FINDING THE RIGHT FIT: A COMPARISON OF SCLERAL FITTING TECHNIQUES

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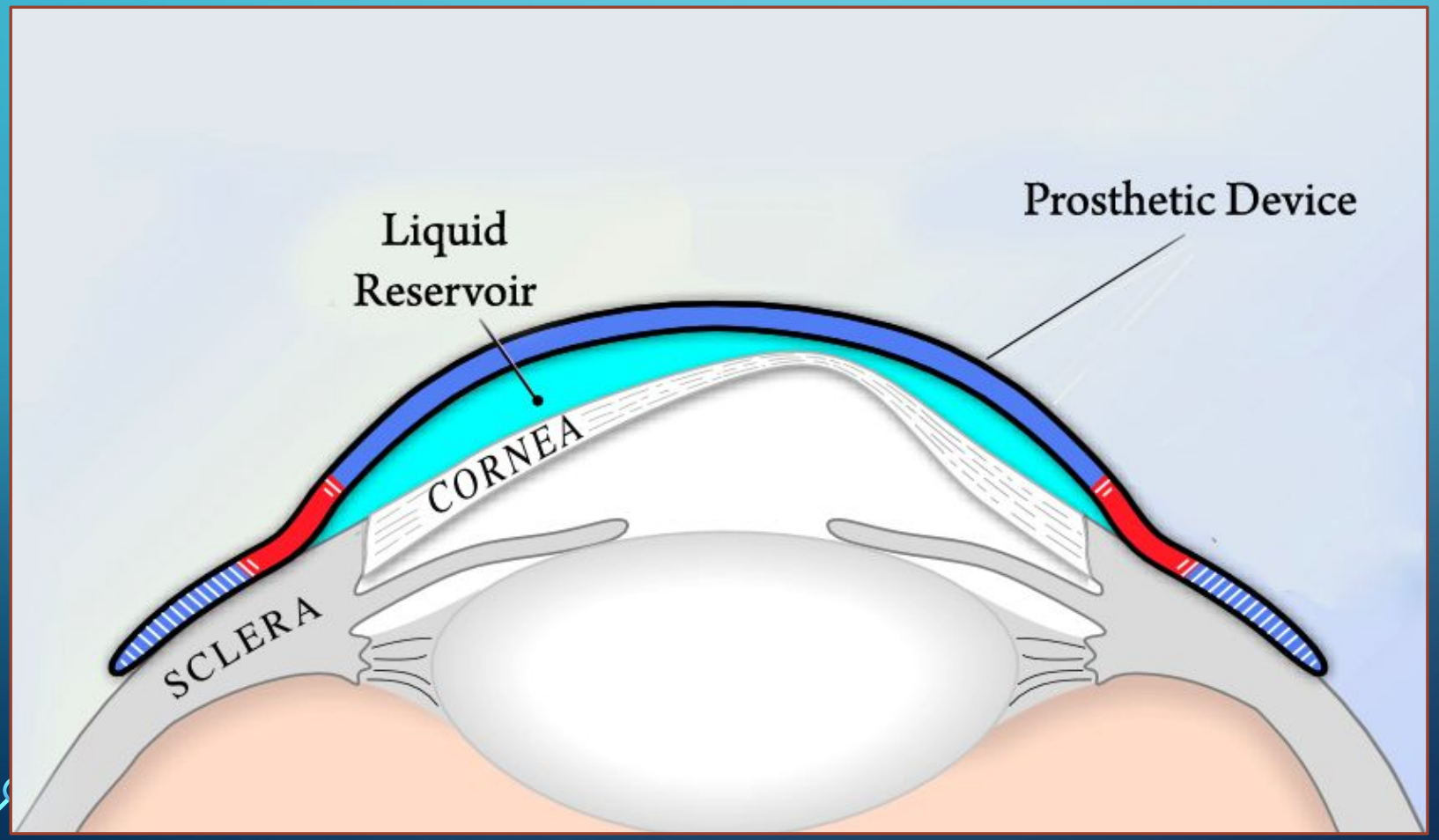
FITTING SCLERAL LENSES – WHAT ARE OUR GOALS



The Basic Concepts Haven't Changed Even If Some Of The Methods Have

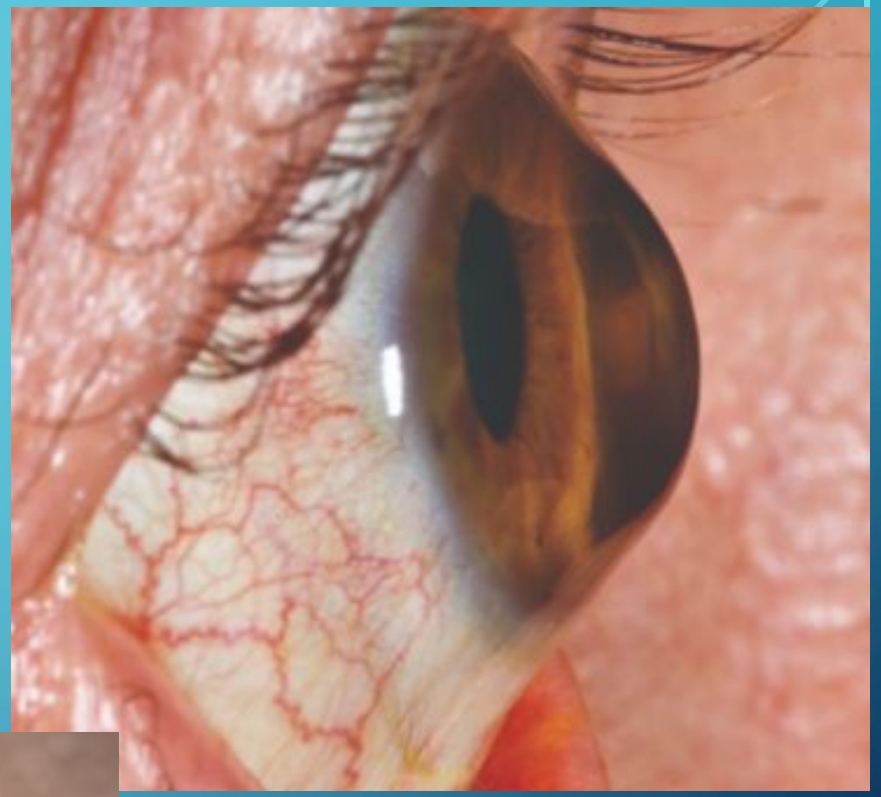
DIAGNOSTIC FITTING VS ADVANCED TECHNIQUES

- The biggest difference is how you get to that first lens order
  - Once you have ordered a lens for the patient and dispensed it, its all the same – modifying fit to get the best outcomes
- Beyond that, it comes down to the lens and what the lab can do to modify the lens to optimize the fit
- Some advanced technique lenses will have more freeform capabilities

DIAGNOSTIC FITTING

FITTING SET BASED FITTING AND THE EVOLUTION OF FITTING SETS

Eye it up!!



Fit Them Just Like Corneal GP's

	BASE CURVE	AXIS	SPH	Cyl	AXIS	DIAMETER	MATERIAL LOT # / MFR
L	7.03 / 7.03	0	-2.25			15.60	F2102080

Back optical diameter	8.60	2 Secondary zone radius	7.23	2 Zone Width	1.70
3 Intermediate zone radius	8.70	3 Intermediate radius	8.70	3 Zone Width	0.90
4 Intermediate zone radius	12.75	4 Intermediate radius	12.25	4 Zone Width	0.50
5 Peripheral zone radius	14.25	5 Peripheral radius steep	13.75		

Typically all one diameter

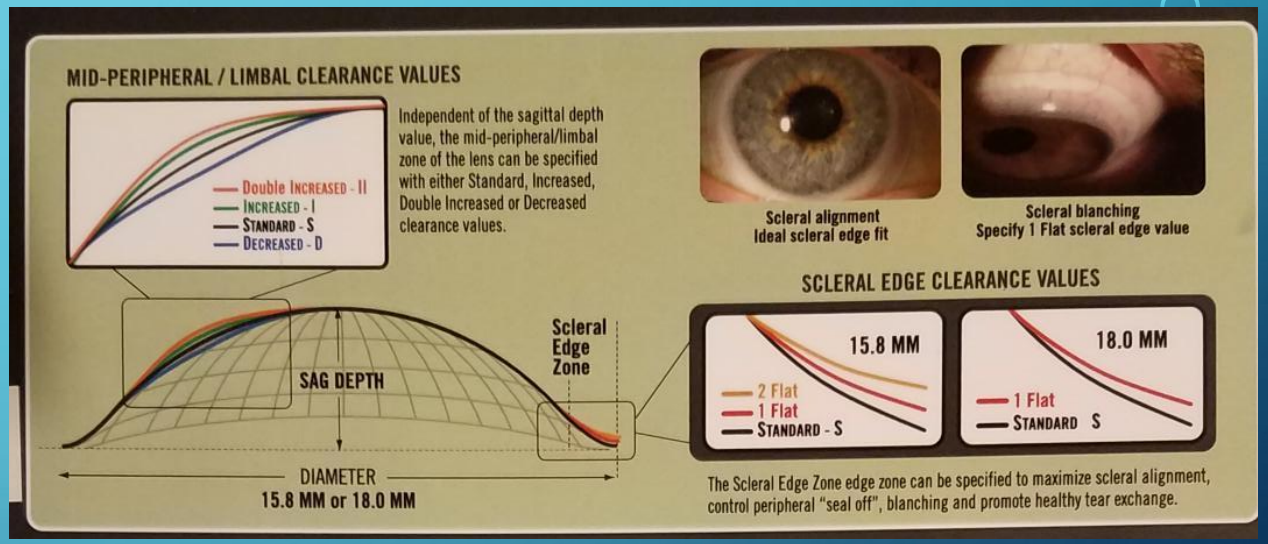
Increasingly steep BC to generate more depth

