

Reading Pentacam

(before refractive surgery)

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Reading
corneal
topography

is

a very important step in
taking the **right decision**
before performing the
refractive surgery.

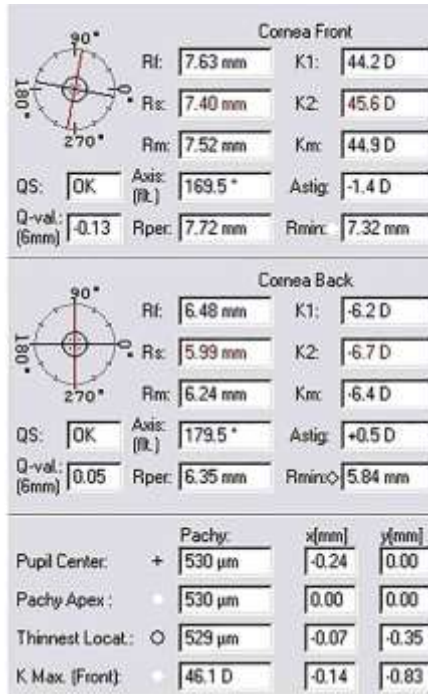
STEPS OF READING THE TOPOGRAPHY

Displaying the Four Refractive Maps:

1. The anterior sagittal map.
2. The anterior elevation map.
3. The posterior elevation map.
4. The corneal thickness map.

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Main Page Analysis

EXAMPLE

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— Quality specification (QS):

OK

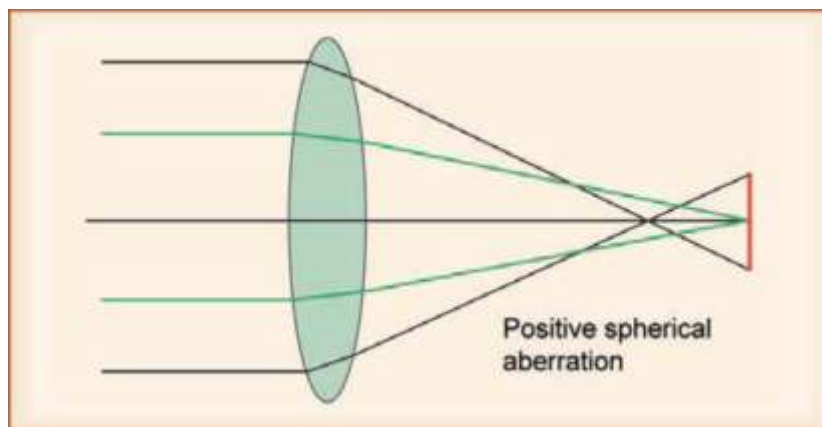
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| K-READINGS

- ✓ Consider the flattest K (usually K1) when treating myopia.
- ✓ Each -1 dpt correction flattens the Ks for 0.75 dpt
- ✓ Not less than 34 dpt
- ✓ The anterior surface of the cornea became very flat (oblate)
- ✓ The patient will suffer from positive spherical aberrations

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K-READINGS

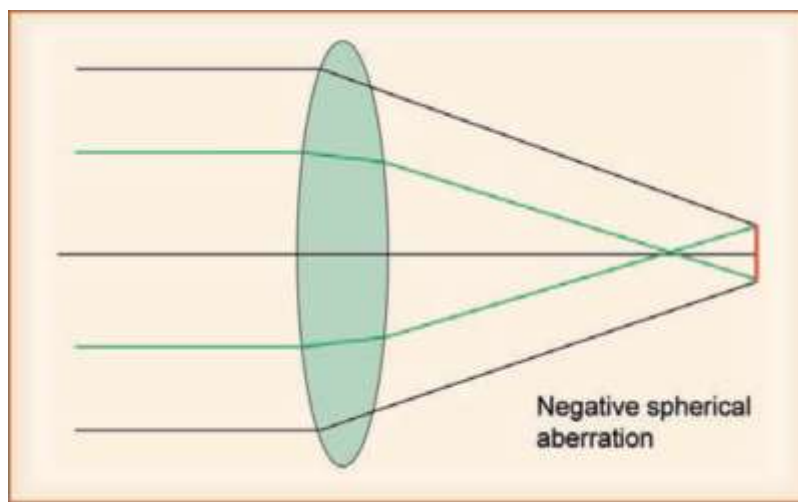


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- Consider the steepest Ks (usually K2) when treating hyperopia.
- Each +1 dpt steepens the Ks for 1 dpt
- Not more than 48 dpt
- The anterior surface of the cornea became very steep (prolate)
- The patient will suffer from negative spherical aberrations

| K-READINGS

— K-READINGS



Q-VALUE

- Describes the slope of the cornea.
- It is an average value from (0 to -1.0).

THINNEST LOCATION

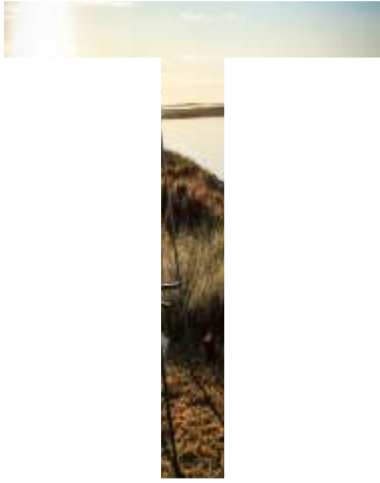
- **Thin** cornea is a cornea below 470 μm with normal tomography, or a cornea below 500 μm with abnormal tomography.
- **The** normal difference in thickness at the TL between the two eyes is $< 30 \mu\text{m}$.
- **The** difference in thickness between TL and pachy apex is normally $\leq 10 \mu\text{m}$.
- **Y-coordinate** is most often normal, suspected or abnormal when it is $< 0.500 \text{ mm}$, 0.500 mm to 1.000 mm , or $>1.000 \text{ mm}$ respectively.

