

TOPOGRAPHY EYE - Q

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DISCLOSURES

- Consultant for Bausch and Lomb and Oculus
- Honoraria from Essilor and Tangible Sciences

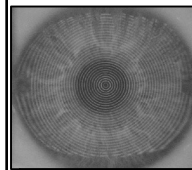
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TOPOGRAPHY EYE - Q

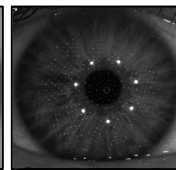
- Types of Instruments
- Types of Scales
- Types of Maps
- Interpreting Maps

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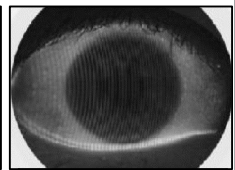
REFLECTION SYSTEMS



**Placido
Reflection**



**LED
Reflection**



**Profilometry
Reflection**

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PLACIDO DISC TOPOGRAPHY

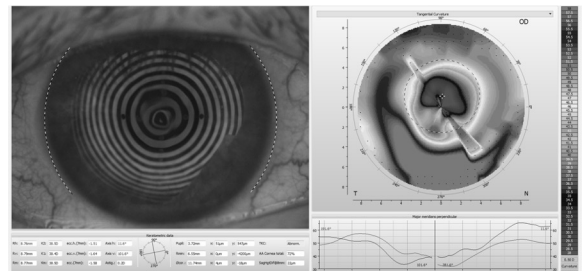
- Reflects a series of rings off the cornea
- Measures how the corneal **curvature** affects the reflection of the rings back
- Interprets corneal shape based on these reflections
- **Tear layer dependent!**



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PLACIDO DISC TOPOGRAPHY

Tear layer dependent means we don't always get accurate data



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PLACIDO DISC TOPOGRAPHY



Large Cone

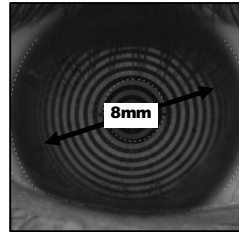


Small Cone

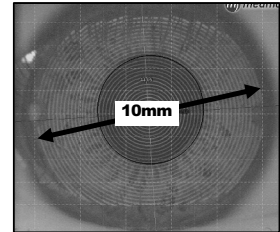
Differences?

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PLACIDO TOPOGRAPHERS



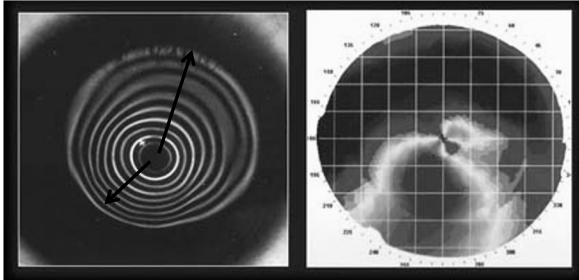
Large Cone



Small Cone

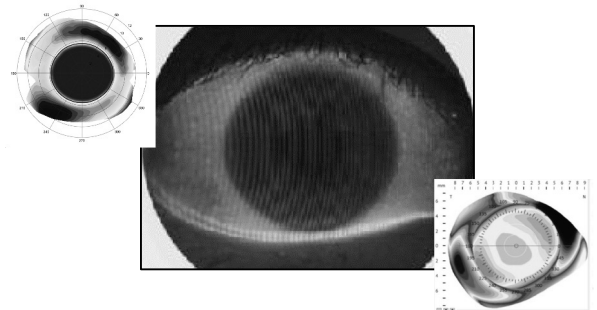
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RINGS VS. COLORS



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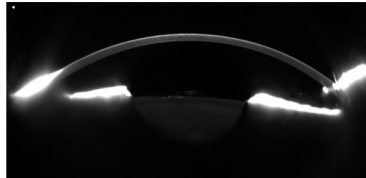
PROFILOMETRY - CORNEAL OR SCLERAL SHAPE



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CORNEAL TOMOGRAPHY

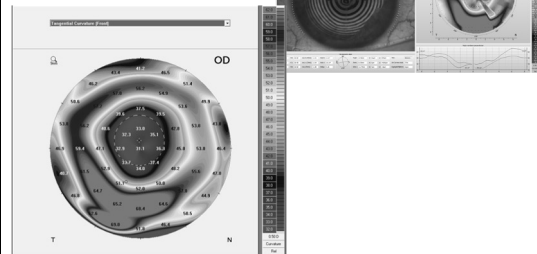
- Uses a slit beam and Scheimpflug camera to take several cross-sectional images of the anterior segment of the eye.
- The individual images are used to construct a 3D model of the eye