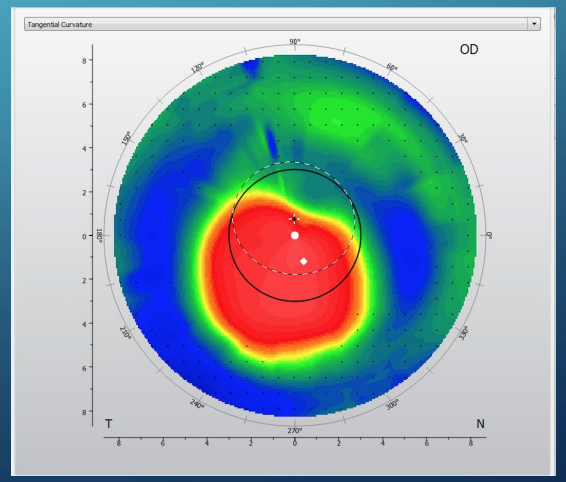
Spherical haptics

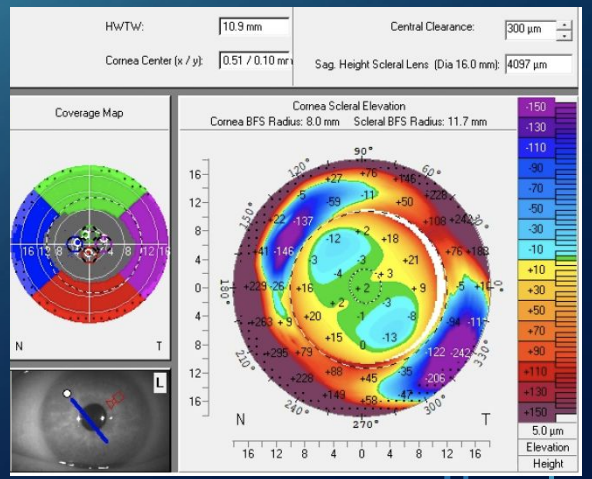
No SAG information

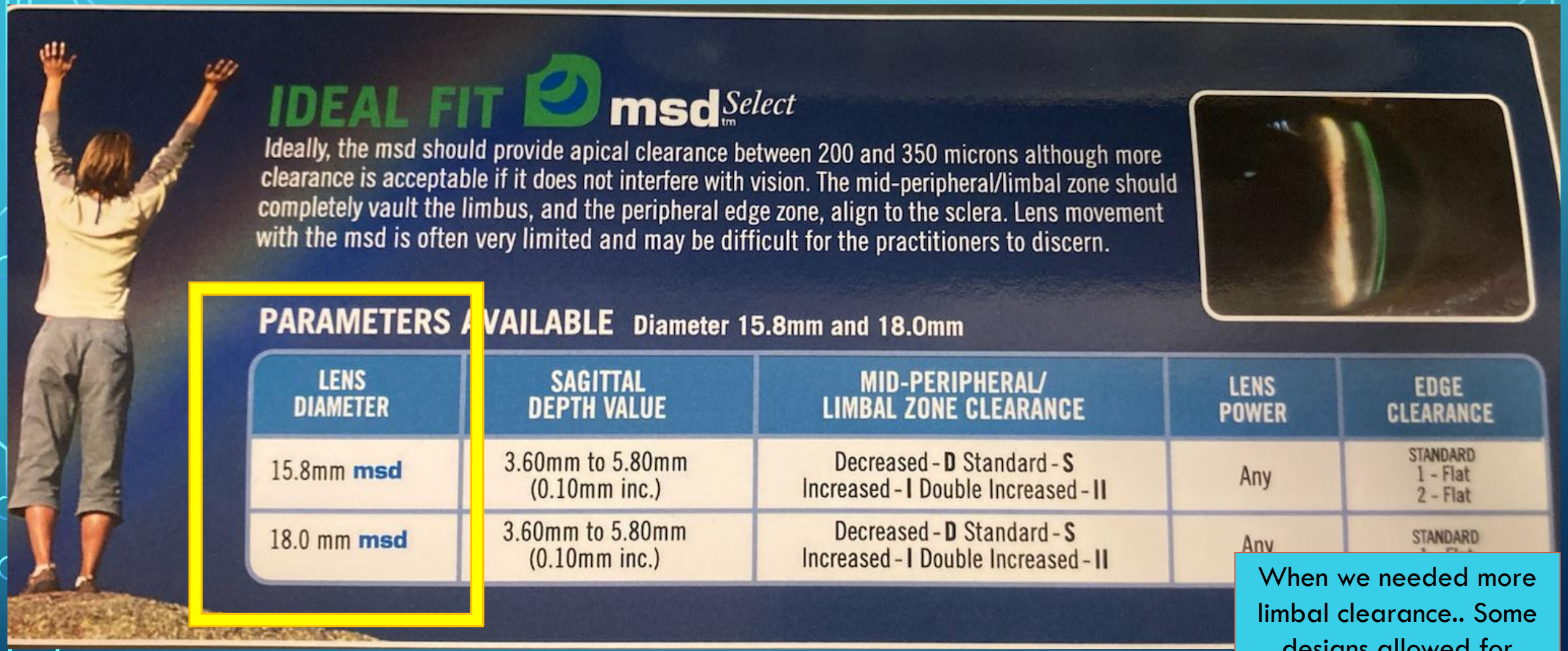
All changes were based on changing a curve radius or width

The transition to SAG and elevation based thinking



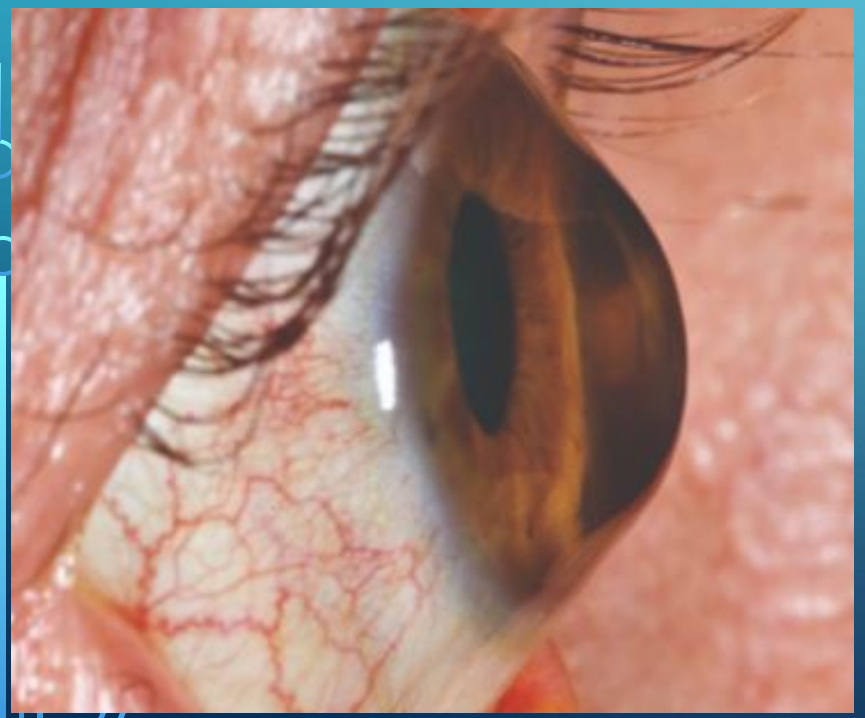




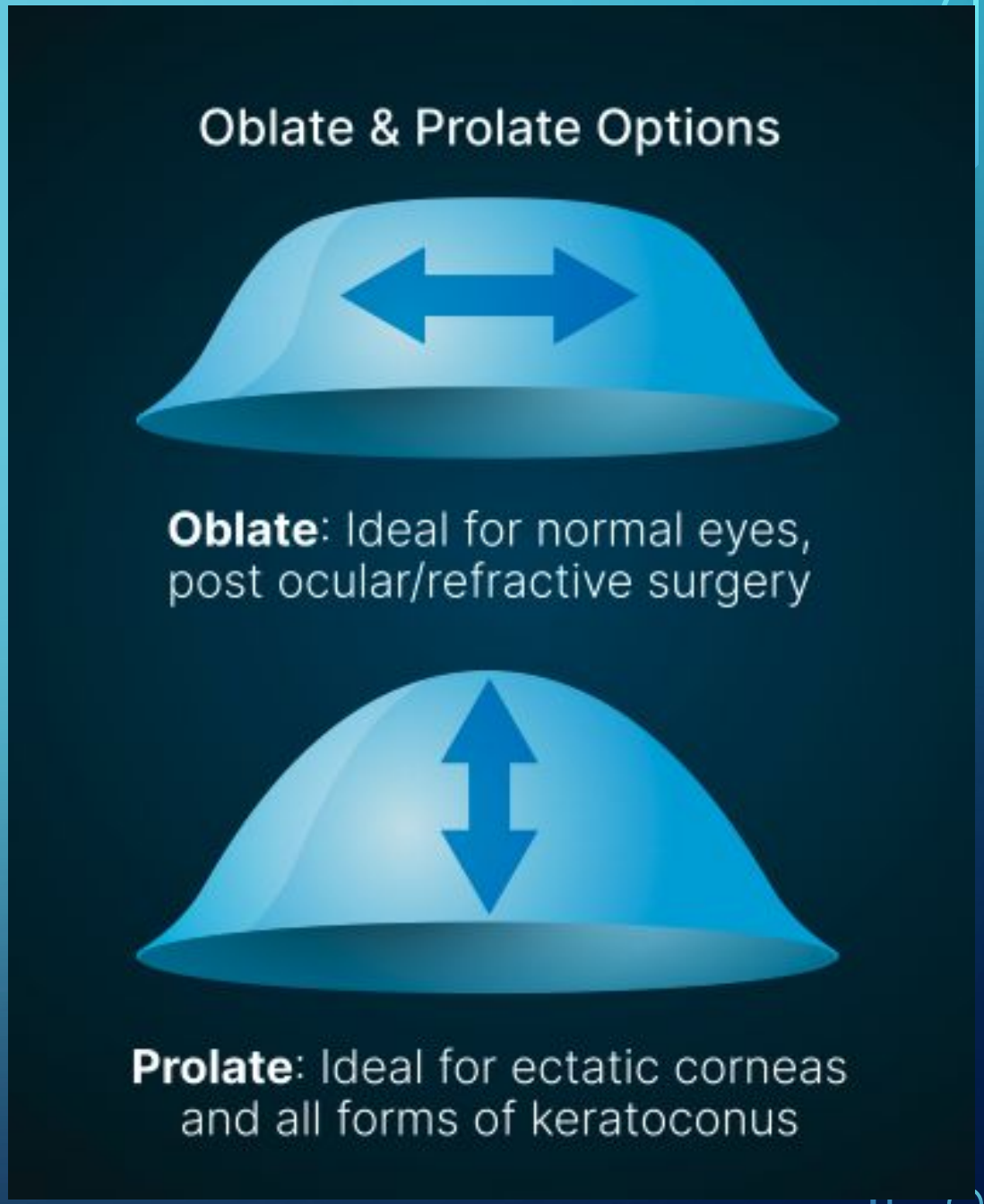


Diameter options had little to do with optimizing the fit – more just full scleral vs mini scleral based on fitter preference

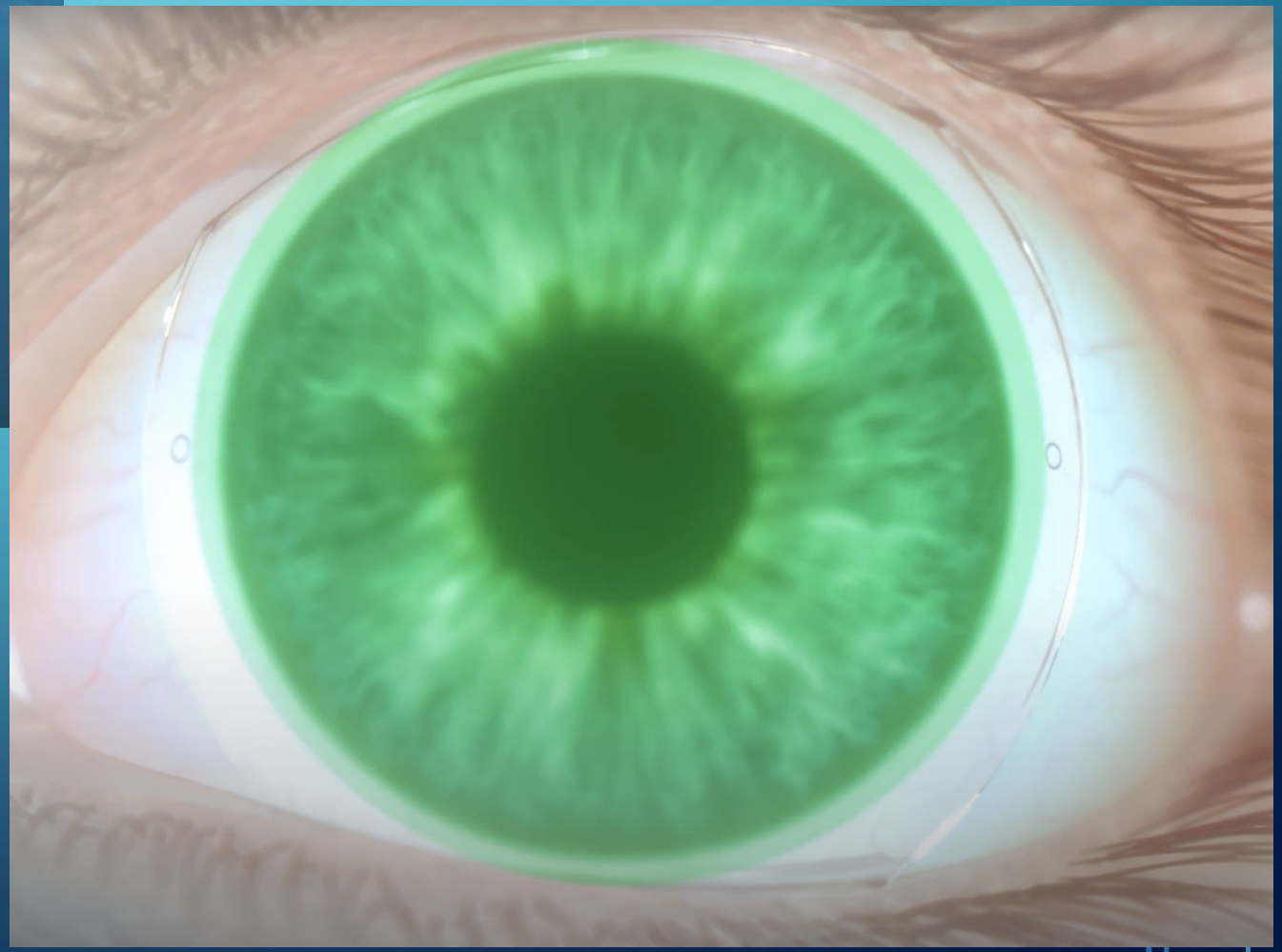
When we needed more limbal clearance.. Some designs allowed for diameter adjustments, but you didn't always know how much to adjust



