A NOVEL ORTHOKERATOLOGY DESIGN FOR THE TREATMENT OF HYPEROPIA

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ABSTRACT:

INTRODUCTION: This poster outlines the correction of hyperopia and presbyopia using a unique Orthokeratology design. The application for this new design extends to a wide range of ametropia, including myopia, astigmatism and mixed astigmatism. The design is described by two zones. This poster describes an example of a case prior to the commencement of prospective research. The current literature shows a discrepancy between practitioner observation and published evidence on Hyperopia and Orthokeratology. At writing, a literature search demonstrated only 11 original research articles specifically related to Hyperopic Orthokeratology.

METHODS: Lens simulation software was used to design a novel orthokeratology lens for the treatment of hyperopia. A case was presented to describe its application in hyperopia and astigmatism as well as an example showing the design in a hyperope.

RESULTS: A new design was successful in the treatment of hyperopia at a three-month review. Continued work is underway to use this lens design in prospective research and add to the limited base of literature on the topic.

DESIGN INFORMATION:

2 ZONE LENS DESIGN FOR THE TREATMENT OF AMETROPIA IN ORTHOKERATOLOGY

ZONE 1: Elliptic hyperboloid
Diameter: 7.6
ctft: 44um

ZONE 2: Topography derived monotonically increasing function.
Total Diameter: 11.2
Edge lift: 90-120um

This new lens design is useful in the treatment of a wide variety of ametropia correction and in the first example it shows that topography based lens design can generate a lens to a high level of accuracy.

LENS DESIGN SIMULATION

The lens schematic shows the lens sag and curvature.

Example of the 2 Zone lens for hyperopia manufactured from the lens design of left demonstrating the accuracy of simulation versus lens in situ.

The simulated fluorescein pattern from the EyeSpace Lens Design Software. The superior tear layer profile is shown through the flat meridian whilst the image below shows the tear layer profile through the steep meridian. The lens design shows an oval treatment zone. The final lens design that was ordered was a bi-toric 2-Zone lens design of the following parameters:

POST-WEAR TOPOGRAPHY

The post-wear axial difference map shows a large treatment zone diameter and a maximum correction of +4.25D or +1.50D of hyperopia.

The post-wear tangential difference map shows a well centred treatment zone.

Unaided vision following three months of wear was recorded as 6/7.5 (20/25).

CONCLUSION:

A new design for the treatment of hyperopia and other ametropias appears to be effective in its treatment. The authors plan to continue and carry out prospective research that will add to the global research on this promising niche within the modality.

REFERENCES: