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Distribution of Corneal Densitometry in Different Grades of Keratoconus

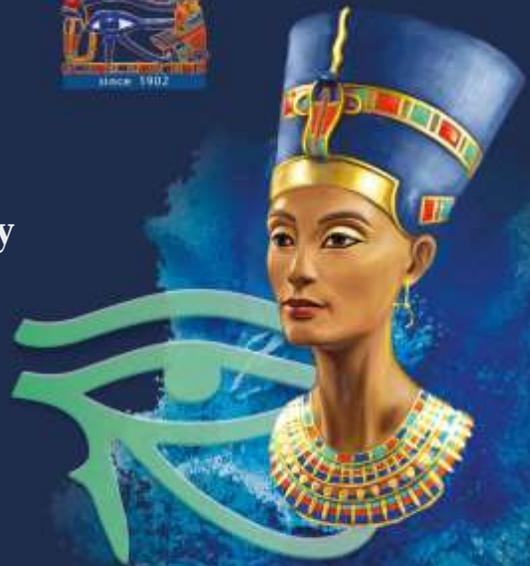
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Introduction:

- Keratoconus (KC) is a degenerative noninflammatory eye disease characterized by a progressive corneal ectasia with increasing irregular astigmatism, which can be complicated by possible scarring or hydrops
- The diagnosis of early keratoconus is considered a challenge and remains a significant area of research.



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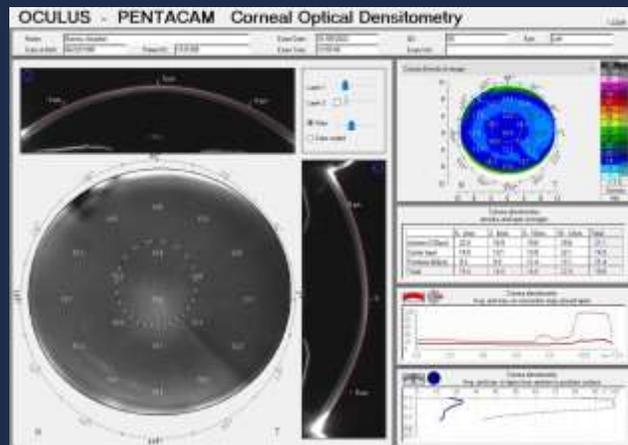
- Scheimpflug tomography is the diagnostic method of choice which is attributed to its increased sensitivity and specificity for Keratoconus screening.



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- Corneal densitometry (CD) software is implemented in the Scheimpflug corneal tomography system, providing numerical values on corneal densitometry and transparency.



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Aim of study:

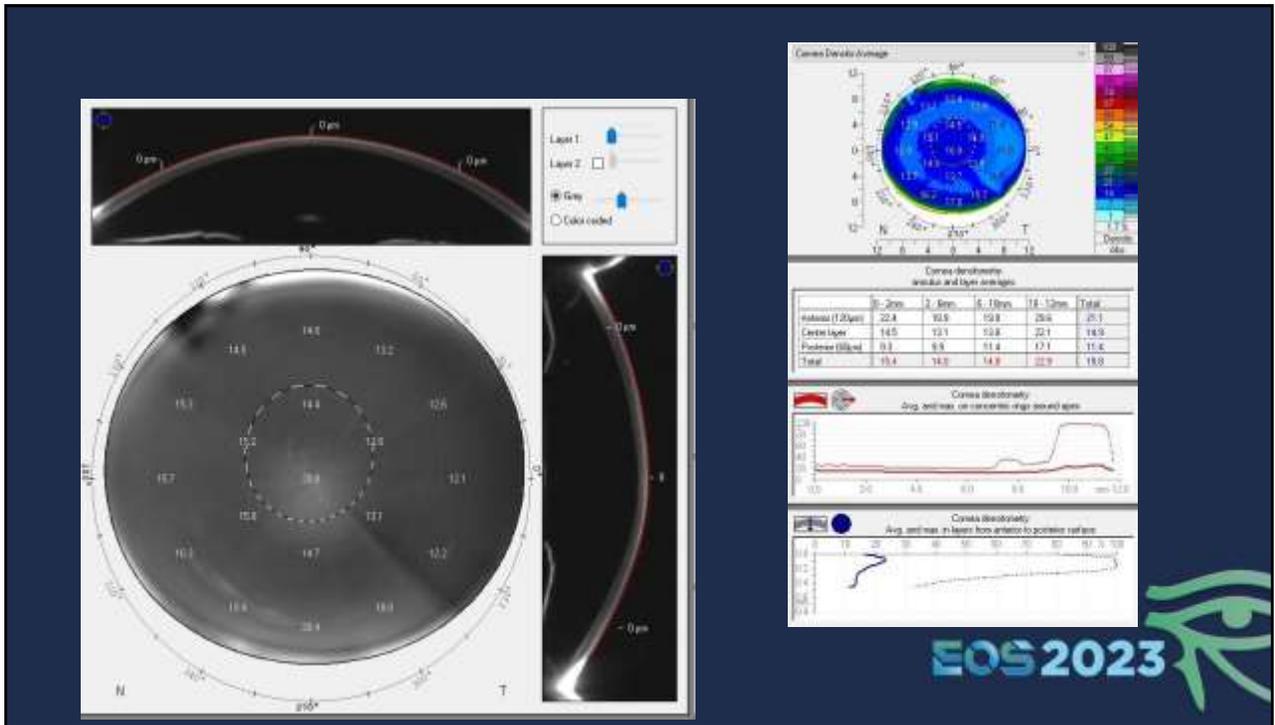
- The cornea maintains its transparency through the regular spacing of collagen fibers and its small uniform orthogonal pattern. As keratoconus has been reported to affect corneal transparency.
- **The aim of the present study** is to evaluate corneal densitometry changes with the Scheimpflug tomography system in different stages of keratoconus.