Geometry Options Became More Common within Fit Sets to Improve Uniformity of Vault



With an Improved Awareness of Scleral Shape, Haptic Toricity was Increasingly Standard in Fitting Sets



EARLY TECHNIQUES

- Required the fitter have a knowledge and understanding of what drove depth
  - Larger cornea vs smaller cornea
  - Flatter vs steeper cornea
  - Post surgical impacts
- Was more trial and error than science
- Still highly successful and more inexpensive

EARLY TECHNIQUES

- Even without technology, our understanding of how to fit has evolved
- Diagnostic sets now come with:
  - Different diameters
  - Different geometric shapes
  - Toric or spherical haptics
  - Fitted on SAG and changes are depth driven
- Diagnostically fitted lenses can still be successful the vast majority of the time
- Just know how to make lens adjustments to

EARLY TECHNIQUES VS. UPDATED TECHNIQUES

Diagnostic Lens Fitting

Instrument Aided Diagnostic Fitting

Instrument Fitted Lenses

Impression Based Lenses

Least expensive

More time consuming

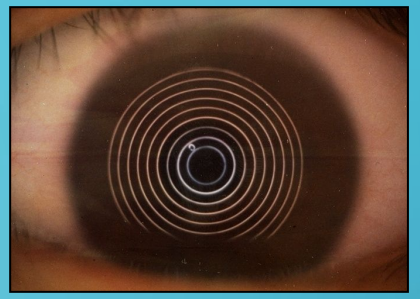
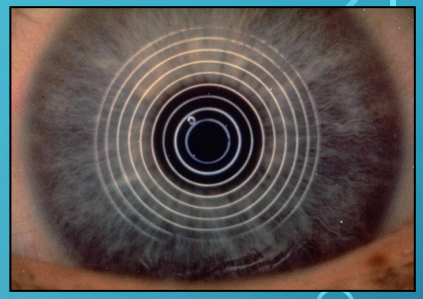
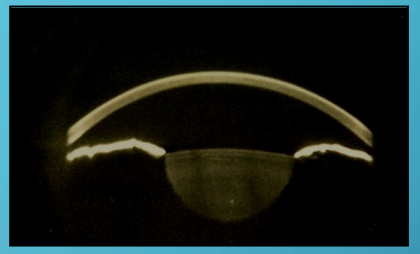
Less convenient

Most expensive

Less time

More convenient

DIAGNOSTIC LENS FITTING 2023


- Ensure you understand how your lens design of choice is fitted!
  - Become familiar with the fitting guide
- When you begin the fitting process, understand that eye you are fitting
  - Large / small / average corneal diameter
    - This drives SAG and the needed lens diameter
  - Geometry
    - To ensure the best possible tear layer under the lens, choose a lens that mimics the ocular surface when possible and appropriate
      - Optimizes fit and oxygen to the cornea

INITIAL LENS SELECTION: FACTORS THAT IMPACT SAG AND SHAPE

Deepest

Shallowest

Most Prolate

Advanced Central KC

Central Nodules

Moderate Central KC

Normal cornea

Post PK

Advanced moderately decentered KC

Peripheral Nodules

Pellucid Marginal Degen

Post RK

Post LASIK

Most Oblate

DIAGNOSTIC FITTING - ASSESS VAULT

- If vault is clearly too deep or too shallow (>450, <150) then put on a more appropriate depth lens

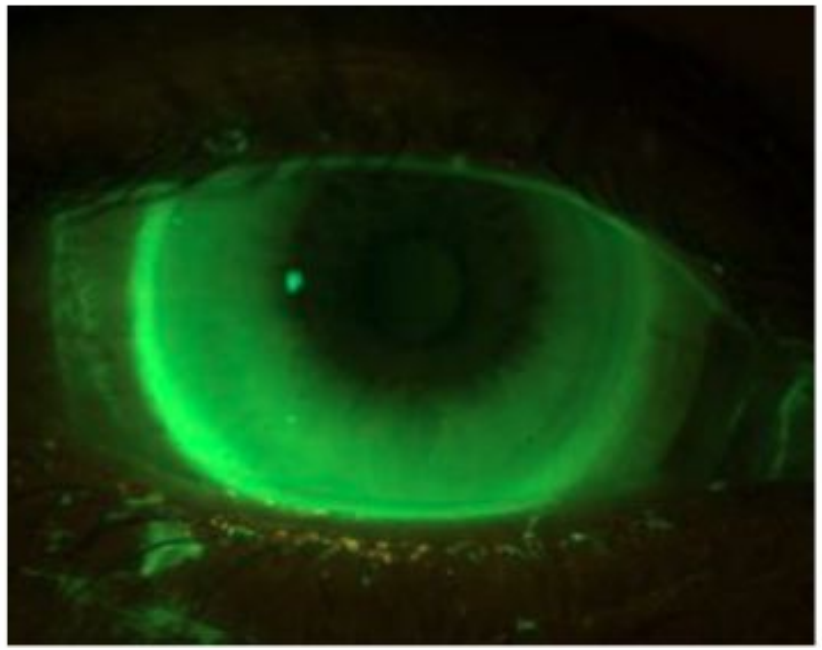


Figure 1. Unacceptable central touch

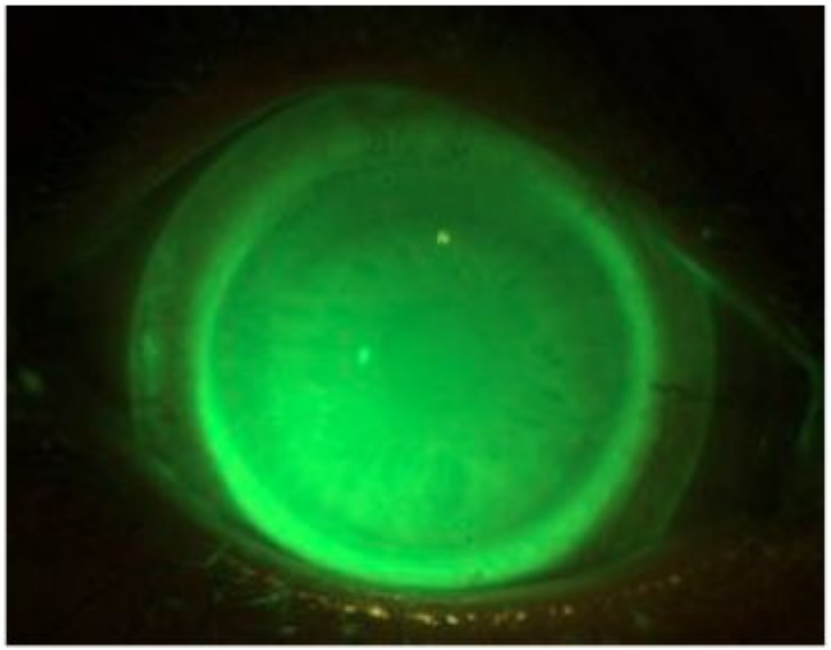
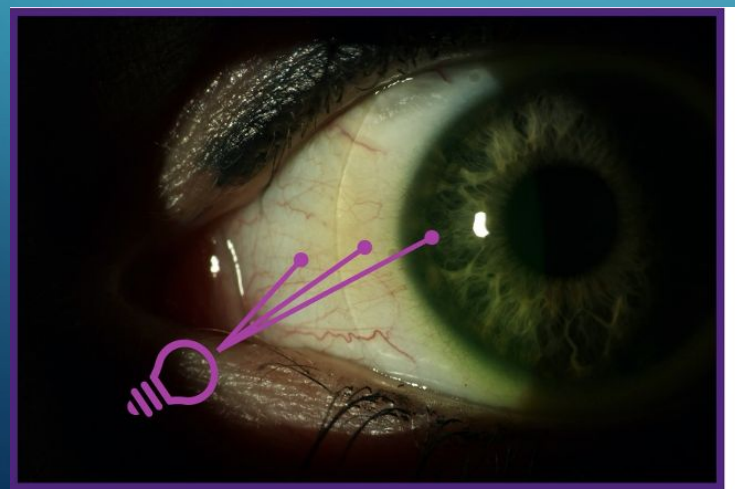
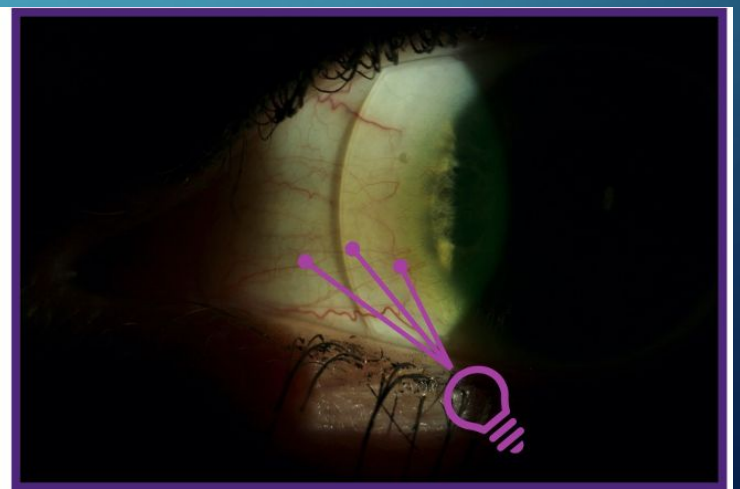


Figure 2. Central Clearance

DIAGNOSTIC FITTING - ASSESS EDGES

- Make sure to look for signs of a tight edge (compression) or a loose edge (edge lift or excessive vertical movement) by moving your light source to check from all angles
- If too flat or steep, note location you need the edges modified and order them with modification





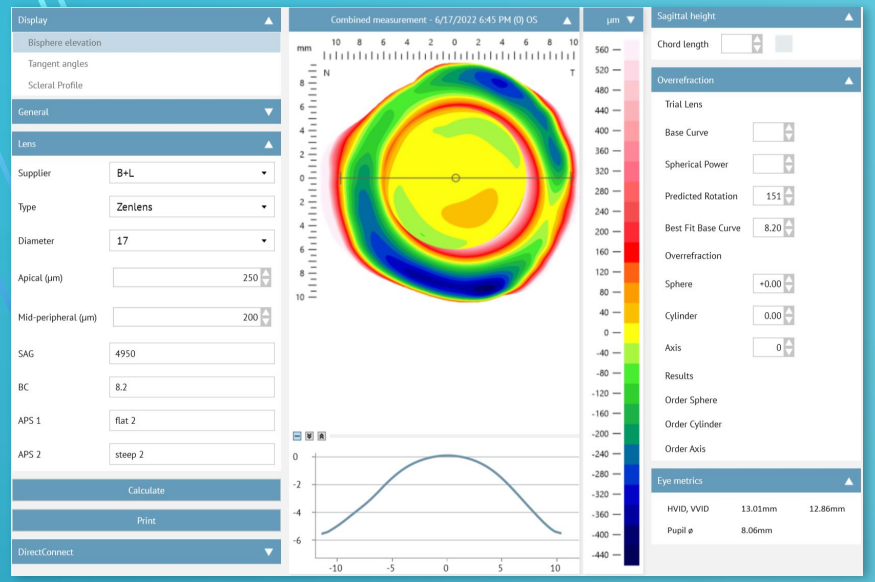
DIAGNOSTIC FITTING – OVER REFRACT

- Over refract spherically first – if VA is good then you are done
- If VA is reduced, do a SCOR
  - If cylinder found is small (<1.00 D) and you are modifying the edges, resist adding cyl to the lens initially until the fit is closer to complete
  - If cylinder is significant and needed for reasonable acuity then a front toric can be added

DIAGNOSTIC FITTING – THAT'S IT!