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SCHEIMPFLUG IMAGING

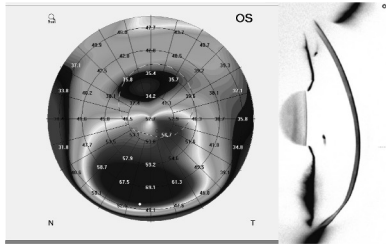
- Not Tear Layer Dependent



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CORNEAL TOMOGRAPHY

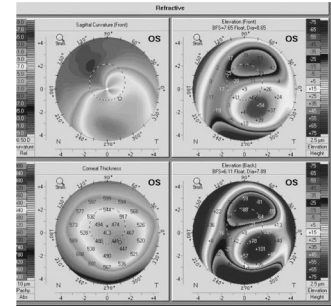
- Two dimensional "slice" through a three dimensional object
- By combining a series of these, you create a 3D representation of the object
- True measurement, not based on a reflection



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CORNEAL TOMOGRAPHY

- Provides true elevation of the anterior and posterior cornea
- Corneal thickness
- Corneal curvature



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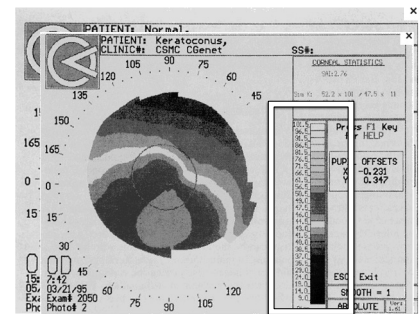
TYPES OF SCALES

- Normalized
- Absolute
- Adjustable

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ABSOLUTE SCALE

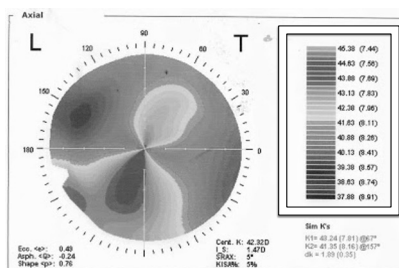
- Takes the full range of powers into account
- Not sensitive
- Applies to apes with all other maps



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NORMALIZED SCALE

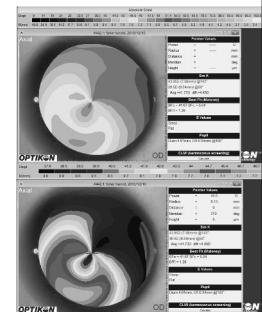
- Determines the scale based upon the lowest and highest powers / points on the map and uses them as the low and high ends of the scale



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ADJUSTABLE SCALE

- Allows you to choose the high and low end of the scale to suit your needs
- You can make the top and bottom values anything you want
- Can allow you to compare apes to apes on a more detailed scale
 - For example: Setting top value to 70 and bottom to 20 or something like that



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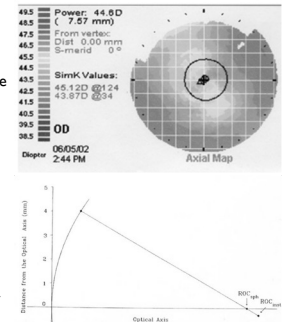
TYPES OF MAPS

- Axial Curvature
- Tangential Curvature
- Elevation

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AXIAL MAP

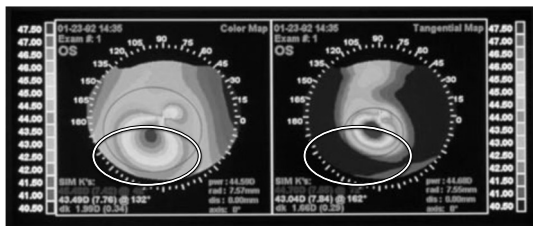
- Distance along the normal from the corneal surface to the optic axis
- Reference distance, not a true curvature
- Running average / excludes extreme values
- Error increases toward periphery
- Spherically biases
- May miss abrupt changes
- Significant smoothing
- Best for determining K Values and understanding corneal refractive power



