Interpretation of pentacam

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What is pentacam

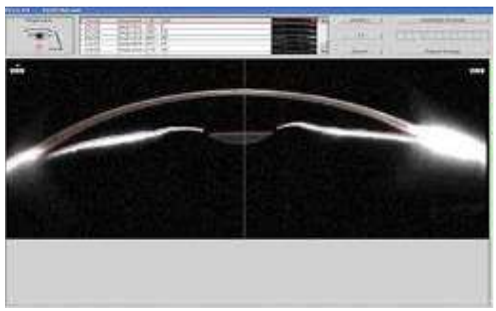
Pentacam is a comprehensive eye scanner which provides data critical to the planning of treatment.

Pentacam images the anterior segment of the eye by a rotating Scheimpflug camera measurement.

Originally, corneal topography was only used to describe the anterior surface of the cornea. Devices now are able to characterize both anterior and posterior corneal surfaces creating a three dimentional map.

The Pentacam utilizes Scheimpflug imaging. It is a rotating Scheimpflug camera that provides 50 images during one scan in less than 2 seconds with 500 true elevation points per image.

The Scheimpflug image is a complete picture from the anterior surface of the cornea to the posterior surface of the lens



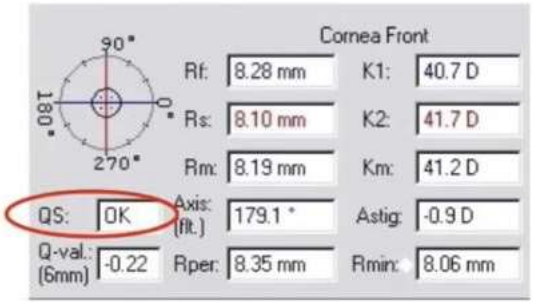
The aim of studying pentacam is to detect the patients who are contraindicated to undergo kerato refractive surgeries by detecting the moderate and high risk factors if present in the pentacam printout.

Low risk is given only to normal corneas as corneal refractive surgery is not a risk free procedure.

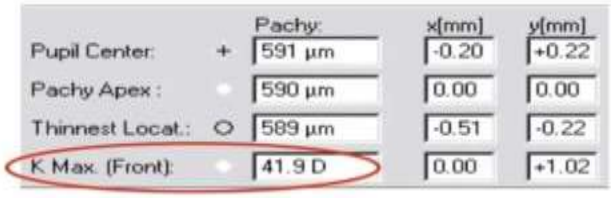
The oculus Scheimpflug analyzer printout consists of data summary, four composite map display and Belin/Ambrosio enhanced ectasia printout.

In the data summary printout we have to look at six points:-

1- Quality specification (Q.S.): It describes the quality of the captured images and it should be signed as (OK) and if not the images must be recaptured.

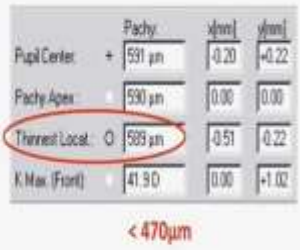


2- K-Max : Normally less than 47.2 D.



≤ 47.2D

3- Thickness of the cornea at its thinnest location (TL): Normally more than 470 um

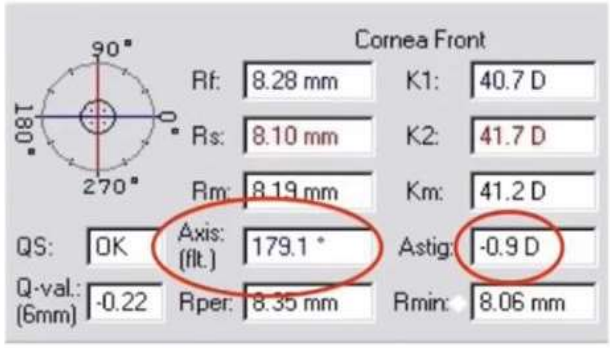


< 470µm

4- Y-Coordinate of the TL: It describes the amount of vertical displacement of the TL from the center of the cornea. Normally less than -0.5 mm.