- The key is to find the best lens you have in your set, get it on the eye, let it sit a bit if you can, adjust SAG and edges to optimize fit, over refract and order

- Advanced fitting really just involves getting to that best lens a little quicker, but you still need to be able to assess the lens for modification



ADVANCED TECHNIQUES

USE OF TECHNOLOGY TO AID IN DIAGNOSTIC FITTING AND EMPIRICAL FITTING

INSTRUMENT AIDED FITTING

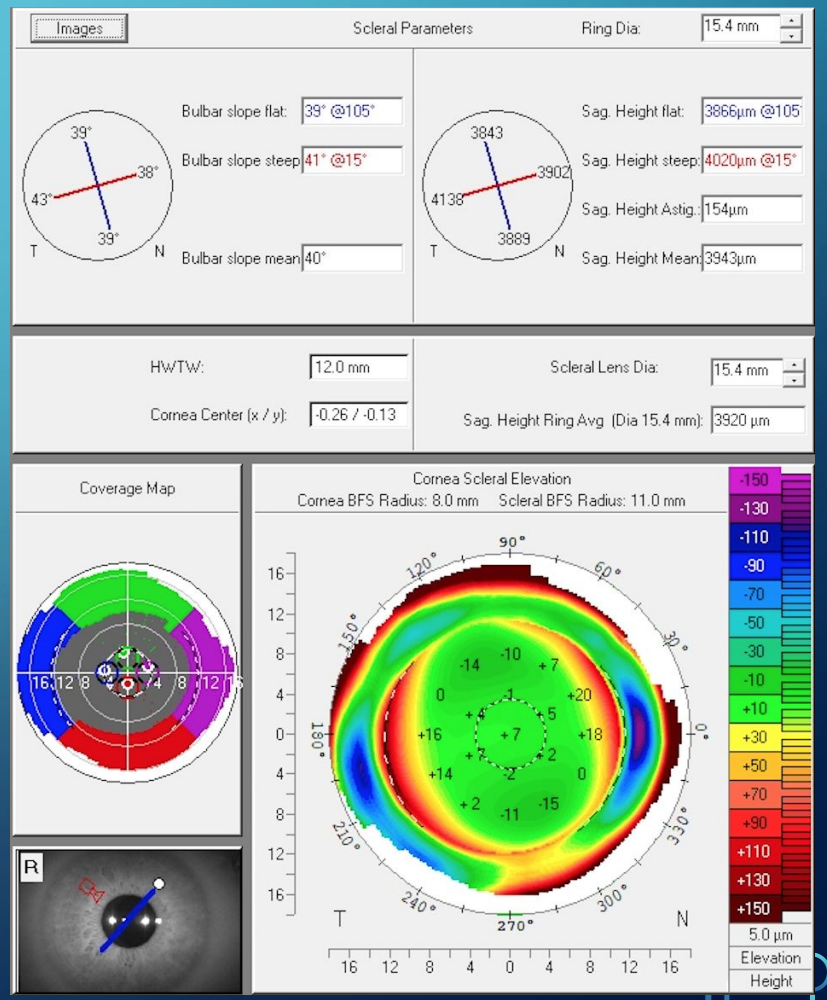
You use the data the instrument provided to choose your initial DX lens

You should be able to fit 90+% of eyes with a single diagnostic lens – adding efficiency and creating a positive impression with your patient.