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TANGENTIAL CURVATURE

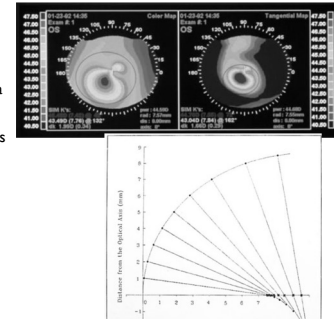
- Similar to Axial map but uses different mathematics to create a more sensitive display
- More closely represents the actual curvature of the cornea over the axial map – more accurately interprets the peripheral cornea



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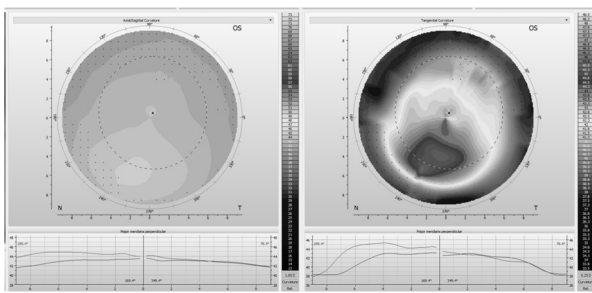
TANGENTIAL CURVATURE

- Instantaneous rate curvature based map
- Based on mathematical formula for local radius at a point along a curve
- More sensitive to abrupt changes
- Less smoothing – more noise
- Includes extreme curvature values
- Localizes exact position of pathology
- More detail



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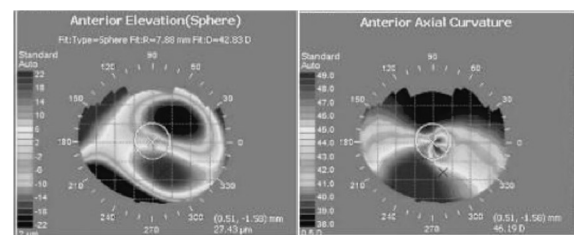
UNDERSTAND HOW THE SCALE AND MAP YOU ARE USING IMPACTS WHAT YOU SEE



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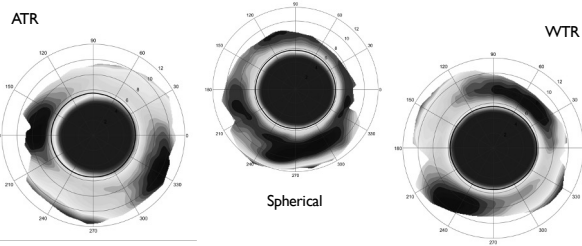
ELEVATION

- Conveys the truest representation of the actual shape of the cornea
- May be most helpful in deciding between corneal and scleral lenses for irregular corneas



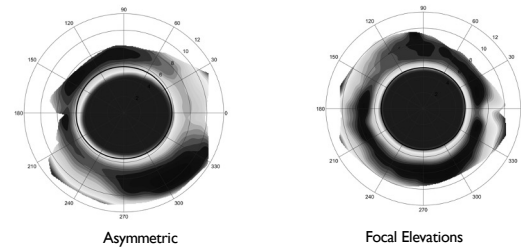
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SCLERAL ELEVATION



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SCLERAL ELEVATION



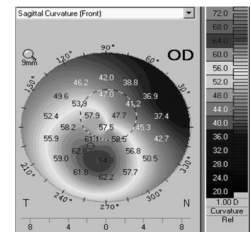
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ANALYZING MAPS

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CORNEAL TOPOGRAPHY

- Classic keratoconic topography demonstrates an area of steepening, usually inferior



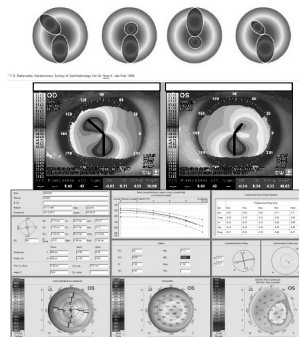
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CORNEAL TOPOGRAPHY

- What are the important features of a topography to look at?