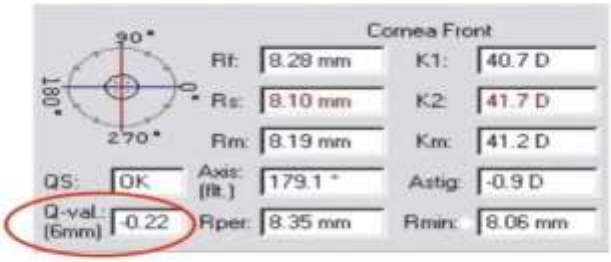
< -0.50mm

5- The amount of corneal topographic astigmatism and the difference between it and the manifest astigmatism which should be less than 1 D and the difference between their axes < 15 deg



≤ 15° ≤ 1.0D

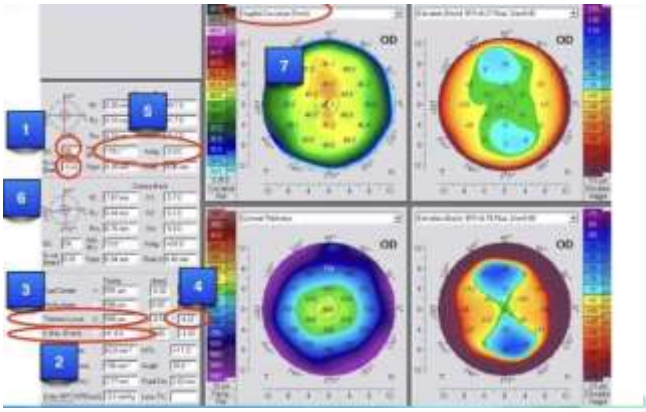
6- Q-value: Reflects the shape or the slope of the corea. Normally between 0 and -1



[0 , -1.00]

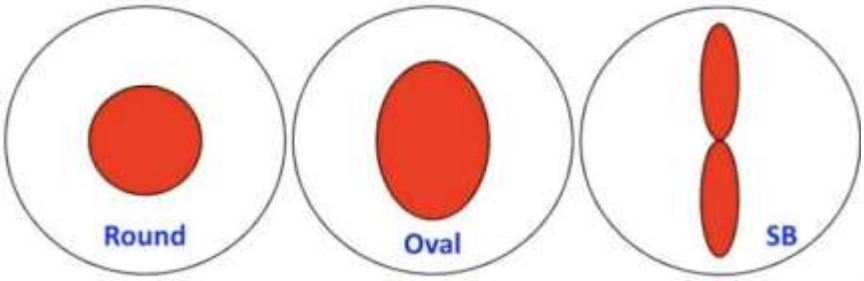
In the four composite map printout we study the following:-

7- Anterior sagittal curvature map: for both shape and values

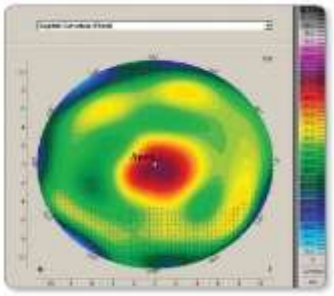


The shapes may be:-

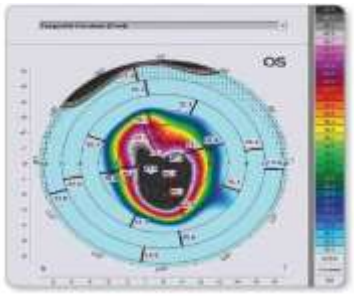
A) Symmetric which only considered normal when K-max is not > 47.2 D



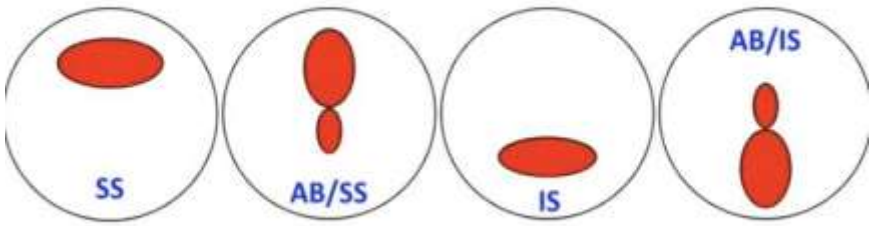
Round pattern



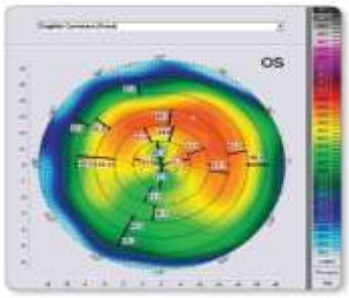
Oval pattern



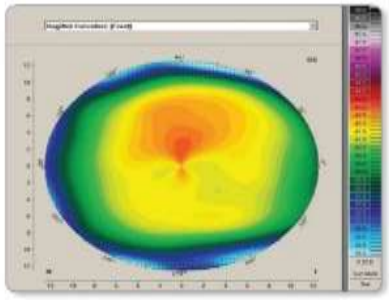
B) Asymmetrical shapes: can be considered normal when S-I <2.5 D and I-S <1.5 D