Choose toricity of haptic

Choose diameter

Choose SAG

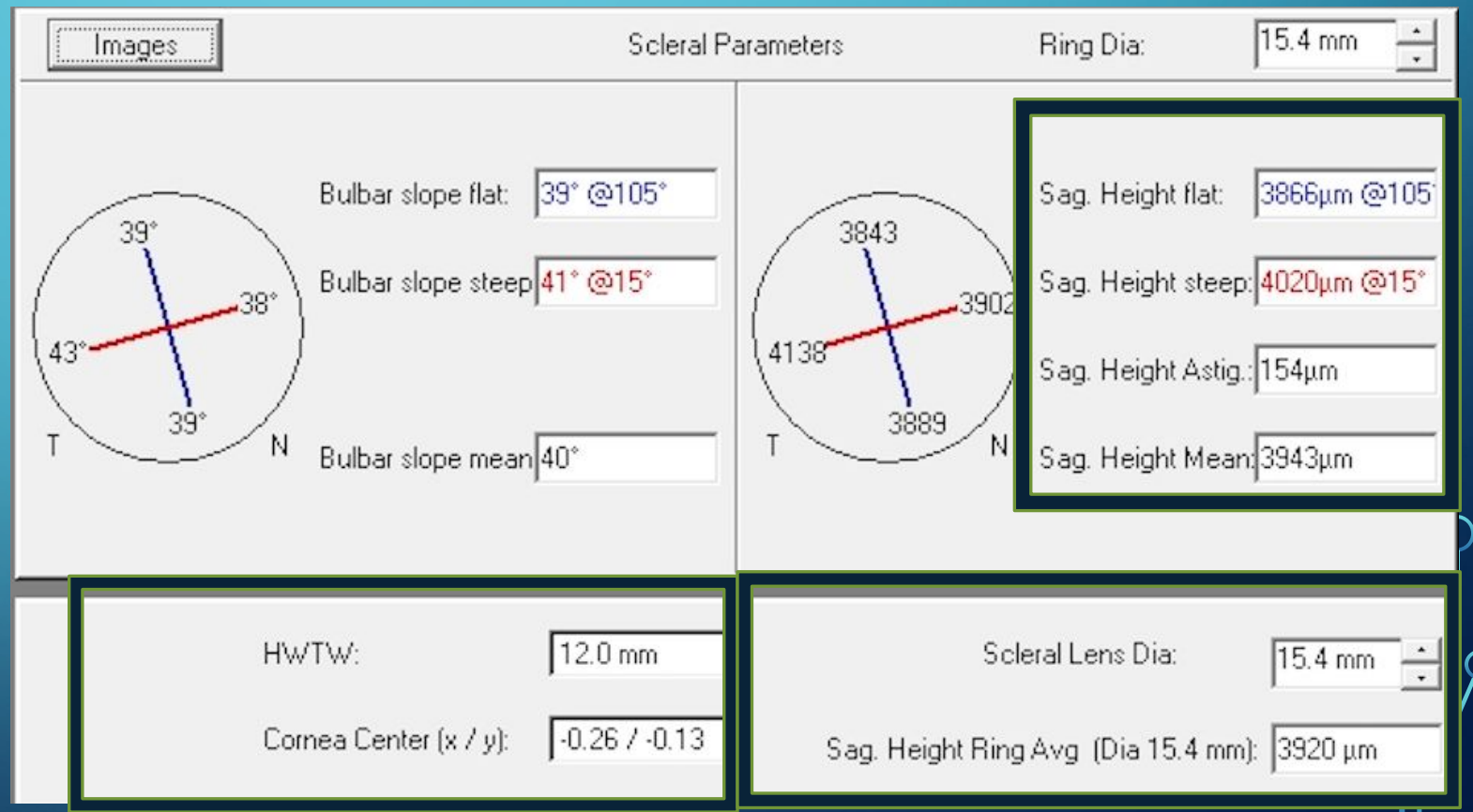


INSTRUMENT AIDED DIAGNOSTIC FITTING

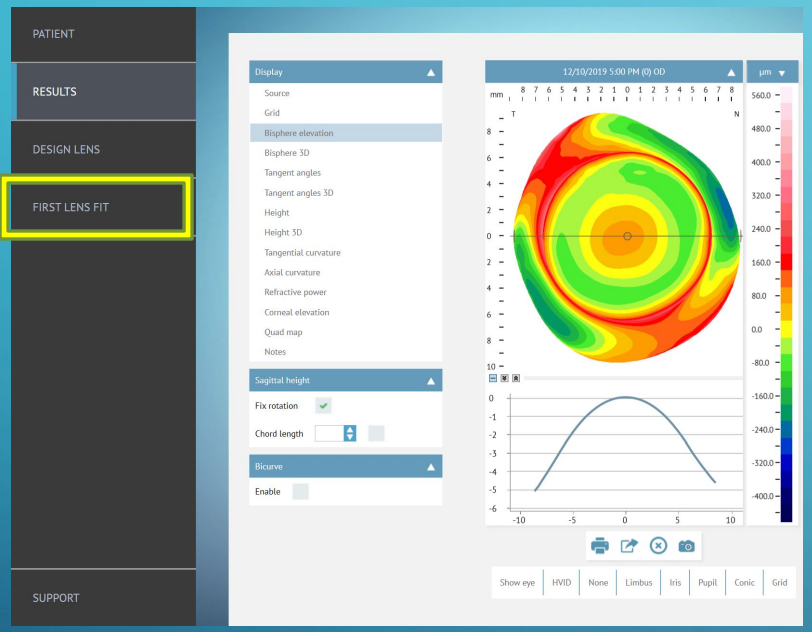
Choose toricity of haptic

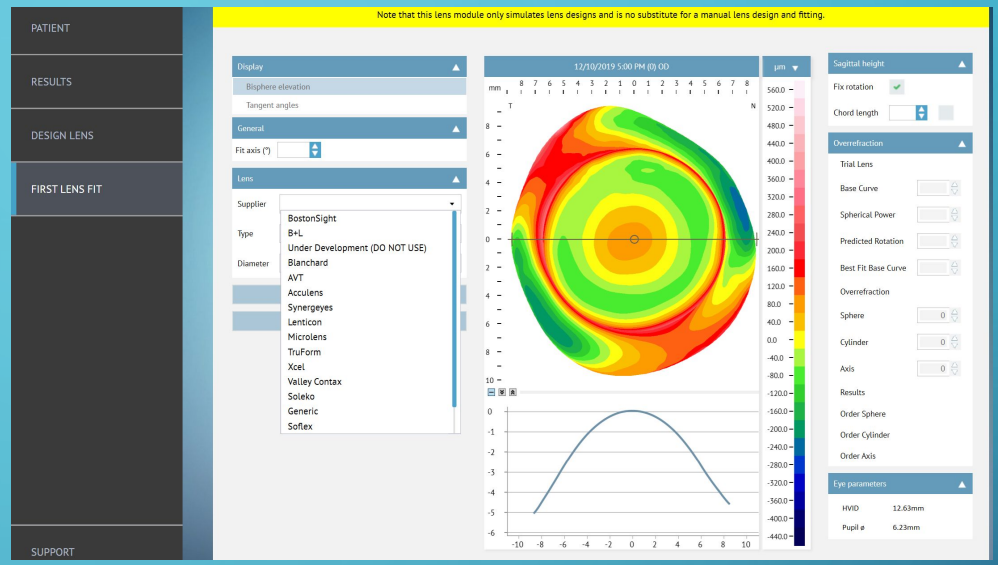
Choose SAG

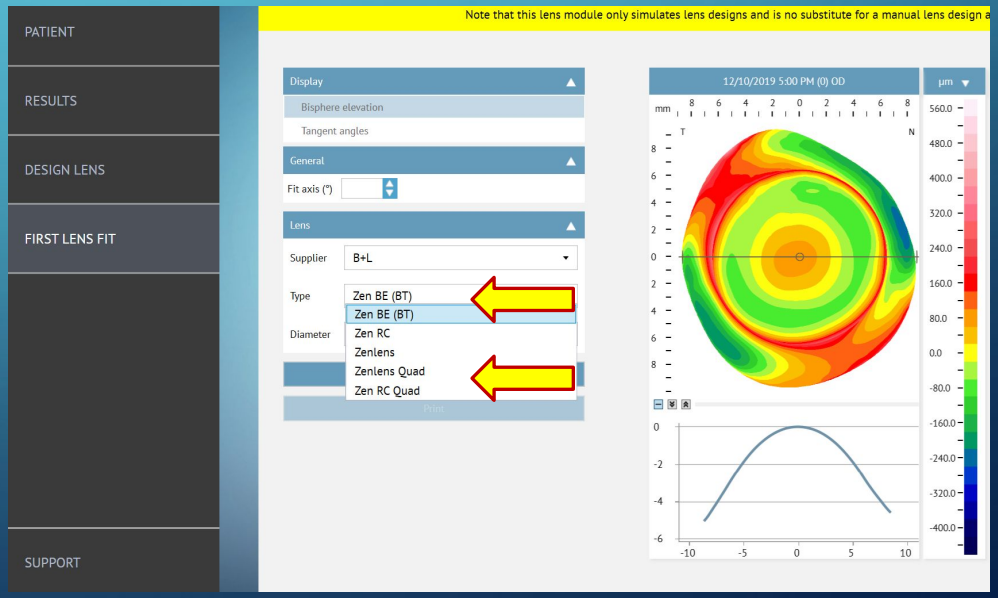
Choose diameter

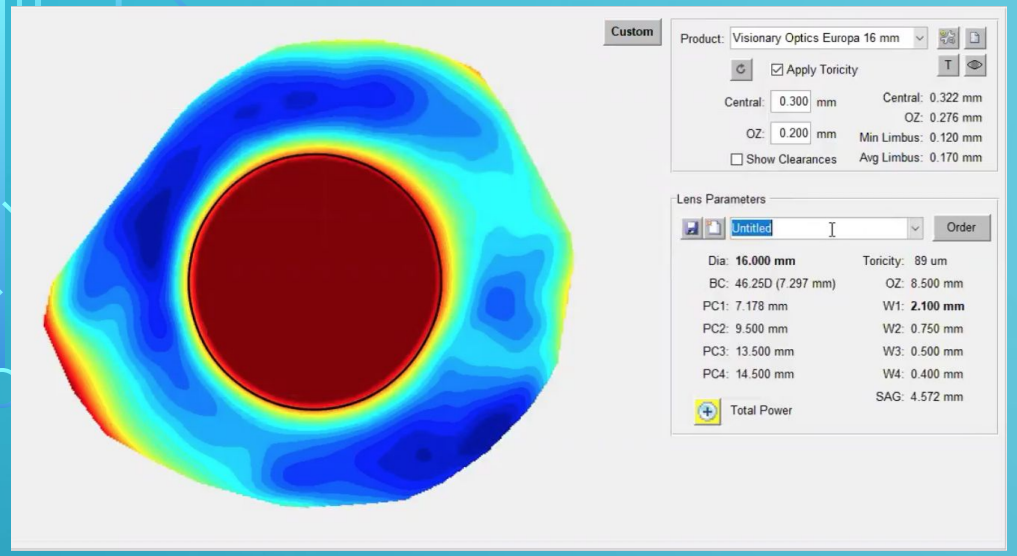


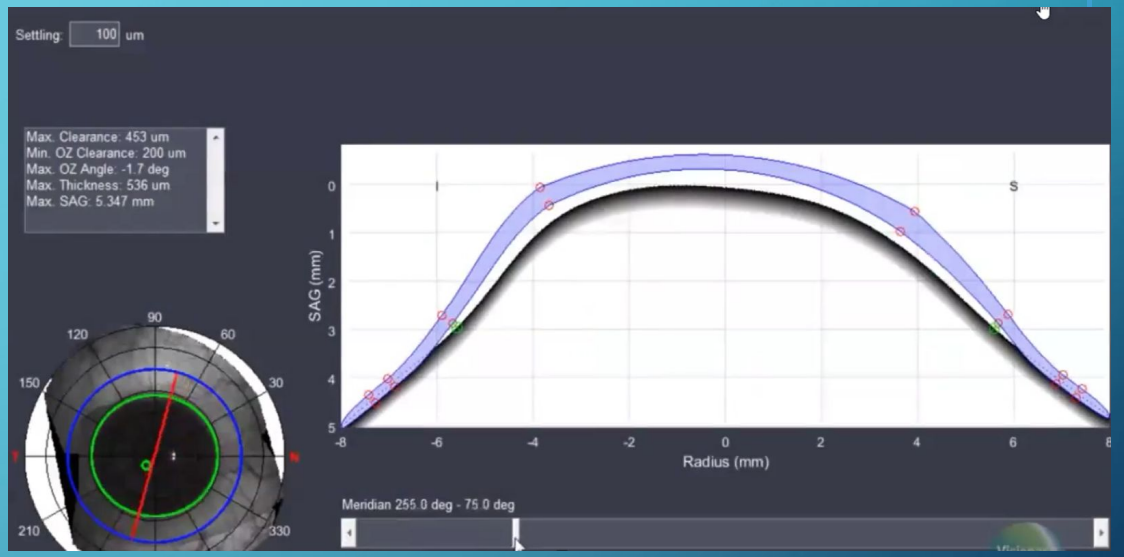
INSTRUMENT FITTED LENSES

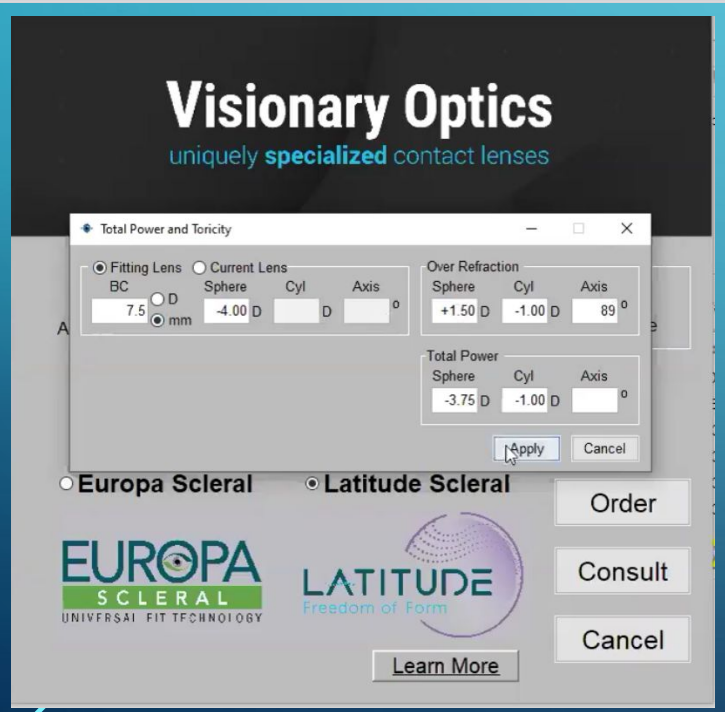


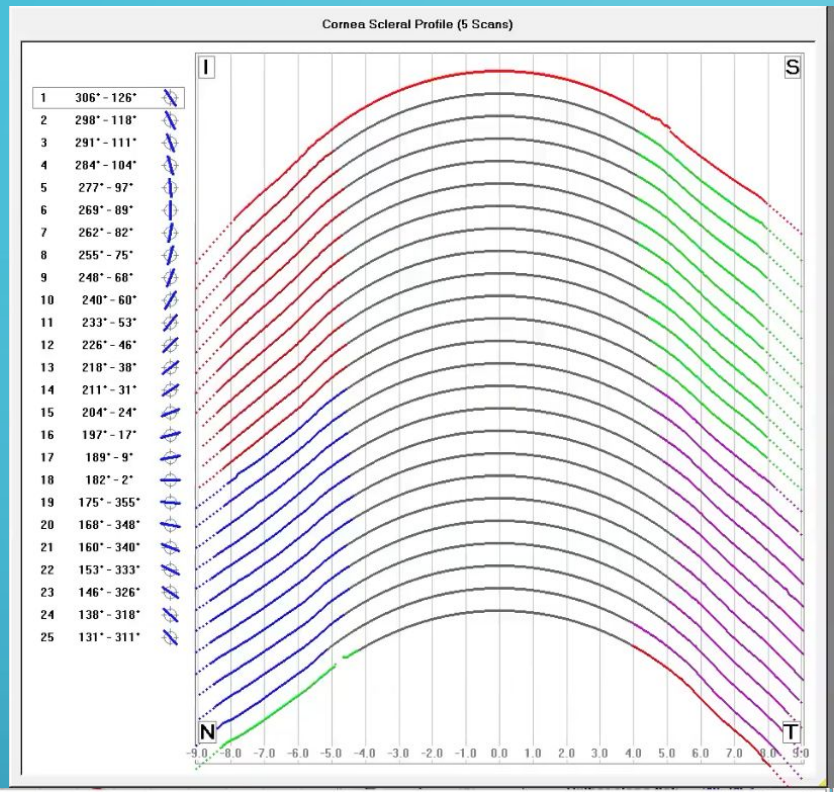


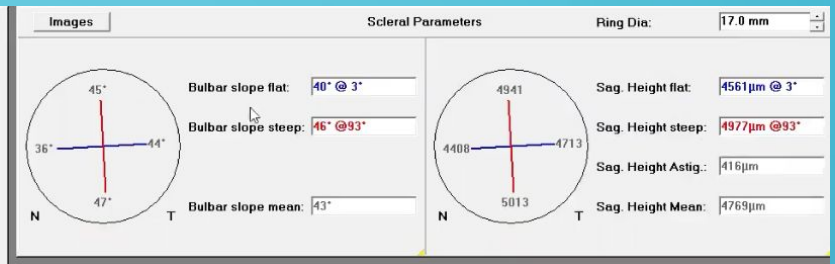



Custom
Product: Visionary Optics Europa 16 mm
Apply Toricity
Central: 0.300 mm
OZ: 0.200 mm
Show Clearances
Central: 0.322 mm
OZ: 0.276 mm
Min Limbus: 0.120 mm
Avg Limbus: 0.170 mm
Lens Parameters
Untitled
Order
Dia: 16.000 mm
BC: 46.25D (7.297 mm)
PC1: 7.178 mm
PC2: 9.500 mm
PC3: 13.500 mm
PC4: 14.500 mm
Toricity: 89 um
OZ: 8.500 mm
W1: 2.100 mm
W2: 0.750 mm
W3: 0.500 mm
W4: 0.400 mm
SAG: 4.572 mm
Total Power

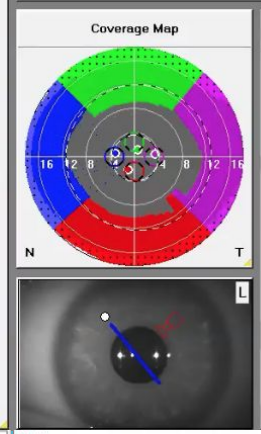

Settling: 100 um
Max. Clearance: 453 um
Min. OZ Clearance: 200 um
Max. OZ Angle: -1.7 deg
Max. Thickness: 536 um
Max. SAG: 5.347 mm
SAG (mm)
Radius (mm)
Meridian 255.0 deg - 75.0 deg


Visionary Optics
uniquely specialized contact lenses
Total Power and Toricity
Fitting Lens
Current Lens
BC
Sphere
Cyl
Axis
Over Refraction
Total Power
Apply
Cancel
Europa Scleral
Latitude Scleral
EUROPA SCLERAL
UNIVERSAL FIT TECHNOLOGY
LATITUDE
Freedom of Form
Order
Consult
Cancel
Learn More


Cornea Scleral Profile (5 Scans)
1 306° - 126°
2 298° - 118°
3 291° - 111°
4 284° - 104°
5 277° - 97°
6 269° - 89°
7 262° - 82°
8 255° - 75°
9 248° - 68°
10 240° - 60°
11 233° - 53°
12 226° - 46°
13 218° - 38°
14 211° - 31°
15 204° - 24°
16 197° - 17°
17 189° - 9°
18 182° - 2°
19 175° - 355°
20 168° - 348°
21 160° - 340°
22 153° - 333°
23 146° - 326°
24 138° - 318°
25 131° - 311°
I
S
N
T
-9.0 -8.0 -7.0 -6.0 -5.0 -4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0


