

How Often Should We Prescribe Toric Orthokeratology Lenses?

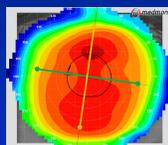
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Introduction

One of the primary decisions we face when fitting a patient with an ortho-k lens is determining whether a symmetric or toric design is indicated. The concept used to aid us in this decision is the sagittal height differential between the two principle meridians (flat and steep) at an 8.0mm chord. An 8.0mm chord is appropriate, because that is traditionally where the landing zone begins its alignment with the peripheral cornea. Previous studies have evaluated the benefits of toric ortho-k lenses, the threshold of when a toric should be used and the success rates¹⁻⁵. This study set out to determine how often a toric lens may be used in practice?

Methods

Retrospective data was collected on 155 consecutive new orthok fits (306 eyes) ordered through two Canadian GP lens labs (Precision Technology Services & Cardinal Contact Lens). This cohort was representative of dozens of practices, across many regions and includes a cross section of the nation's diverse ethnicities. Inclusion criteria required that all patients had healthy normal eyes, free of surgery or ocular disease. Although the subjects came from many different practices, all were imaged on the same model of corneal topographer (Medmont E300, Nunawading, Australia). Various pre-fitting topographical data was collected to understand eye shape including corneal astigmatism and sagittal differential at an 8mm chord diameter.

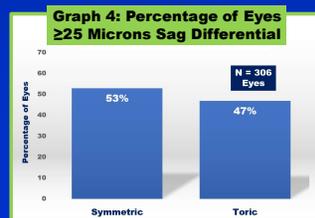
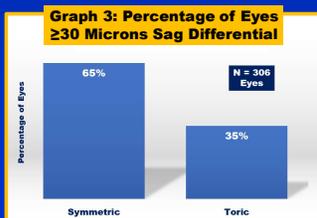
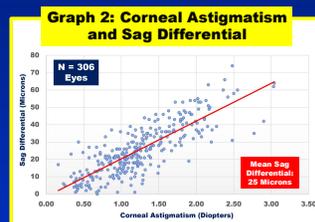
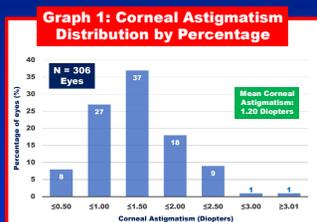


Sagittal Differential on Flat and Steep meridian at 8mm



Results

Graph 1 presents the corneal astigmatism distribution in this cohort. Graph 2 displays the relationship between central corneal astigmatism and peripheral sagittal differential. Graphs 3 and 4 exhibits the percentage of eyes requiring toric orthok lenses based on a 30 and 25 micron threshold respectively.



Discussion

Analysis of this cohort on consecutive orthok patients would suggest the following clinically relevant findings:

- The average corneal astigmatism in this cohort is 1.20D (Graph 1).
- There is a positive correlation between central corneal astigmatism and peripheral sagittal differential at 8mm: P-value: 0.2154 (Graph 2).
- Using a threshold of 30 microns sagittal differential at 8mm, 35% of patients in this cohort would require a toric orthok lens (Graph 3).
- Using a threshold of 25 microns sagittal differential at 8mm, 47% of patients in this cohort would require a toric orthok lens (Graph 4).

This study did not seek to determine the success rate or limits of orthok effectiveness on a range of central or peripheral astigmatism. Additionally, the study uses thresholds of 25 and 30 microns for toric orthok lenses but does not prove which would provide better clinical outcomes.

Conclusion

Orthokeratology patients will present with a wide variety of corneal astigmatism. A significant percentage of our patients may require a toric alignment zone to accommodate the non-symmetric nature of the peripheral cornea.

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