PUPIL

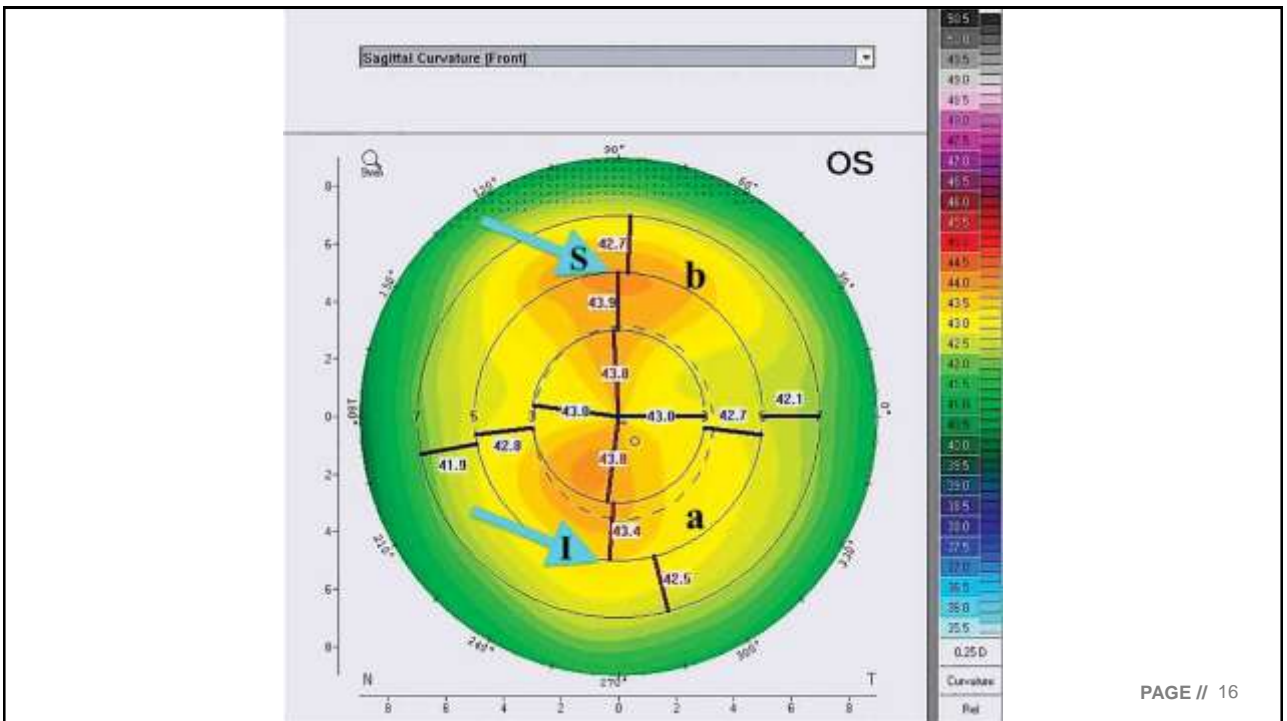
- **Evaluate** angle kappa; normal x-coordinate—in absolute value—is $\leq 200 \mu\text{m}$ (or $\leq 5^\circ$).
- **Pupil** diameter: It is necessary for adjusting optical zone (OZ) diameter, which should be at least 0.5 mm larger than the scotopic pupil size.
- **It** is also important when intracorneal ring implantation is indicated.

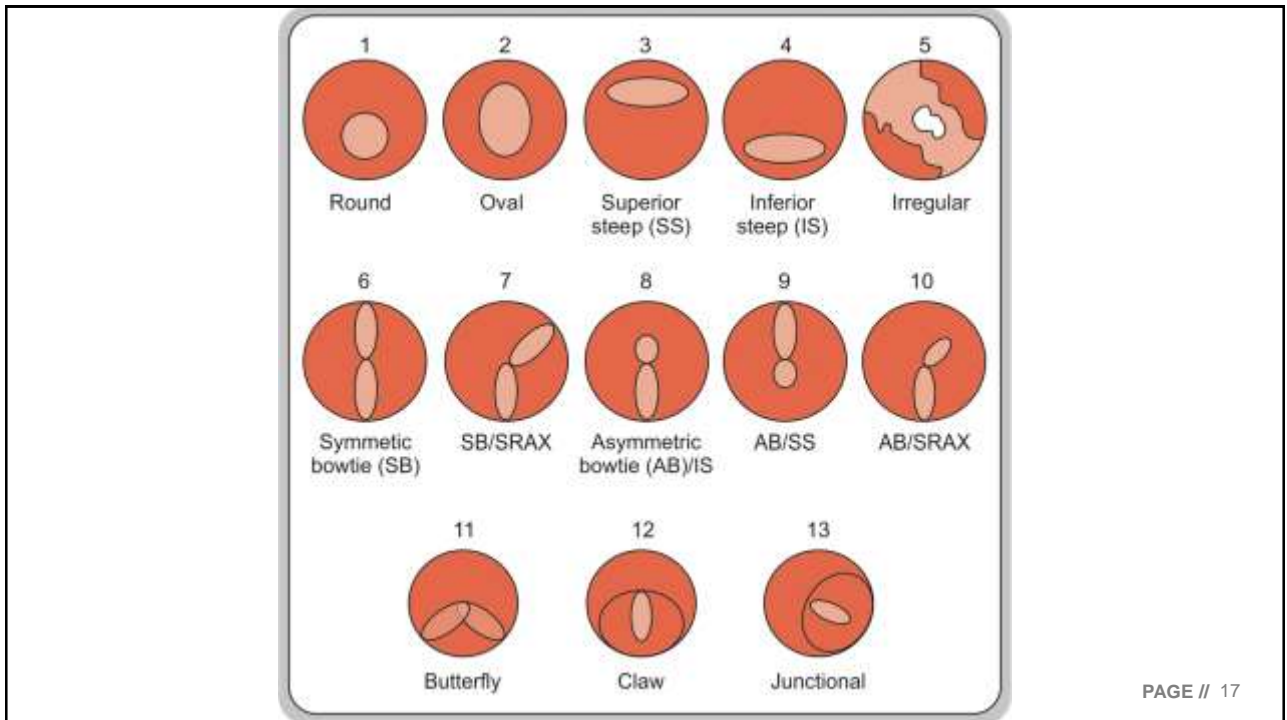
— CORNEAL ASTIGMATISM

- **Calculate** algebraic sum of astigmatism of the anterior and posterior corneal Surfaces
- **Compare** with the manifest refraction
- **It** should be no more than 1D difference in power or more than 15 degree in axis.