Images
Scleral Parameters
Ring Dia: 17.0 mm
45°
36°
44°
47°
N
T
Bulbar slope flat: 40° @ 3°
Bulbar slope steep: 46° @93°
Bulbar slope mean: 43°
4941
4408
4713
5013
N
T
Sag. Height flat: 4561µm @ 3°
Sag. Height steep: 4977µm @93°
Sag. Height Astig.: 416µm
Sag. Height Mean: 4769µm


HWTW: 12.0 mm
Cornea Center (x / y): 0.29 / -0.01 mm
Central Clearance: 300 mm
Sag. Height Scleral Lens (Dia 17.0 mm): 5069 µm


Coverage Map
N
T
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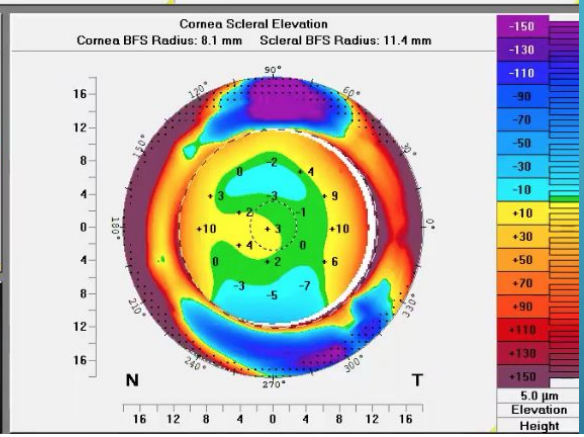
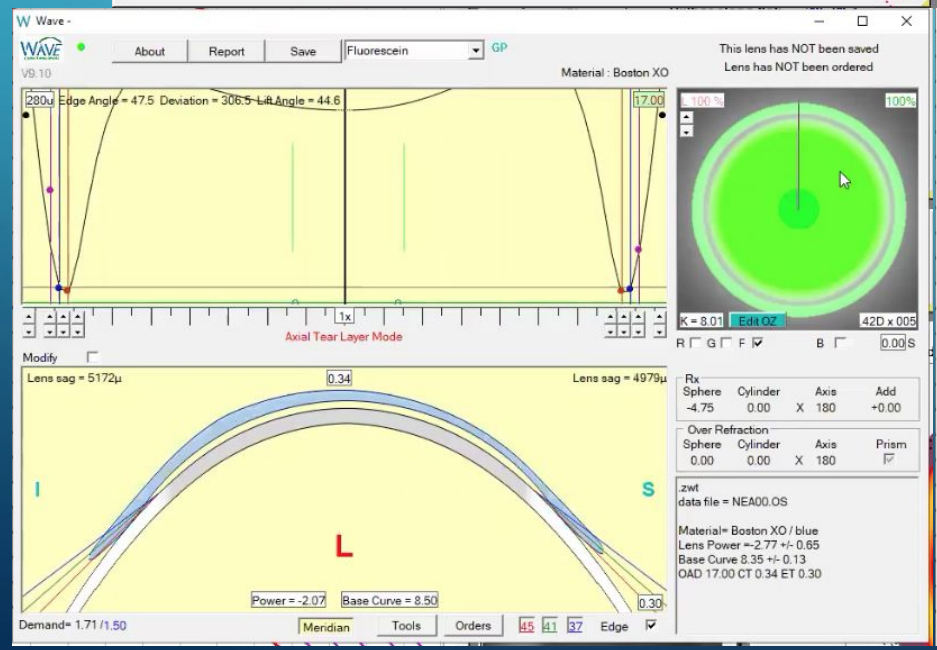
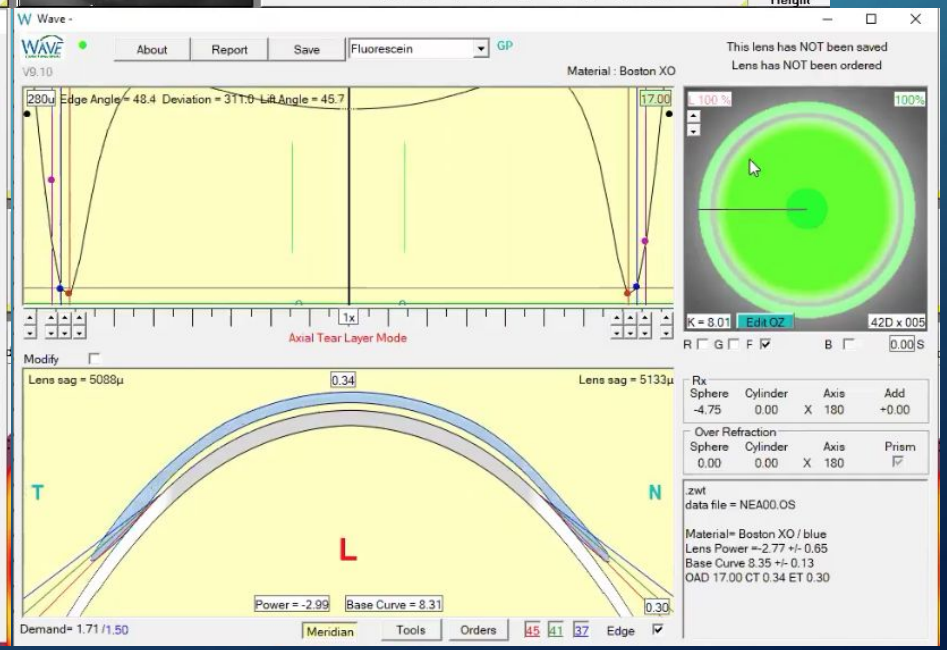

Cornea Scleral Elevation
Cornea BFS Radius: 8.1 mm Scleral BFS Radius: 11.4 mm
N
T
-150
-130
-110
-90
-70
-50
-30
-10
+10
+30
+50
+70
+90
+110
+130
+150
5.0 µm
Elevation
Height


Wave -
About
Report
Save
Fluorescein
GP
V9.10
Material : Boston XO
This lens has NOT been saved
Lens has NOT been ordered
280u Edge Angle = 47.5 Deviation = 306.5 Lift Angle = 44.6
17.00
100%
K = 8.01
Edit OZ
42D x 005
Axial Tear Layer Mode
Modify
Lens sag = 5172µ
0.34
Lens sag = 4979µ
I
S
L
Power = -2.07
Base Curve = 8.50
0.30
Demand= 1.71 /1.50
Meridian
Tools
Orders
45 41 37
Edge
Rx
Sphere Cylinder Axis Add
-4.75 0.00 X 180 +0.00
Over Refraction
Sphere Cylinder Axis Prism
0.00 0.00 X 180
.zwt
data file = NEA00.OS
Material= Boston XO / blue
Lens Power =-2.77 +/- 0.65
Base Curve 8.35 +/- 0.13
OAD 17.00 CT 0.34 ET 0.30

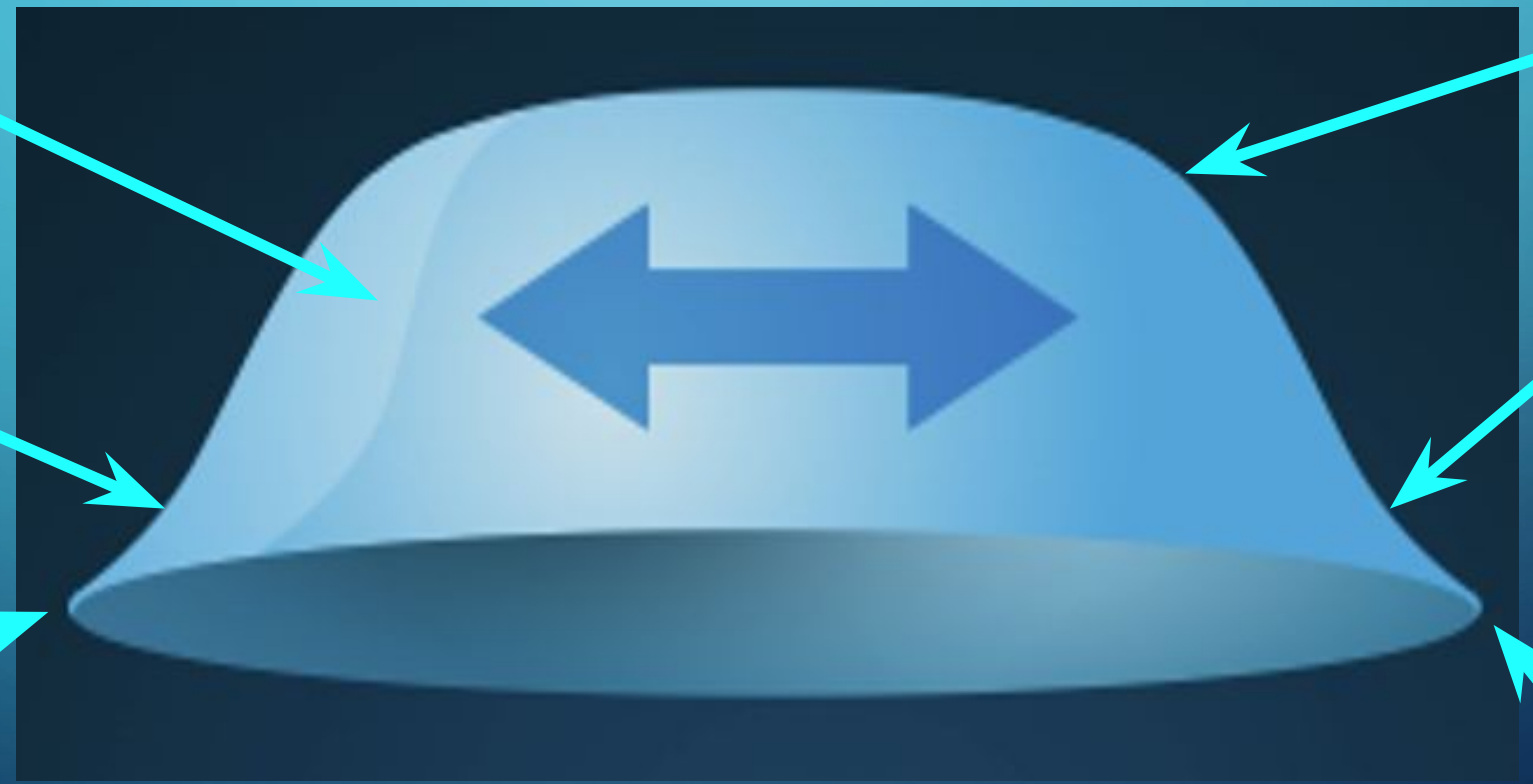

Wave -
About
Report
Save
Fluorescein
GP
V9.10
Material : Boston XO
This lens has NOT been saved
Lens has NOT been ordered
280u Edge Angle = 48.4 Deviation = 311.0 Lift Angle = 45.7
17.00
100%
K = 8.01
Edit OZ
42D x 005
Axial Tear Layer Mode
Modify
Lens sag = 5088µ
0.34
Lens sag = 5133µ
T
N
L
Power = -2.99
Base Curve = 8.31
0.30
Demand= 1.71 /1.50
Meridian
Tools
Orders
45 41 37
Edge
Rx
Sphere Cylinder Axis Add
-4.75 0.00 X 180 +0.00
Over Refraction
Sphere Cylinder Axis Prism
0.00 0.00 X 180
.zwt
data file = NEA00.OS
Material= Boston XO / blue
Lens Power =-2.77 +/- 0.65
Base Curve 8.35 +/- 0.13
OAD 17.00 CT 0.34 ET 0.30