- Steep Central K's
- Asymmetric Bowtie
- Skewed Radial Axes > 21 degrees

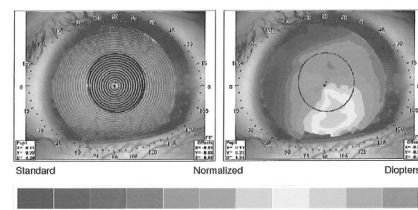
- Most topographers have Keratoconus screening Indices available



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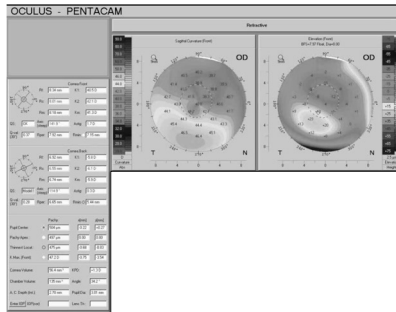
KCN OR NOT?

Date: 3/3/2015 12:23:38 PM	Exam 4
Max: 64.78 @ 18°	Min: 44.30 @ 41°
Max: 0.10	Min: 0.09 / Max: 0.50
Max: 64.57 @ 48°	Min: 44.30 @ 41°
Max: 0.09	Min: 0.09 / Max: 0.50



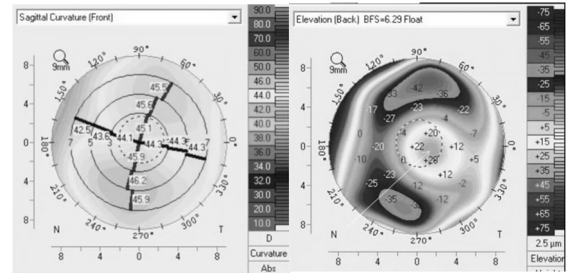
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KCN OR NOT?



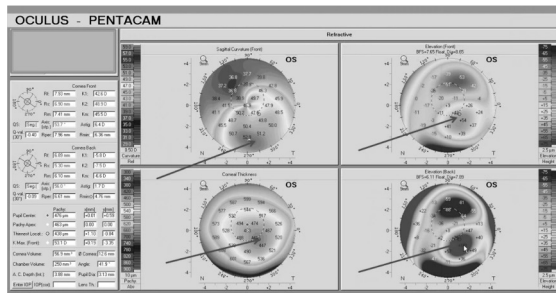
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TOMOGRAPHY



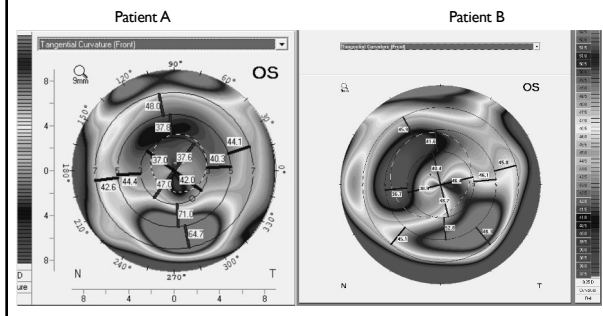
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KERATOCONUS - THE WHOLE PACKAGE



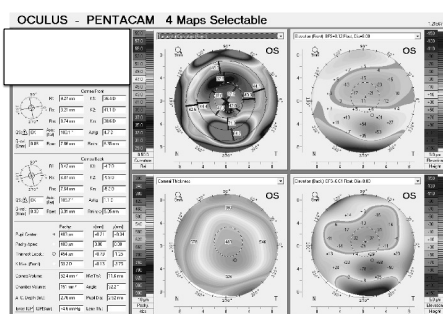
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WHAT IS GOING ON ? – BOTH HAVE REDUCED ACUITY POST LASIK



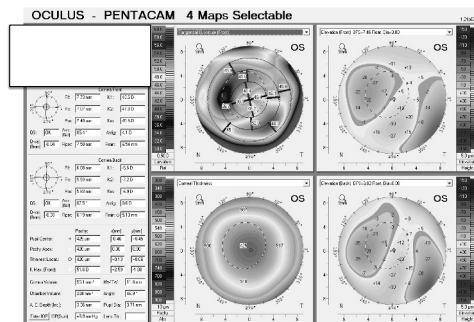
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WHAT IS GOING ON? - PATIENT B



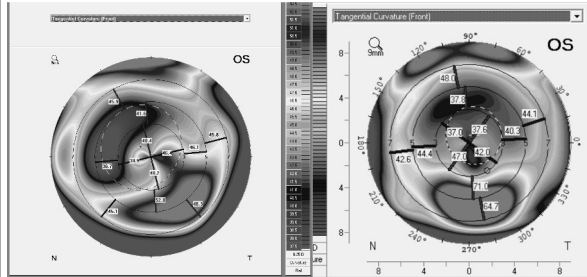
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WHAT IS GOING ON? - PATIENT A