THE ANTERIOR SAGITTAL CURVATURE MAP





THE ANTERIOR SAGITTAL CURVATURE MAP

- **The** I-S difference between the two opposing points (S and I) on the 5-mm central circle on the steep axis should be $< 1.5 D$.
- **The** S-I difference should be $< 2.5 D$.
- **The** angle between the axes of the two lobes of Symmetric Bowtie with Skewed Radial Axis (SB/SRAX) should be less than 22°

THE ELEVATION MAPS

- **Describes** the height details of the measured corneal surface by matching it with a reference surface (RS).
- **Points** above the RS are considered elevations and expressed in plus values
- **Those** below the RS are considered depressions and expressed in minus values

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THE ELEVATION MAPS

There are several shapes of the RS, the most important are:

- **Best fit sphere (BFS)** which describes (qualifies) the shape of the measured Surface
- **Best fit toric ellipsoid (BFTE)** which estimates (quantifies) the parameters of that surface

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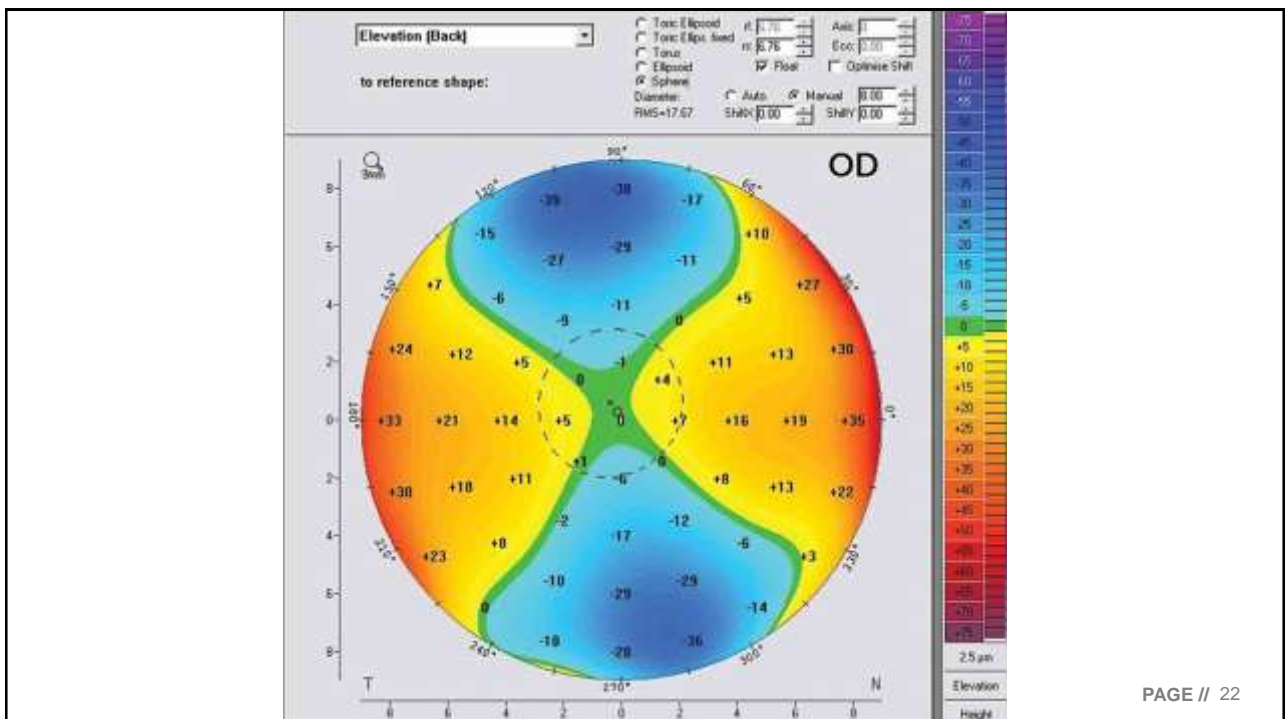
THE ELEVATION MAPS

- The normal shape of a cornea with regular astigmatism is the symmetric hourglass

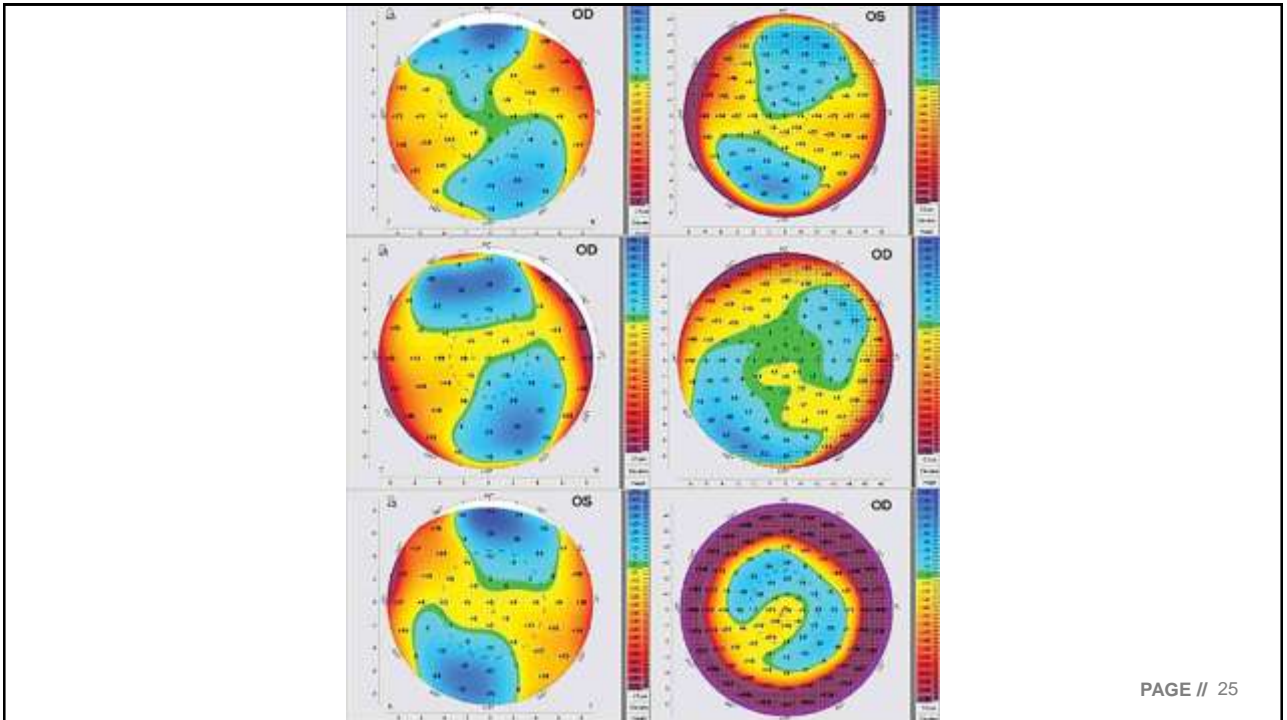
Abnormal shapes include:

- Skewed hourglass.
- Tongue-like extension and irregular hourglass
- Isolated island

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THE ELEVATION MAPS

Parameters (BFTE float mode):

- The highest plus values within the central 5-mm zone should be less than 12 μm and 15 μm on the anterior and posterior elevation maps respectively

THE ELEVATION MAPS

Parameters (BFS float mode):

- **look** at values corresponding to the TL using the BFS float mode.
- **In** myopic patients :Values more than plus 8 and 18 for front and back surfaces are abnormal
- **In** hyperopic patients :Values more than plus 7 and 28 for front and back surfaces are abnormal

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THE PACHYMETRY MAP

- **Pachymetry** of the thinnest location should be more than 470 μm
- **The normal** difference between the two opposing points on the vertical meridian at the central 5-mm circle is $\leq 30 \mu\text{m}$

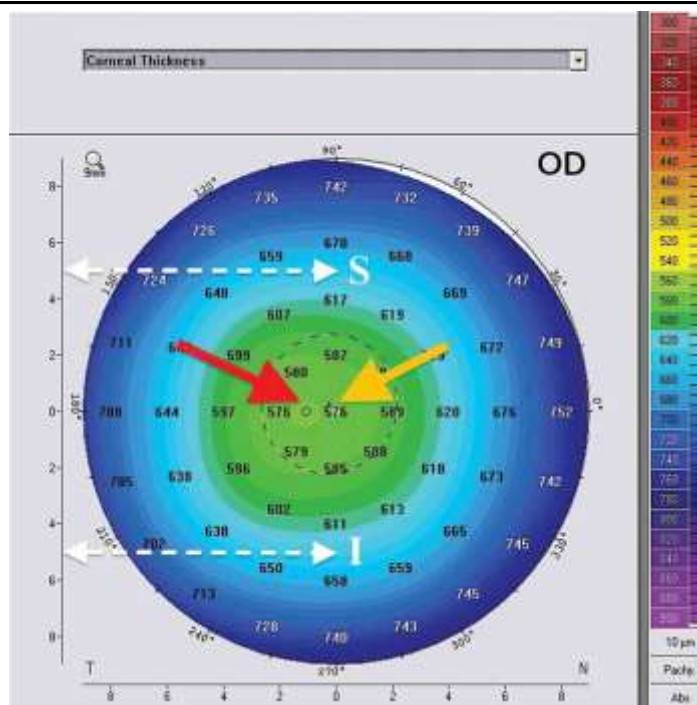
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THE PACHYMETRY MAP