IMPRESSION BASED LENSES

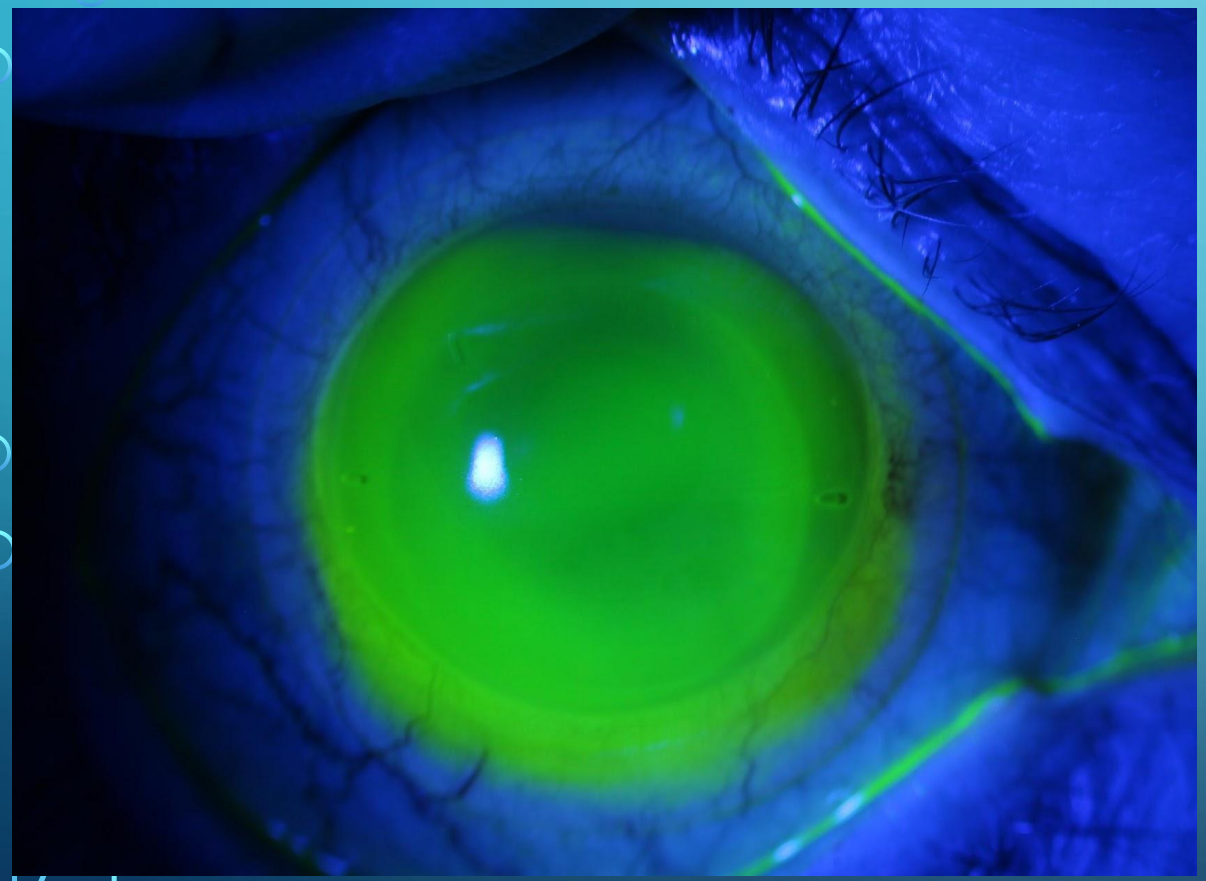
UPDATED TECHNIQUES

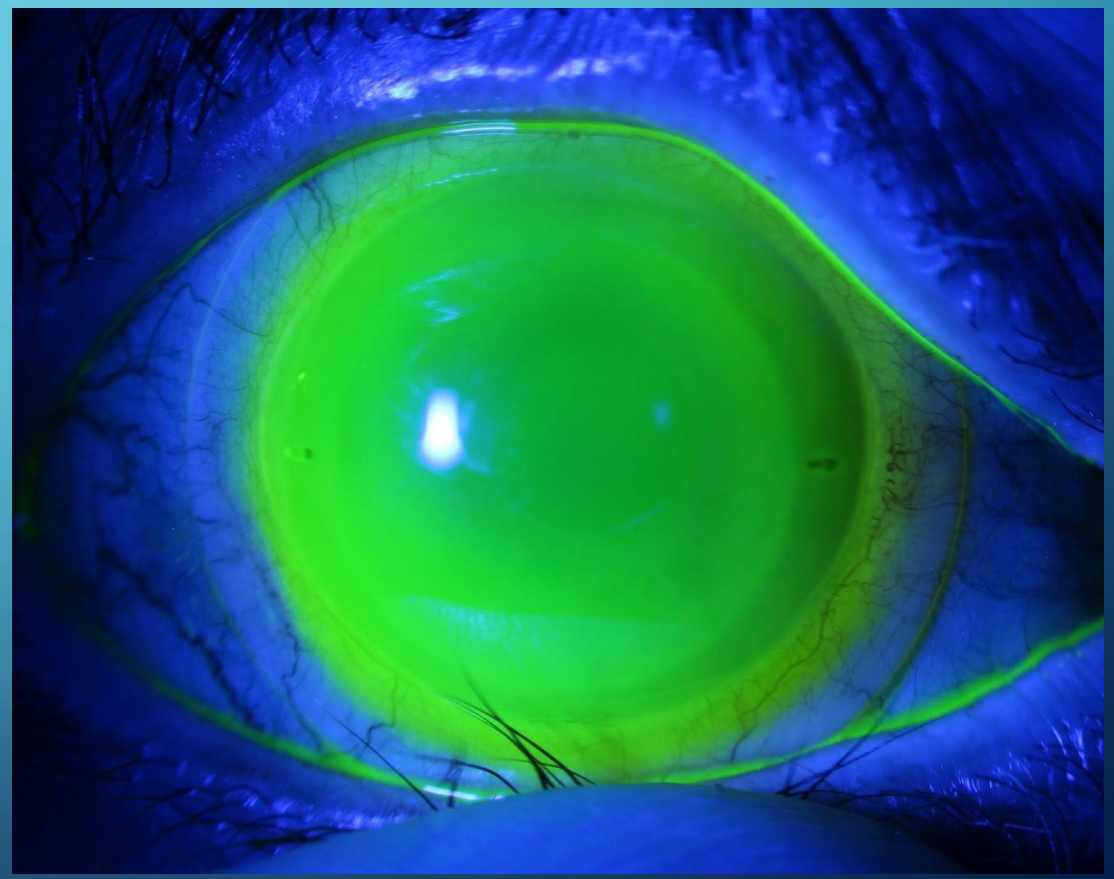
USING YOUR SKILLS TO ENHANCE FITTING OUTCOMES

TERMINOLOGY



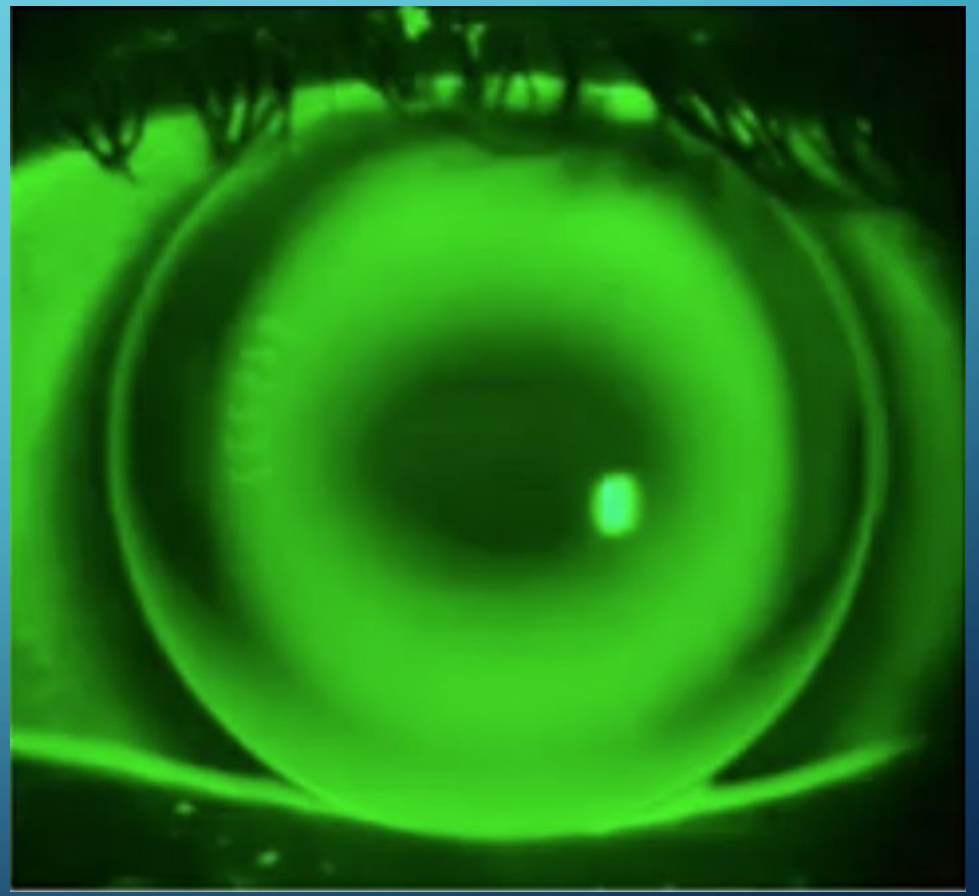
MOVE YOUR LENSES INTO POSITION TO GET A BETTER IDEA OF THE LENS TO EYE RELATIONSHIP





ALIGNMENT… THE ORTHO K EXAMPLE

- Spherical Lens on Toric Cornea
- How do we address this?
- We add DEPTH – but where?
- In the base curve, reverse curve, or alignment zone?

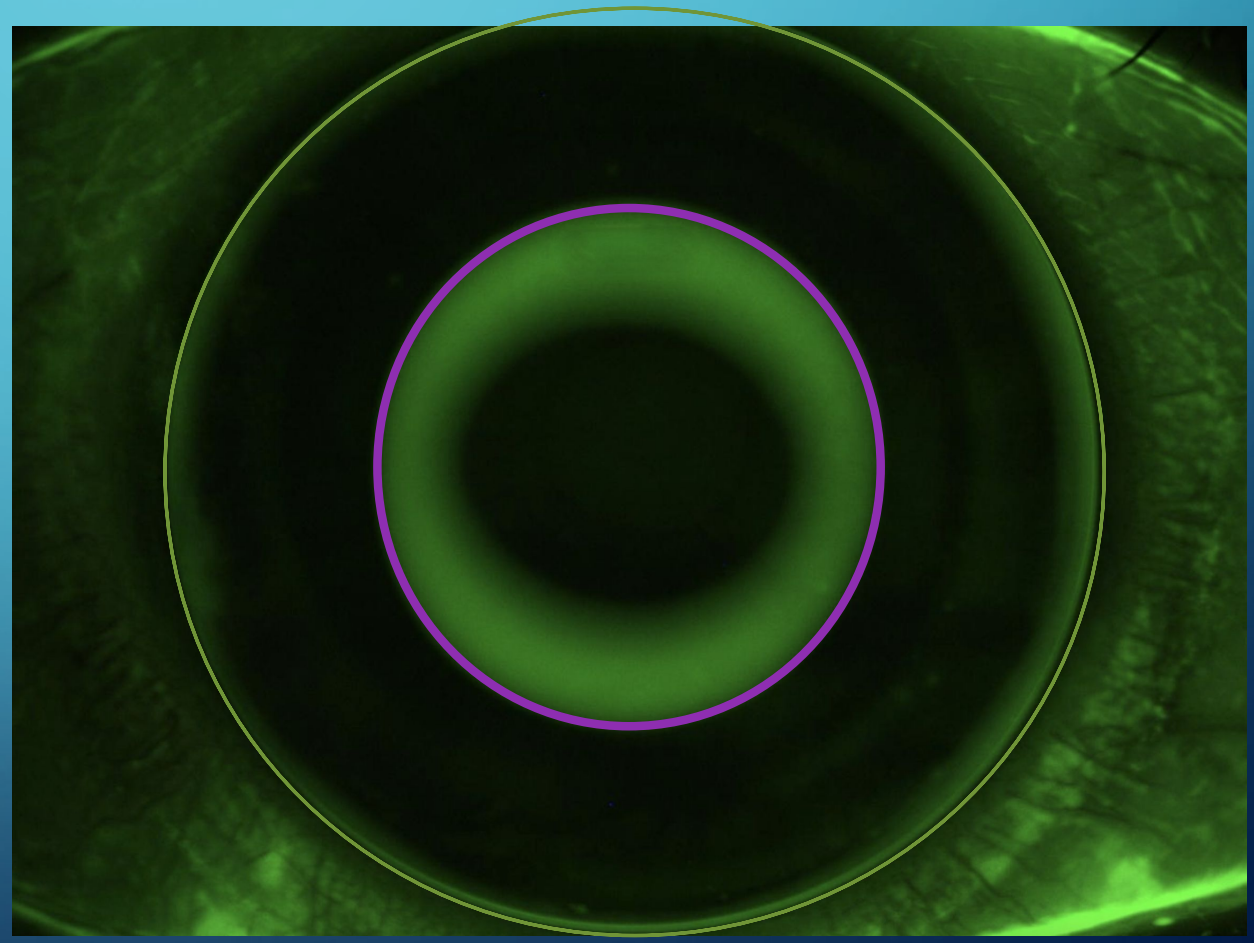


ALIGNMENT.. THE ORTHO K EXAMPLE

- A proper ortho-k lens fit will maximize the surface area of the alignment zone through added depth in the RETURN ZONE in one meridian, as well as steepening the alignment zone