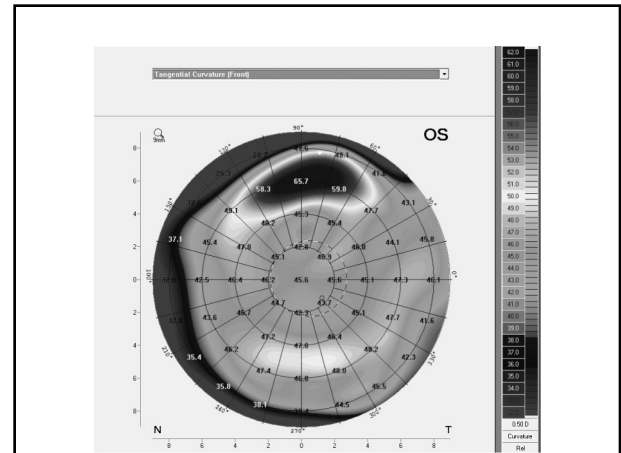


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POST LASIK ECTASIA VS. NOT??

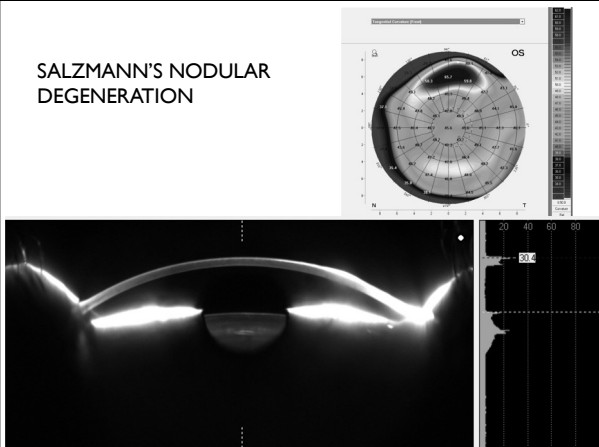


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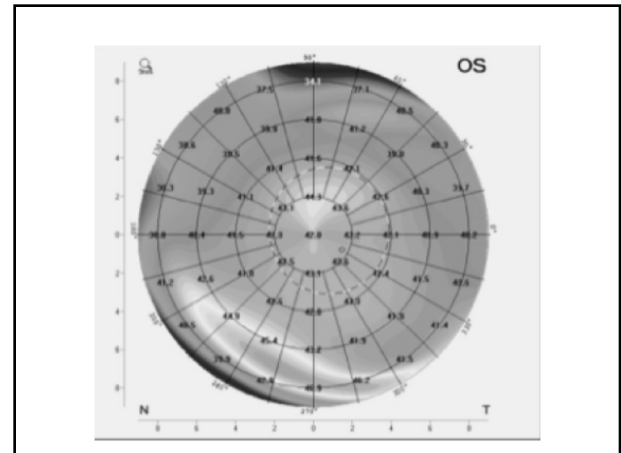


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SALZMANN'S NODULAR DEGENERATION

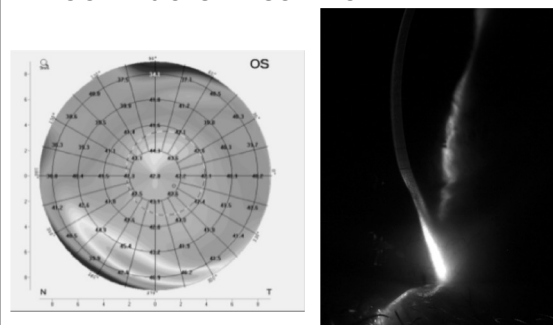


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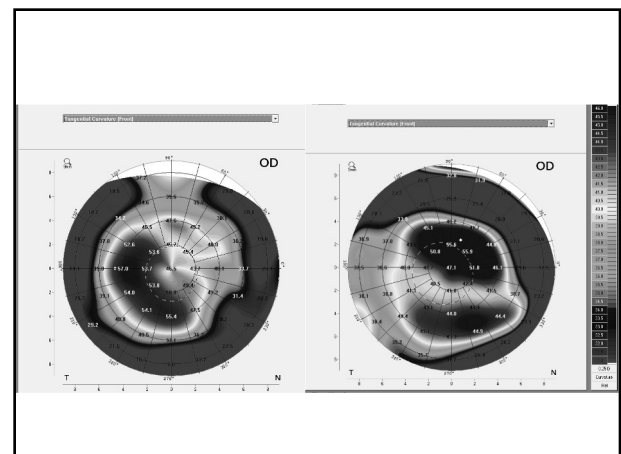