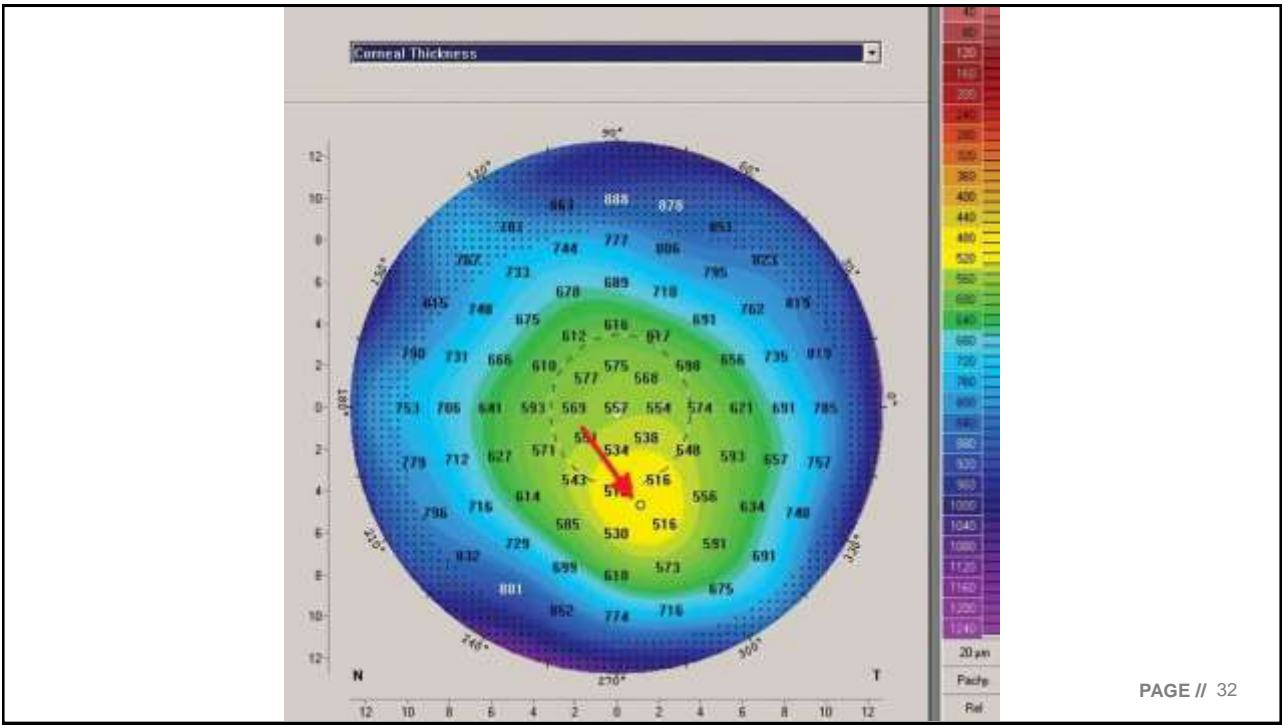
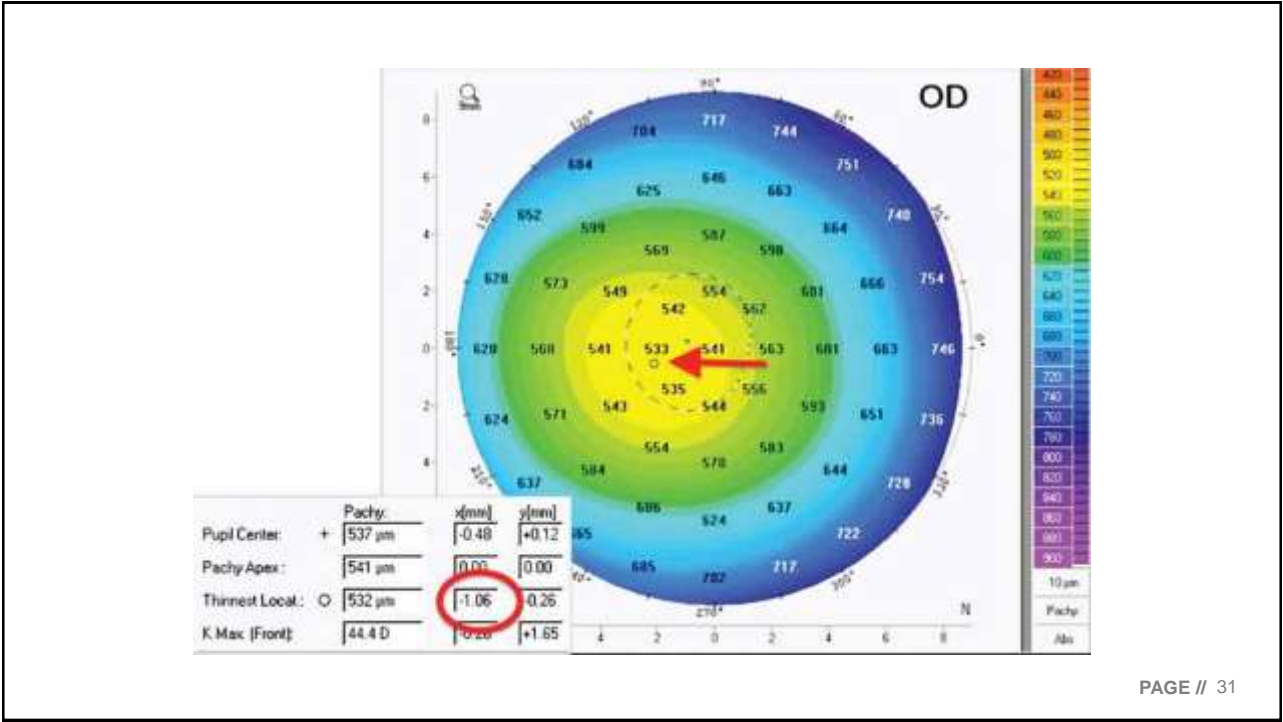
The normal pachymetry map has a concentric shape
Abnormal shapes include:

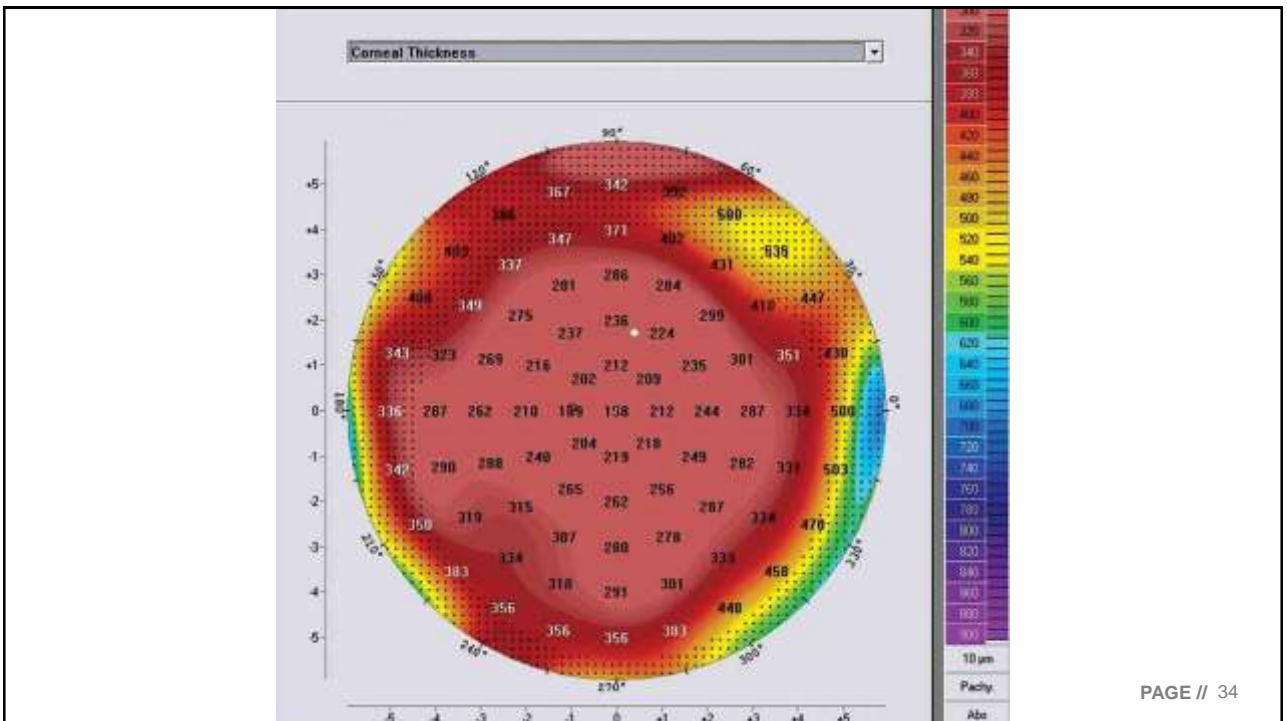
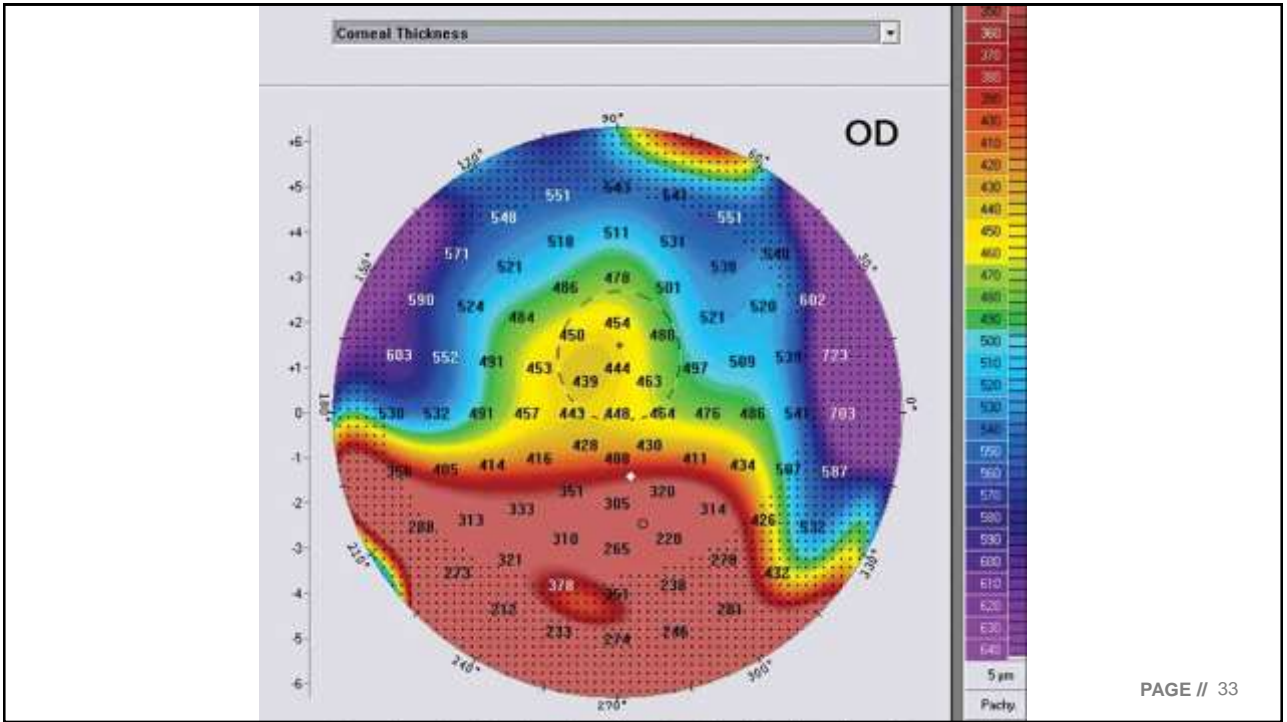
- Horizontal displacement of the TL
- Dome shape. The TL is vertically displaced
- Bell shape. Pellucid Marginal Degeneration (PMD).
- Keratoglobus

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THICKNESS PROFILES

The normal profile is a curved line plotted in red, following (but not necessarily within) the course of the normative black dotted curves, with an average of 0.8–1.1

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THICKNESS PROFILES

Abnormal profiles include:

Quick Slope

- The red curve leaves its course before the 6 mm zone.
- The average is usually high (> 1.1).