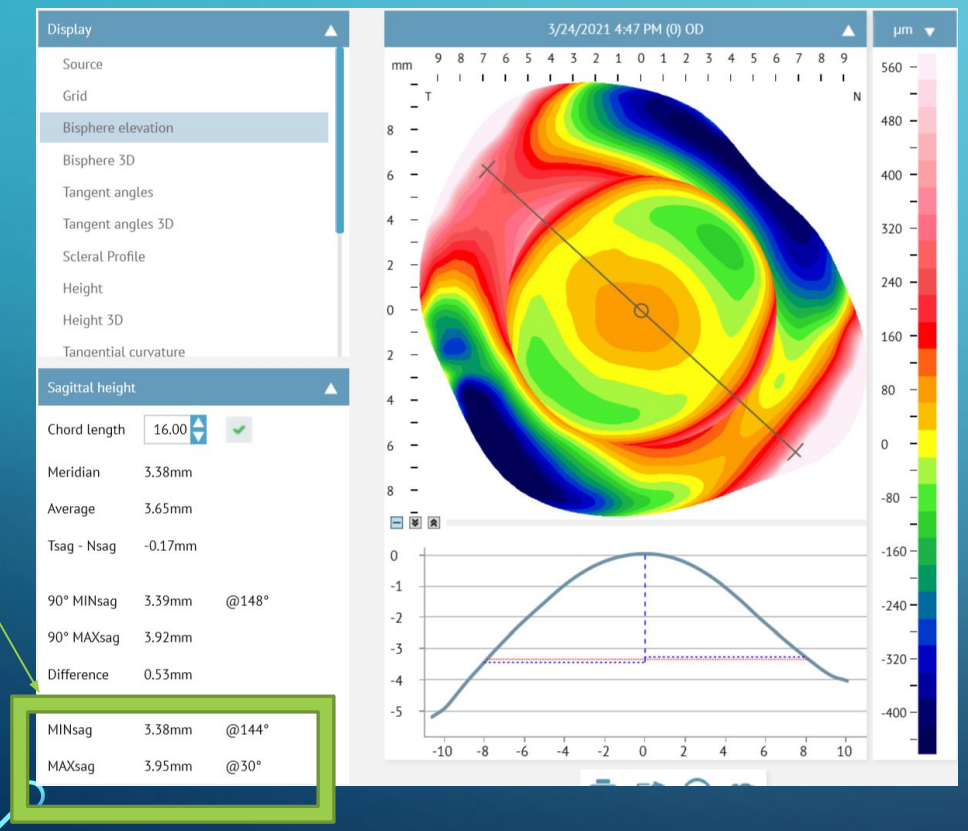
- The ratio is roughly 2:1

- In order to get a proper scleral lens fit, we should strive for the same thing in the scleral landing zone

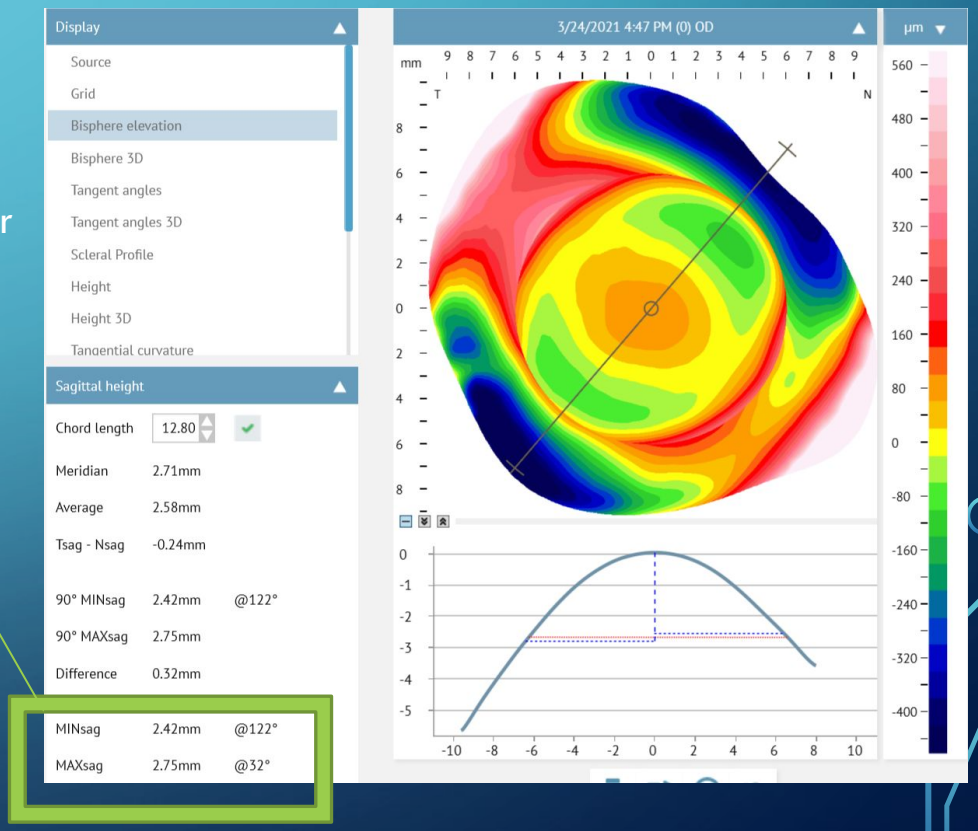


IF YOU HAVE OCULAR SURFACE SHAPE DATA – USE IT!

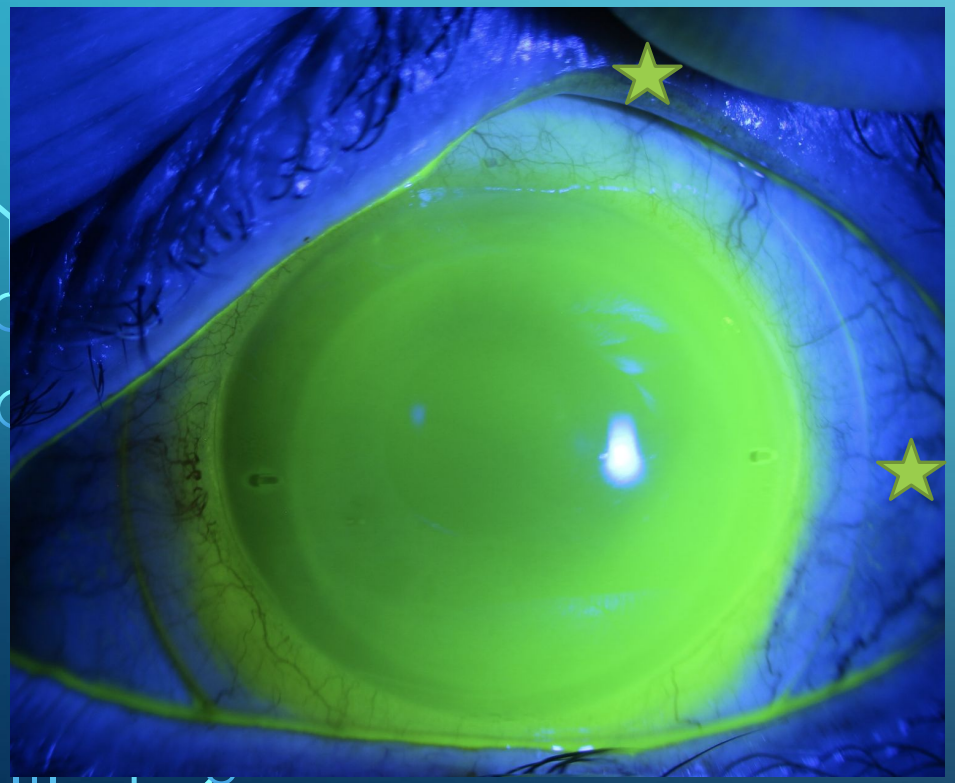
570 microns of toricity at 16 mm – don't just put it in the scleral zone!

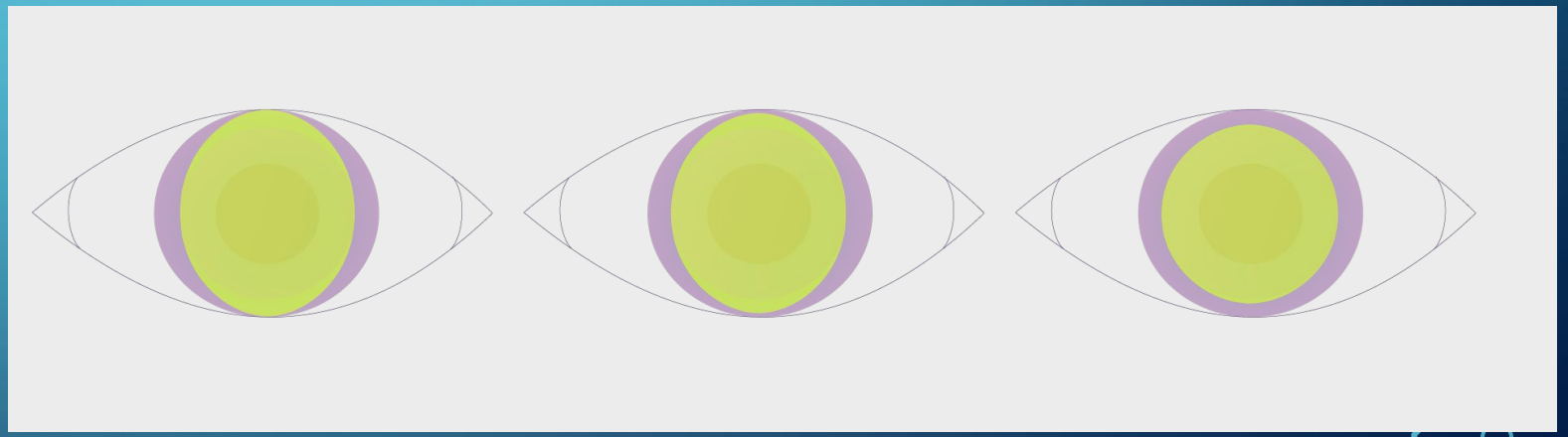


330 microns of toricity inside the vault chamber – put it there and put the remaining 240 in the scleral zone



IF YOU DON'T HAVE OCULAR SURFACE SHAPE DATA, USE YOUR SKILL





UPDATED TECHNIQUES

- Technology can provide more individualized, precise lens fits
  - They come at a price in many cases
- Your lens will only be as good as the scan
- Obtaining scans can be challenging
  - Ironically, the eyes that need customization most are often the hardest to obtain good imaging on
- You can still use your fitting skills to recognize fit issues and how to adjust

FITTING SCLERAL LENSES

- All of this is really about:
  - Getting that first lens ordered
  - How customized you want or need the lens to be
  - How high a priority being efficient and not reusing lenses is for a doctor and their patient

- Ultimately, no matter how you choose to fit your patient, once you have a lens on eye, it comes down to the skill of the fitter and an understanding of how a specific lens is modified to obtain the right outcome

- Anyone can order a highly sophisticated lens – only a skilled fitter will be able to

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