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MOOREN'S ULCER - CONTROLLED



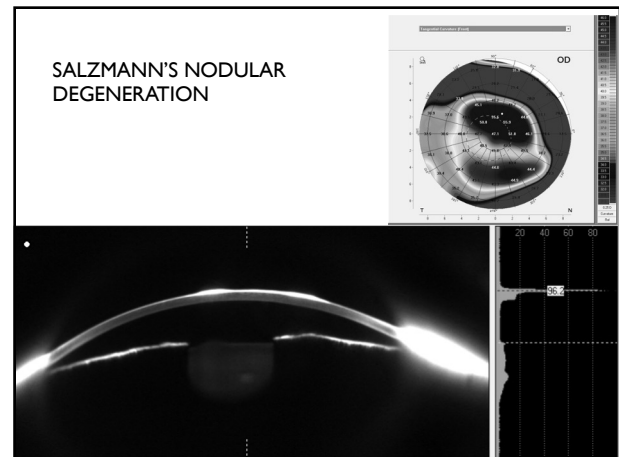
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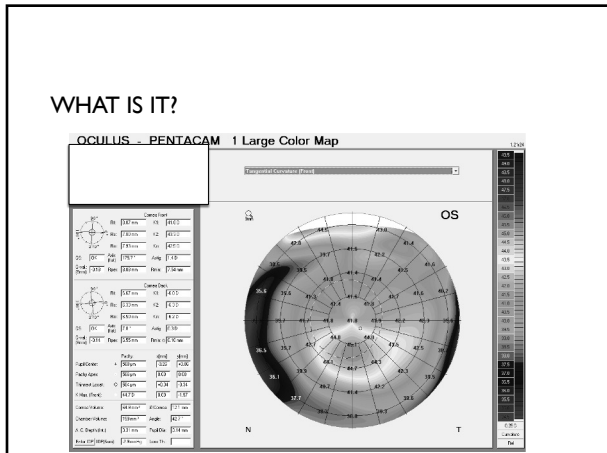
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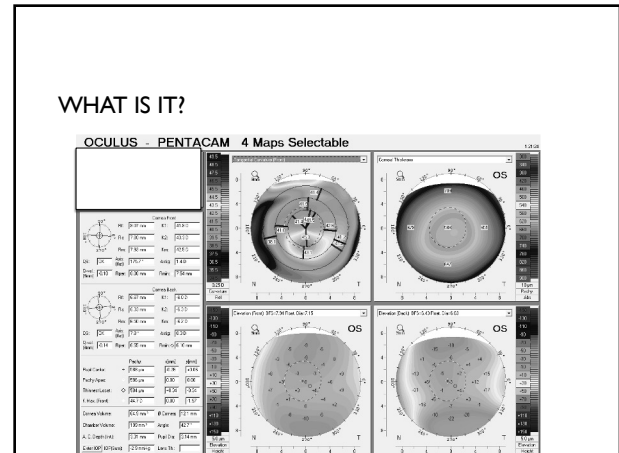
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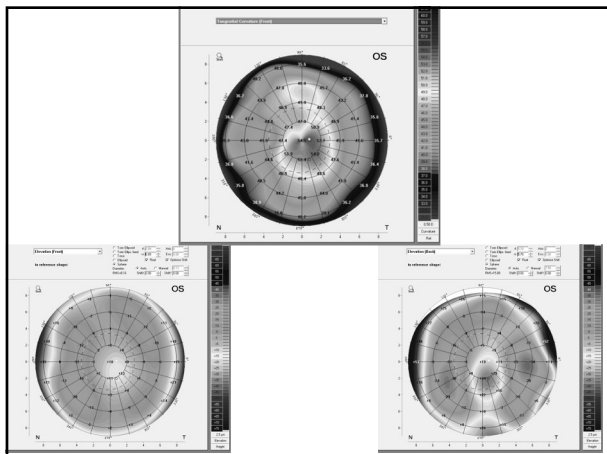
