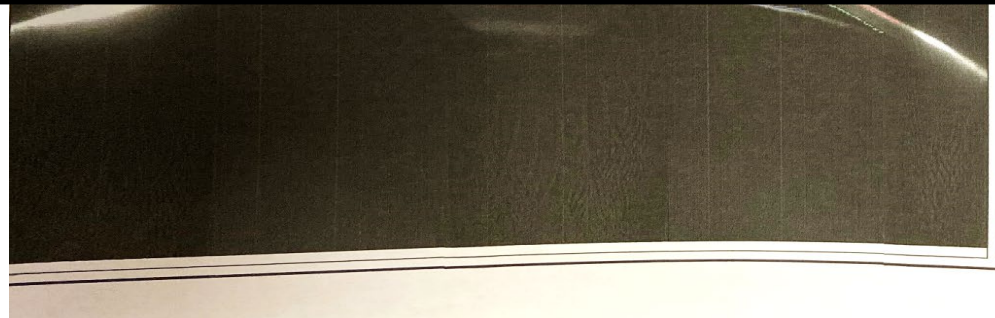
“Oh yeah, doc...I did have LASIK surgery > 30 years ago.”

Assess Higher Order Aberrations

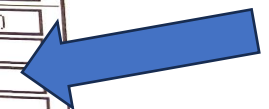


Total Cor. Astig. (WFA) (4mm zone):	-0.8 D (80.8 °)
Total Cor. Sph. Aberration (WFA Z40) (6mm zone):	-0.082 μm
Total Cor. Irregular Astig. (WFA HO RMS) (4mm zone):	0.266 μm
ACD (Int.):	1.82 mm
ACD (Ext.):	2.33 mm
Axial/Sag. B/F Ra	85.1 %
HWTW:	
QS:	OK
Pupil Dia:	2.66 mm

Total Cor. Astig. (WFA) (4mm zone):	-0.3 D (124.2 °)
Total Cor. Sph. Aberration (WFA Z40) (6mm zone):	0.089 μm
Total Cor. Irregular Astig. (WFA HO RMS) (4mm zone):	0.313 μm
ACD (Int.):	1.82 mm
ACD (Ext.):	2.33 mm
Axial/Sag. B/F Ra	83.8 %
HWTW:	
QS:	OK
Pupil Dia:	2.71 mm




Apex:	42.1 D	42.1 D	42.2 D	40.9 D	43.6 D
Pupil:	42.6 D	42.4 D	42.5 D	41.2 D	43.8 D
Total Cor. Astig. (WFA) (4mm zone):	-0.3 D (124.2 °)				
Total Cor. Sph. Aberration (WFA Z40) (6mm zone):	0.089 μm				
Total Cor. Irregular Astig. (WFA HO RMS) (4mm zone):	0.313 μm				
ACD (Int.):	1.82 mm	ACD (Ext.): 2.33 mm			
Axial/Sag B/F Ra	83.8 %	HWTW:			
QS:	OK	Pupil Dia: 2.71 mm			
Pachy:					
Apex:	512 μm	Thinnest:	512 μm	Difference: 0 μm	



Which IOL would you implant?

- I implanted non-diffractive EDOF IOLs with micro-monovision (monofocal plus, small-aperture, light-adjustable not available at the time)

Post-op UDVA

- OD 20/40 (-0.50 D)
 - OS 20/20 (plano)
 - OU 20/20 J2
- 

Pupil Size, HOAs, Angle Kappa/Chord Mu

- How do each of these measurements affect your decision making about advanced technology IOL choices?
 - Do you have any specific criteria or cutoffs that you find helpful?
- What technologies do you find helpful for assessing each of the above
- How would you manage .75D of astigmatism
- How much asymmetric astigmatism or “floppy bowtie” is too much?
 - Are there additional tests that you find helpful in these situations?