Patients and Methods:

- Keratoconic (KC) corneas (stage 1-3 classified according to the topographic parameters) were examined using the Scheimpflug tomographer (Pentacam, Oculus) using the Corneal densitometry (CD) software.
- CD was measured over three different depths (anterior stromal layer (120 μm), posterior stromal layer (60 μm), middle stromal layer between these two layers), and concentric annular zones (0.0 to 2.0, 2.0 to 6.0, 6.0 to 10.0, 10.0 to 12.0 mm diameter area).





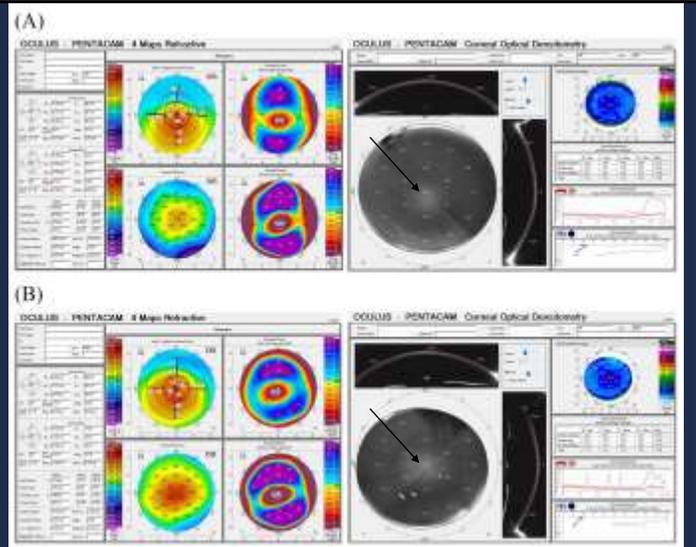
Results:

- The study participants were divided into 3 groups: Keratoconus stage 1 (KC1) with 64 participants; Keratoconus stage 2 (KC2) with 29 participants; and Keratoconus stage 3 (KC3) with 36 participants.
- Comparing CD of all three layers (anterior, central, and posterior) of the cornea over different circular annuli (0-2, 2-6, 6-10,10-12mm) revealed a significant difference in the 6-10 mm annulus between all groups and in all layers ($p=0.3, 0.2, 0.2$ respectively).

- In the layers of the cornea, there was a clinically significant difference between KC1 and KC3 in the 6-10 annulus ($p=0.03, 0.02, 0.02$, respectively).
- There was a significant difference between KC2 and KC3 groups in the central 0-2 annulus in the anterior layer with $p=0.004$.

N,B; A) 4 Map printout corneal topography of a case of KC grade 2 (Left), Corneal optical densitometry printout of the same eye (Right).

B) 4 Map printout corneal topography of a case of KC grade 3 (Left), Corneal optical densitometry printout of the same eye (Right)

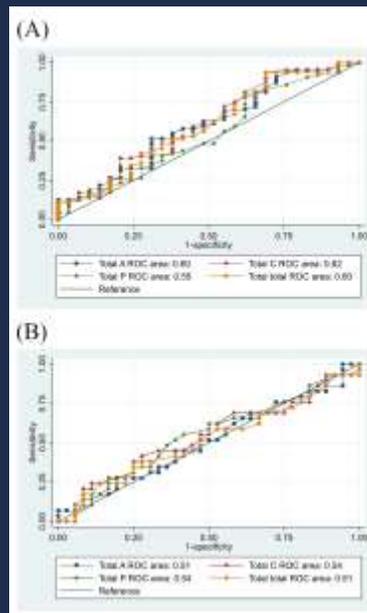


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- AUR was done, revealing that the central layer showed the highest specificity (93.8%) on comparing KC1 and KC2.
- The CD in the anterior layer between KC2 and KC3 had the highest specificity (86.2%).

N,B; A) Roc curve of different corneal density parameters to differentiate between KC 1 & KC 2.

B) Roc curve of different corneal density parameters to differentiate between KC 2 & KC 3



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Conclusion:

Corneal Densitometry showed increased values in the anterior corneal layer and in the annulus 6-10mm more than other locations in all stages of keratoconus.



Thank You