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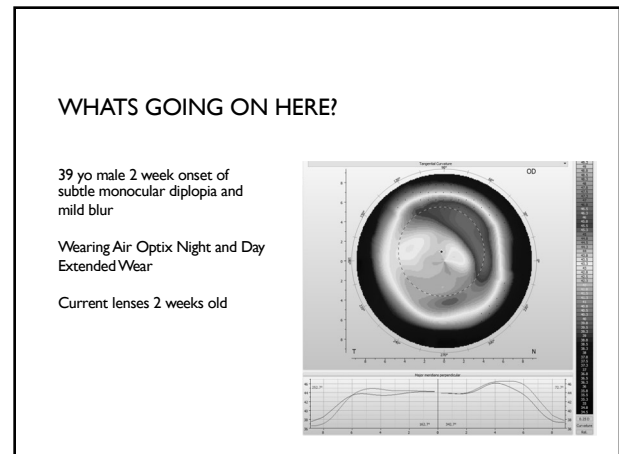
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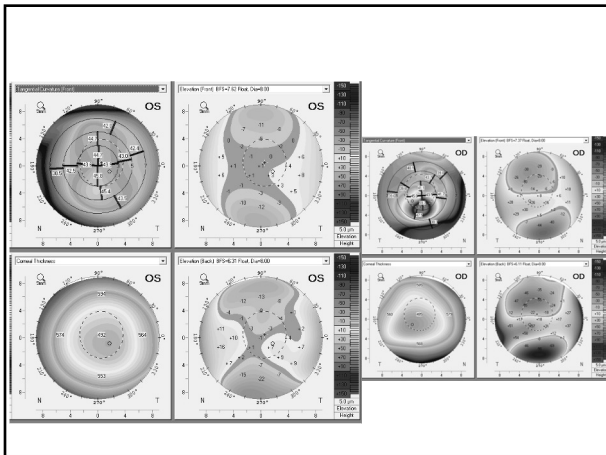
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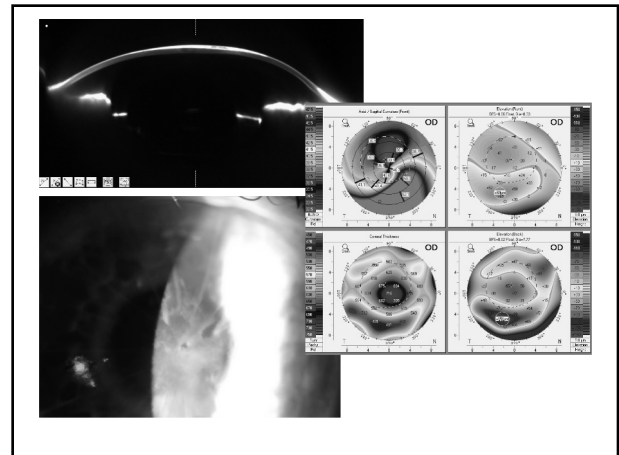
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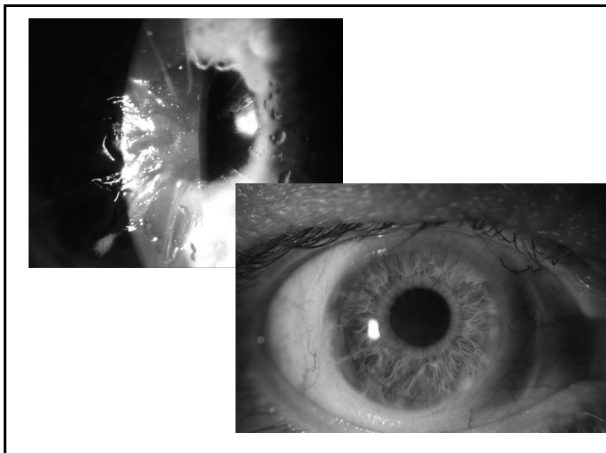
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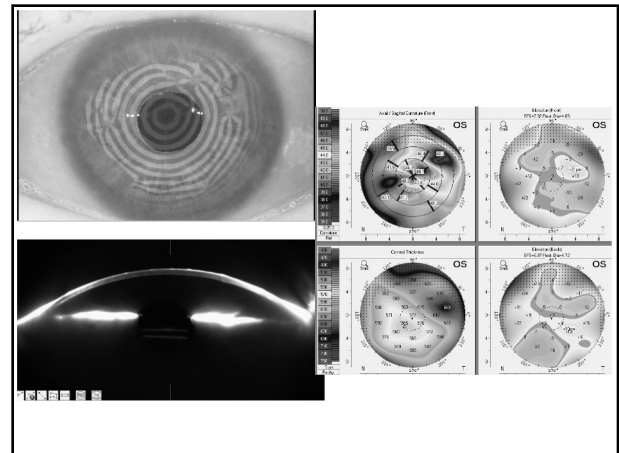