Angle Alpha & Chord Mu

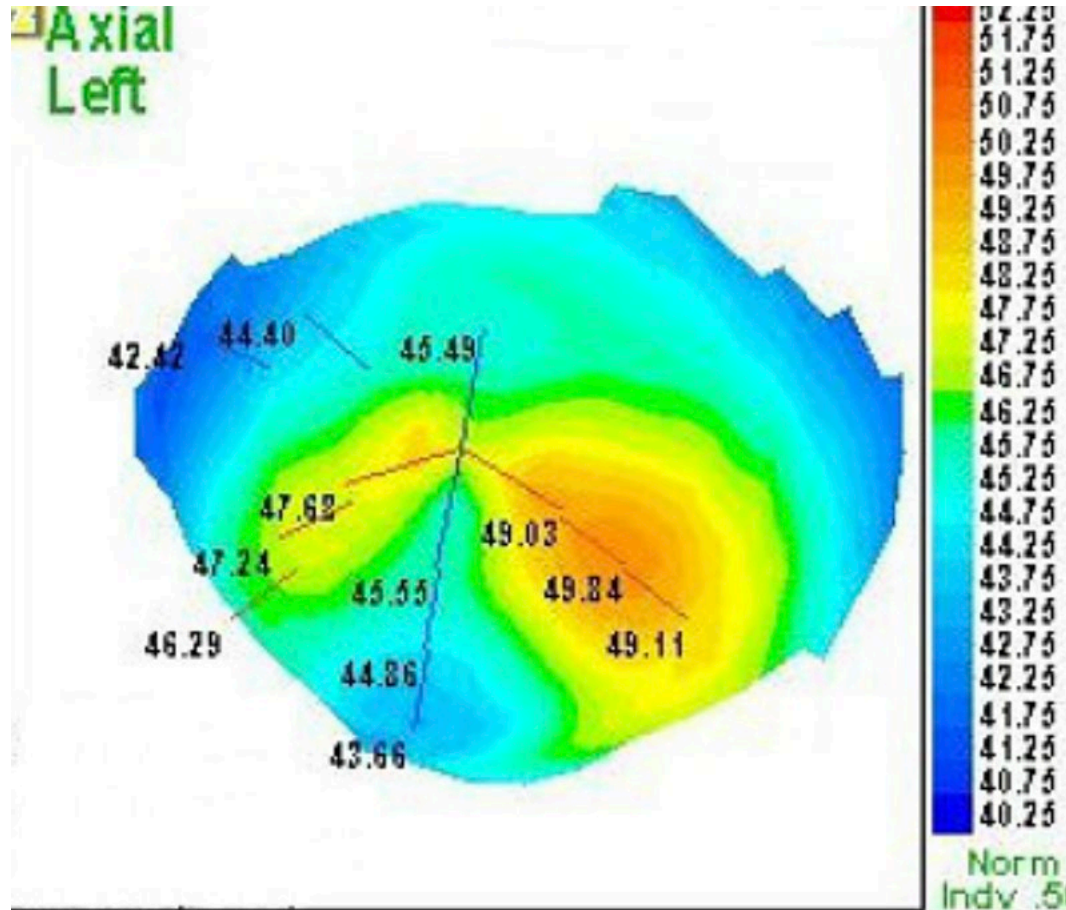
- Chord Mu is the distance between the pupil center and the visual axis while Angle Alpha is the distance between the center of the limbus (corneal center) and the visual axis.
- Angle kappa is the angular value between the pupillary axis and the visual axis

Some have suggested that chord mu values greater than .4mm to .6mm are associated with a higher incidence of glare and halo in patients with multifocal IOLs

A 2024 peer review article published in Clinical Ophthalmology did not find any association between angle kappa and patient satisfaction with multifocal IOLs.



What To Do With “Mild Irregular Astigmatism?”



Out of CLs long enough?

Does the corneal cylinder match the keratometric and spectacle cylinder?

Patient's Age?

Have they had good vision in past?

Summary: My Preop Diagnostics Checklist

- Topography/tomography (2-3 devices)
 - Assess for irregular astigmatism and ocular surface disease
 - Assess total HOAs at 4mm and SA at 6mm
- Optical Biometry (2 devices)
- OCT Macula/Optic Nerve
 - Pay attention to vitreomacular interface and vitreous opacities
- Specular Microscopy
- Tear Osmolarity
- OCT epithelial map (optional)
 - Only if Ks and axes are very inconsistent (EBMD suspect) or post-LVC