S-shape

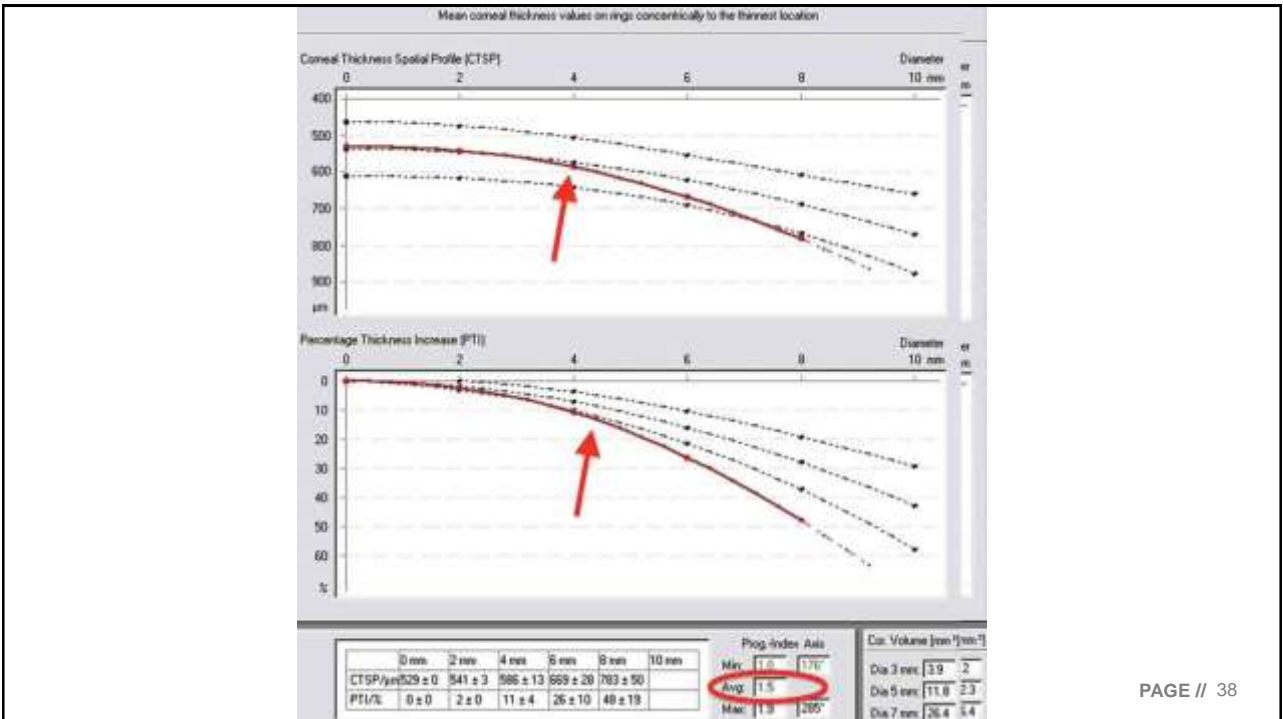
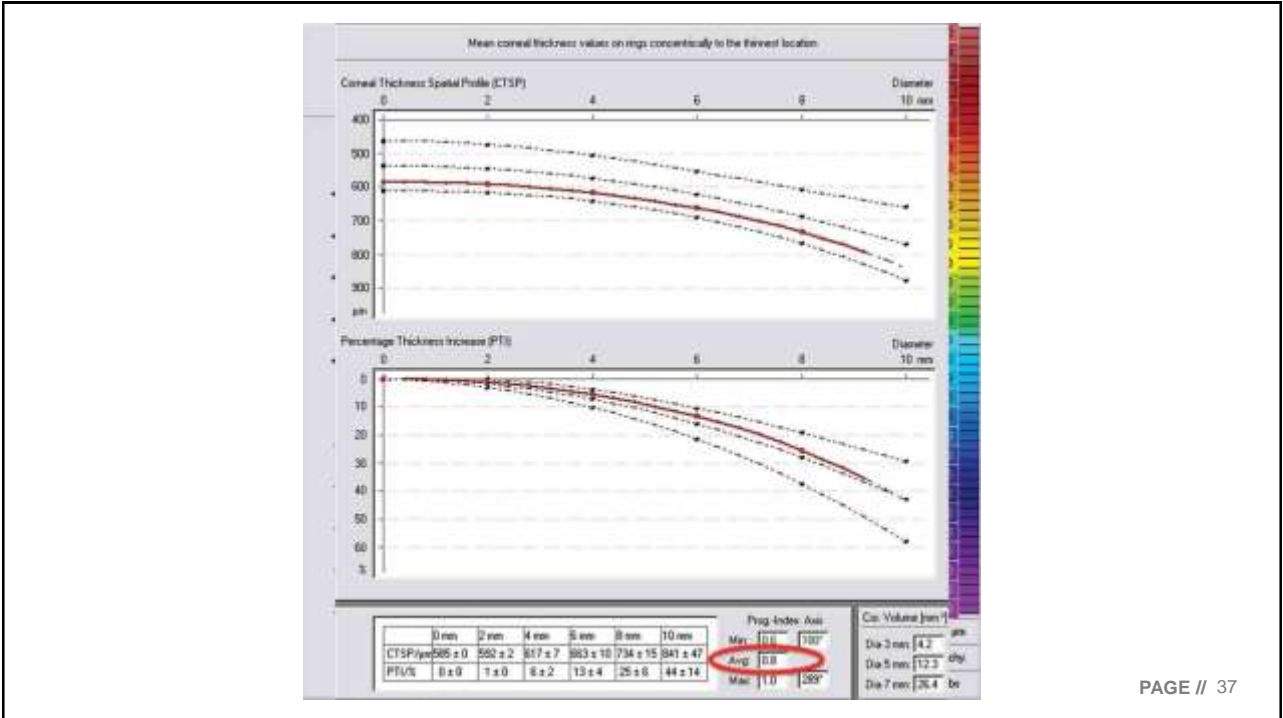
Flat shape