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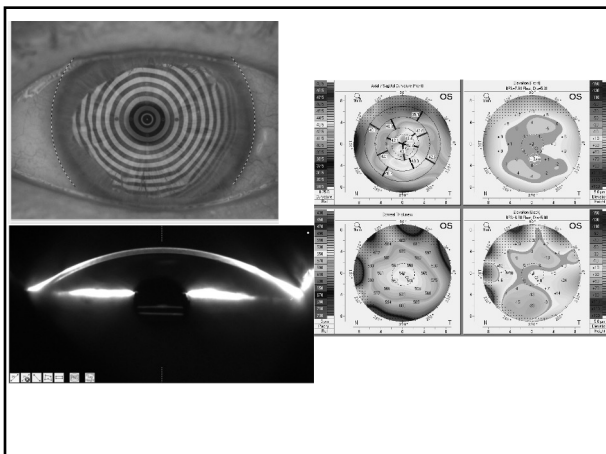
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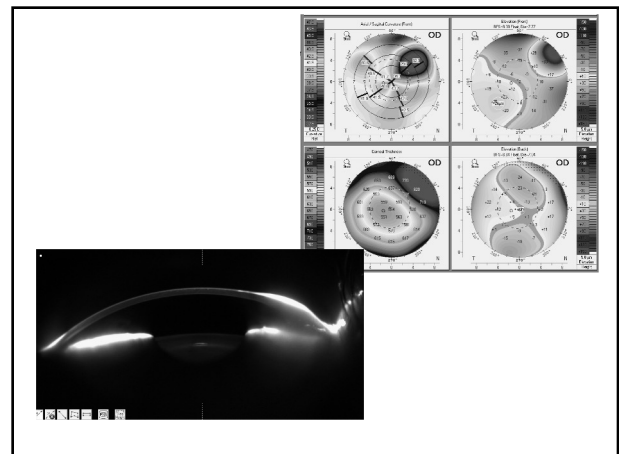
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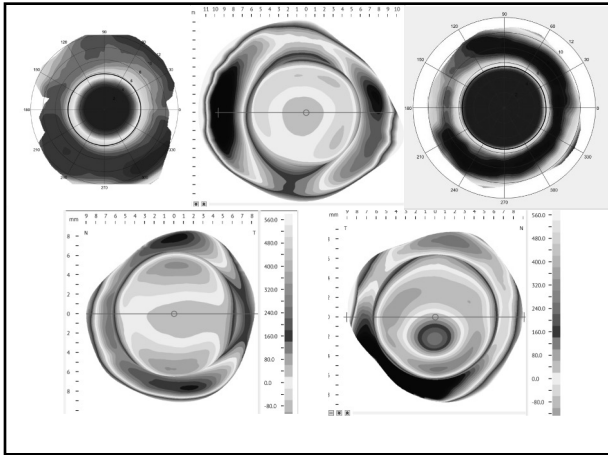
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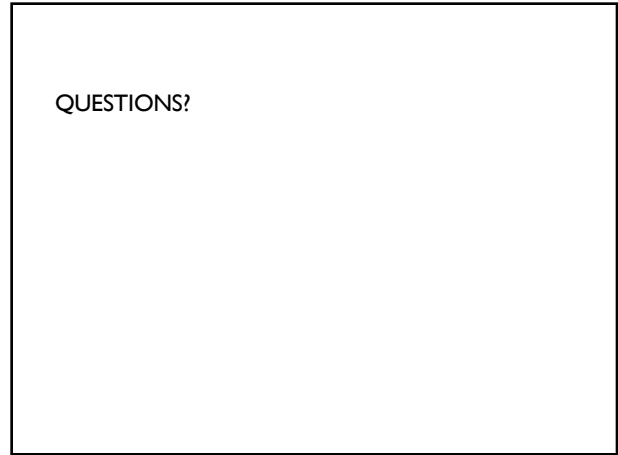
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