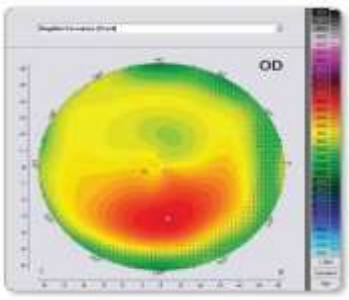
SS pattern



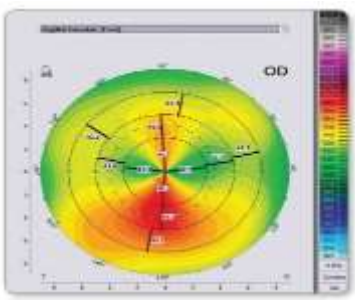
AB/SS pattern



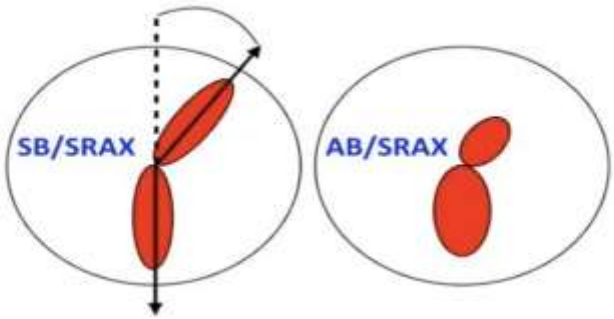
IS pattern



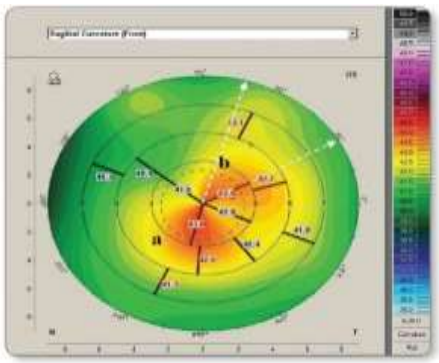
AB/IS pattern



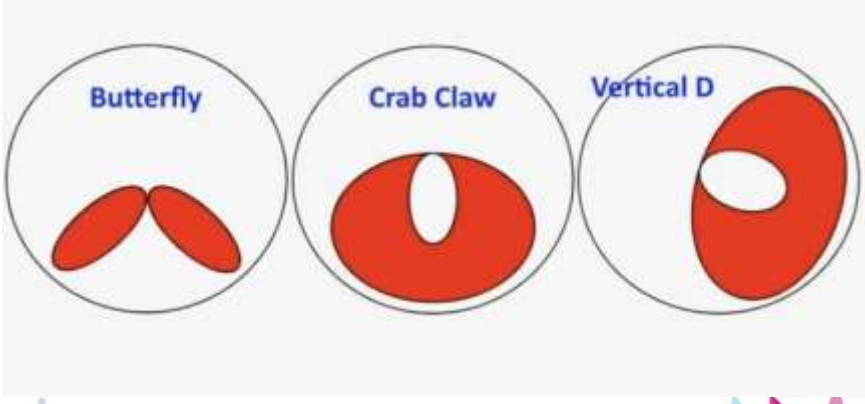
C) Skewed shapes :- Can be considered normal if the angel between the two segments is < 22 degrees