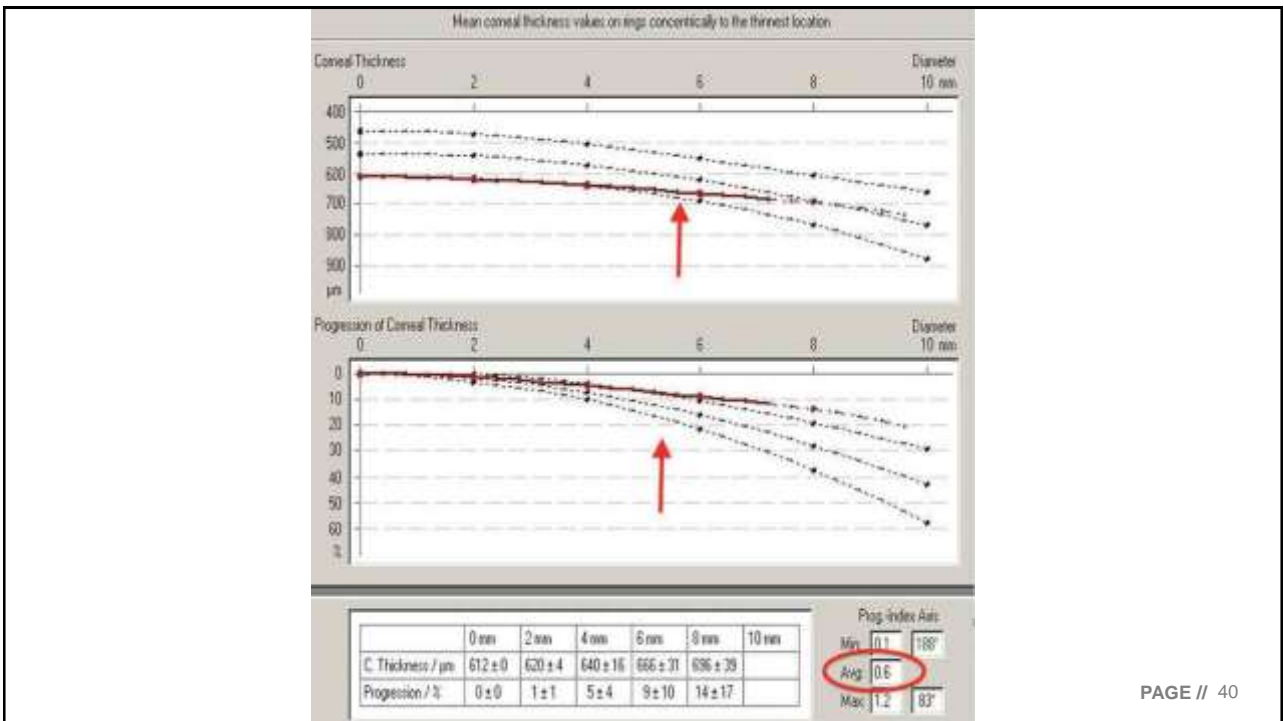
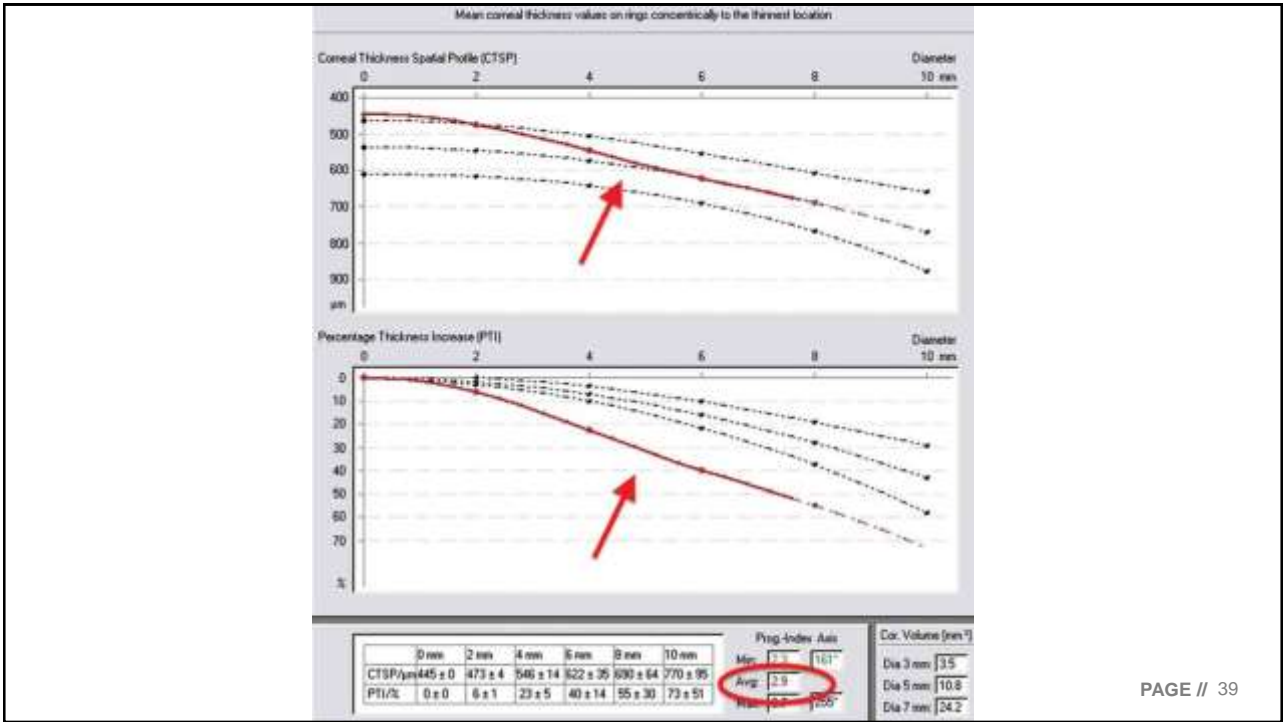
in diseased thickened (oedematous) corneas

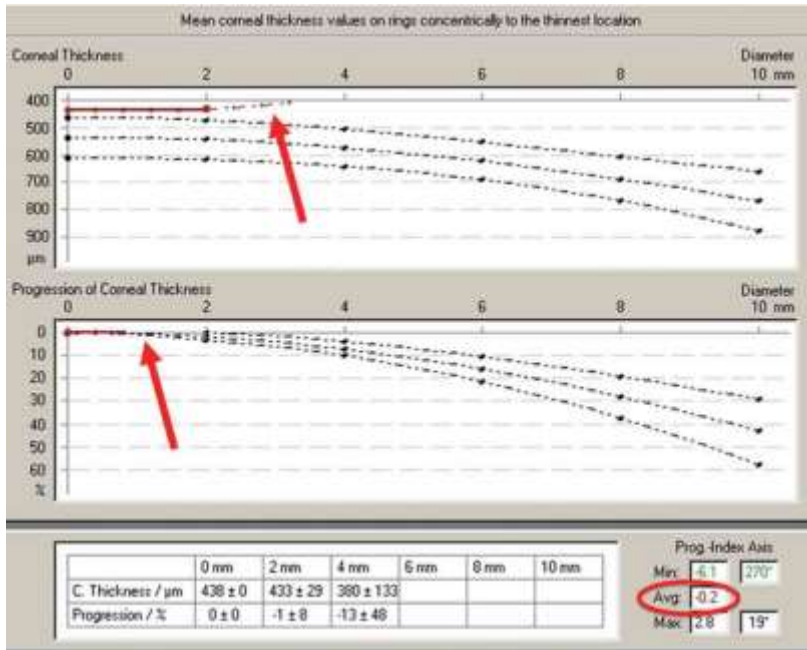
Inverted upward course

in some cases of PMD

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COMPARE WITH OTHER EYE

- Mean anterior keratometry: less than 0.3D
- Mean posterior keratometry: less than 0.3D
- Thinnest location: less than 12um
- Front elevation at the thinnest location: less than 2 D
- Back elevation at the thinnest location: less than 5 D

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Home Message

- **QS:** OK
- **Q value:** 0 to -1.0
- **K reading:** ≤ 47.2 D
- **TL:** ≥ 470 um
- **Y co-ordinate** of TL ≤ -1 MM
- **TL Elevations** ≤ 8 and 18 for myopia and 7 - 28 for hypermetropia
- **IS difference** ≤ 1.5 d
- **IS difference** ≤ 30 um
- **Skewing** of radial axis of astigmatism ≤ 22 degrees
- **Highest** plus value in BFTE map ≤ 12 and 15
- **Normal** thickness profile curve with average below 1.2

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Presented by Riad El Zaher Hassan

THANK YOU

