Title: Influence of Different Types of Astigmatism on Myopia Progression in Children Wearing Defocus Incorporated Multiple Segments Spectacles

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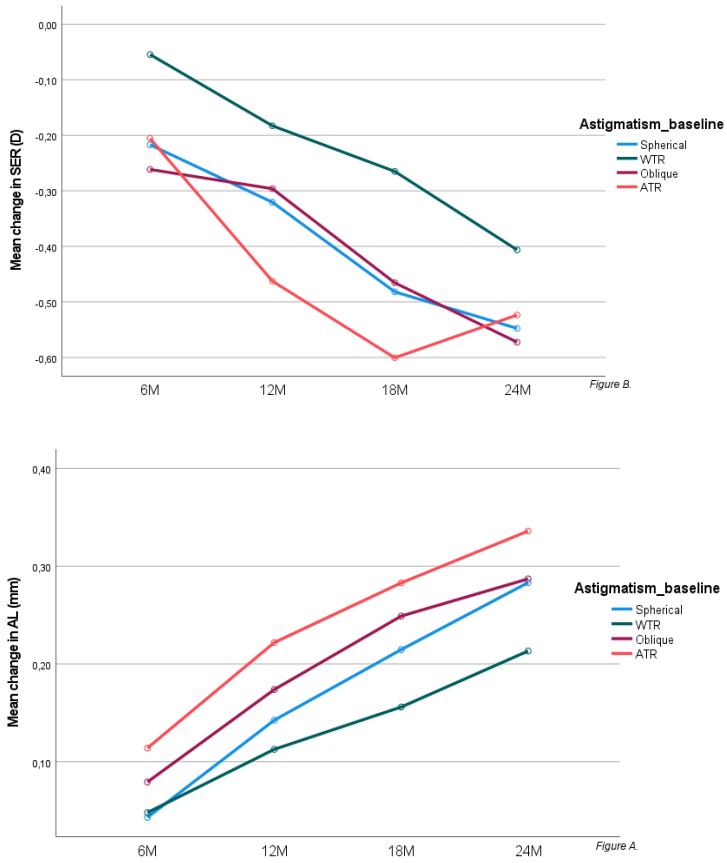
Purpose: Genetic and environmental factors are well evidenced to influence myopia progression. Little is known about the effect of astigmatism on myopia progression. This retrospective study aims to investigate the correlation between progressive myopia and astigmatism focussing on the influence of the type of astigmatism on myopia progression in children undergoing myopia management with Defocus Incorporated Multiple Segments (DIMS) spectacles.

Methods: Relevant data from two anonymised data sets were obtained for analysis: an Asian population aged 8-13 years, and a Caucasian population aged 5-15 years. Each participant's refractive error was classified into one of four categories: spherical, with-the-rule (WTR), oblique or against-the-rule (ATR) astigmatism. The myopia progression was evaluated by the change in Spherical Equivalent Refraction (SER) and axial elongation (AL) between baseline and 24-month (24M) follow-up visit.

Results: Retrospective right eye data for 184 children (79 Asian & 105 European) were analysed. The Asian participants were sub-classified as spherical (n=24), WTR (n=36), Oblique (n=17) or ATR (n=2); European participants were sub-classified as spherical (n=32), WTR (n=38), Oblique (n=27) or ATR (n=8) based on their refractive errors.

One-way ANOVA analysis of both data sets showed no significant difference in either SER and AL changes within or between the four different categories at 24M. Independent analysis of both data sets indicated that participants with WTR astigmatism had the least myopia progression. Analysis of the two datasets combined also found that participants with WTR had the least progression and participants with ATR astigmatism had the most myopia progression (Figure 1).

Figure 1: Mean change in SER and AL over 24months for Asian and European Children subclassified into four categories based on their refractive error. *WTR: With-the-rule, ATR: Against-the rule, SER: Spherical Equivalent Refraction, AL: Axial Length*



Conclusion:

Initial analysis shows that myopic participants with WTR using DIMS spectacle lenses have less myopia progression compared to participants with oblique or ATR. Long-term investigations in patients with different types of astigmatism undergoing myopia management are required to better understand the correlation between progressive myopia and different types of astigmatism.

Keywords: astigmatism, myopia progression, DIMS, myopic defocus