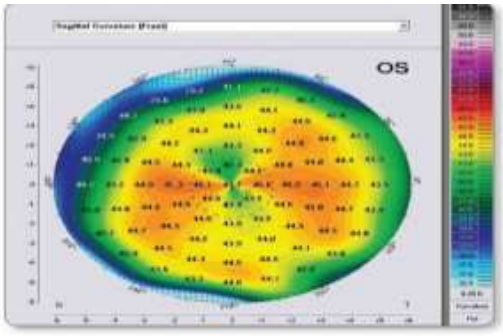
SB/SRAX



D) Special shapes:- all are considered of high risk

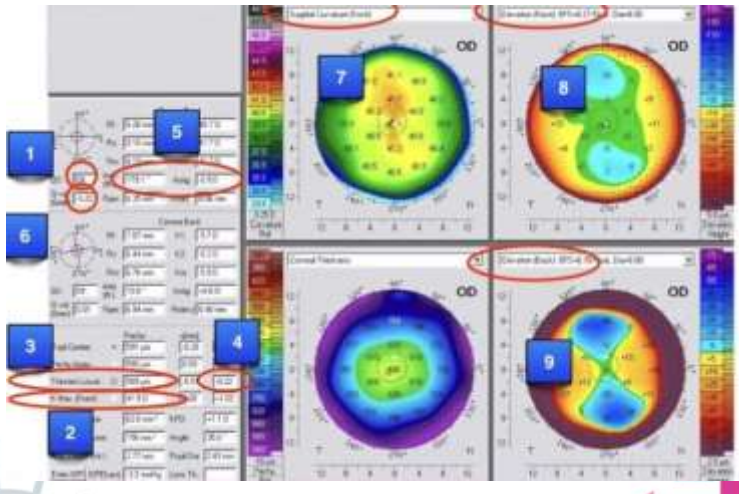


Butterfly pattern



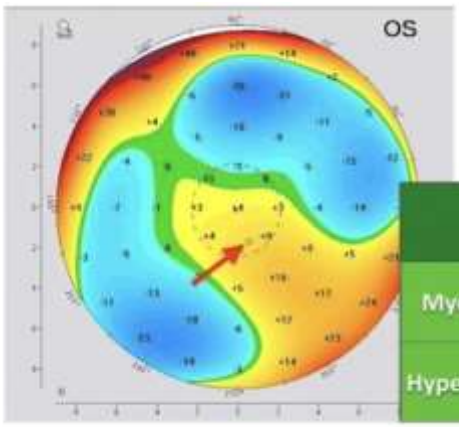
consider flattest K when treat myopia:
…..each -1D correction will flattens the cornea by about 0.75 D.
…..we should not end up with less than 34D .
……as this will changes the corneal shape to be oblate (flat) and the patient will suffer from +ve spherical aberrations.
consider steepest K when treat hyperopia:
…..each +1D correction will steepens the cornea by about 1.25 D.
…..we should not end up with more than 49D
…..as the patient will suffer from –ve spherical aberrations.

8&9 -Anterior and posterior elevation maps



When the elevation maps are displayed in the PFS mode

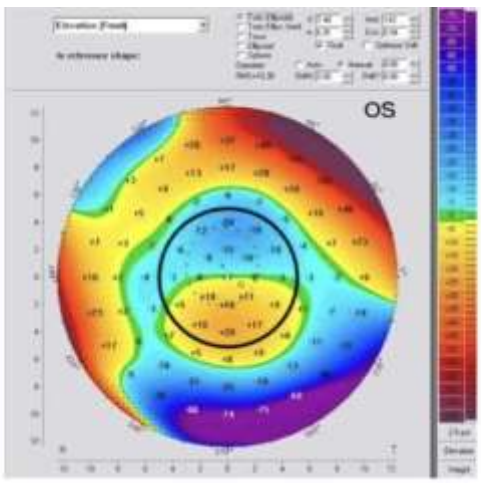
BFS



	Anterior	Posterior
Myopic	≤ 8	≤ 18
Hyperopic	≤ 7	≤ 28

When the elevation maps are displayed in the PFTE mode

BFTE

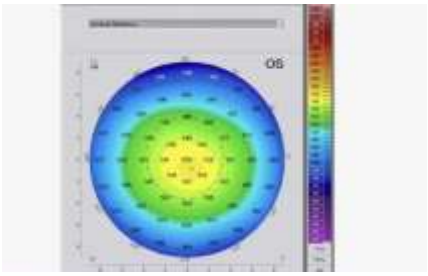


Ant ≤ 12

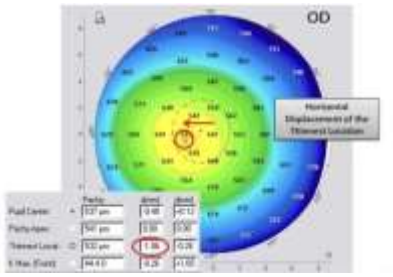
Post ≤ 15

10- Corneal thickness (pachymetry) map shapes include:- S-I < 30 um

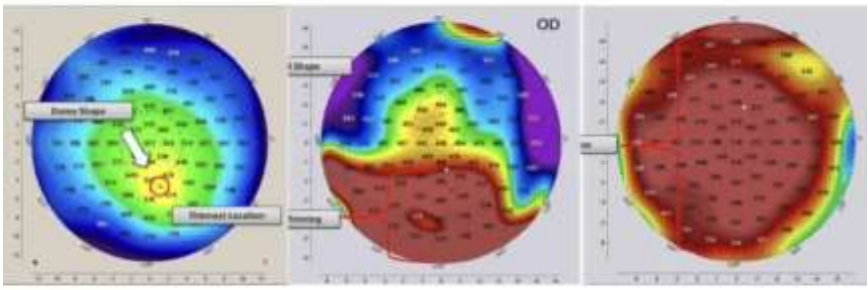
Symmetric (concentric) shape



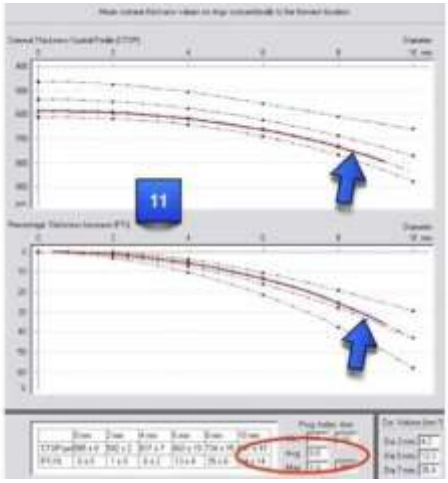
Asymmetrical (horizontal displacement)



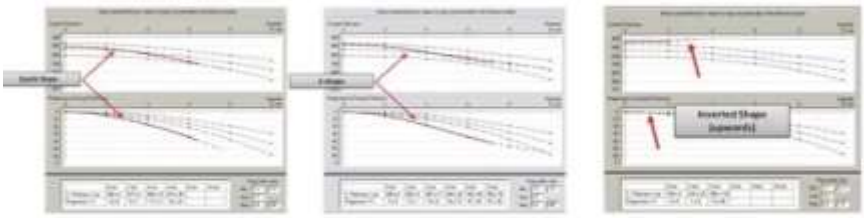
Dome, bell and keratoglobus shapes are of high risk



In Bellin/Ambrosio enhanced ectasia printout we study:
11- Corneal thickness spatial profile and index of progression



Abnormal shapes as quick slope, S shaped and flat curves are considered high risk



12- The intereye corneal asymmetry

TABLE 3

Summary of Intereye Corneal Asymmetry Score[a]

Scoring Criteria	Positive (+1 point) if Intereye Difference
Mean anterior keratometry	≥ 0.3 diopters
Mean posterior keratometry	≥ 0.1 diopters
Thinnest pachymetry	≥ 12 µm
Front elevation at thinnest location	≥ 2 µm
Back elevation at thinnest location	≥ 5 µm

[a]Score of 3 is observed in up to 6% to 11% of healthy patients, whereas a score of 4 is found in less than 4% of patients without keratoconus. A score of 5 should be considered highly abnormal (1% or less of non-keratoconic patients).

Galletti JD et al. Corneal Asymmetry Analysis by Pentacam Scheimpflug Tomography for Keratoconus Diagnosis. J Refract Surg. 2015;31(2):116-23

	High Risk	Moderate Risk
Thinnest Location (TL)	< 470	
TL-Y coordinate	> -1.00	-0.50 to -1.00
Q-value		] 0 , -1.0 [
Anterior Sagittal Curvature	SRAX	
	Butterfly, Claw, D	IS or AB/IS : I-S>1.5 : K<47
	Symmetric : K >50	Symmmetric : K 47 - 50
Elevation Maps	BFS : see table	
	BFTE >12 Ant; >15 Post	
Thickness Map	Dome, Bell, Globus	S-I >30 : TL-Y<-0.50
Thickness Profile	Quick, S before 6, Inverted	S after 6, High Avg
Intereye Asymmetry	4,5	3


THANK YOU