Relationship between contrast management spectacle lenses for myopia control and refractive astigmatism

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Purpose

Whilst a number of studies have shown peripheral defocus spectacle lenses can effectively slow axial length (AL) elongation and cycloplegic spherical equivalent refractive error (cSER), recent research suggests a potential link between these lenses and increased astigmatism development in myopic children. This research aimed to explore the impact of contrast management spectacle lenses, where myopia control does not rely on peripheral defocus, on astigmatism progression in myopic children to understand whether similar changes may be present.

Method

12-month data from two multi-centre, randomised control trials evaluating Diffusion Optics Technology (DOT), which uses contrast management, were analysed; a 4-year clinical trial in North America (NCT03623074) where cSER slowed by 0.41D (74%; p<0.0001); and a 2-year clinical trial in China (NCT05562622) where cSER slowed by 0.48D (75%; p<0.0001).

Evaluation of right eye refractive data was undertaken to determine the number of subjects with astigmatism (>0.25DC) at baseline and 12-months, and the magnitude of any change between test and control groups.

Results

173 North American eyes (ages 6-10 at recruitment) and 182 Chinese eyes (ages 6-13 at recruitment, were analysed. Eyes with astigmatism changed from 87% to 92% in the North American study and from 91% to 88% in the Chinese study after 12-months of wear (no significant difference between study arms, p=0.16). No significant change was found between test and control groups in North American children (-0.02 ± 0.32 DC vs 0.02 ± 0.42 DC; p=0.485) or Chinese children (0.18 ± 0.43 DC vs 0.15 ± 0.39 DC; p=0.679)

A Bland-Altman plot showed good consistency between cylindrical refractive error and corneal astigmatism for both groups.

Conclusions

At 12-months, contrast management spectacle lenses showed significant slowing of myopia progression in North American and Chinese children with no evidence of increased astigmatism, suggesting practitioners can continue to have confidence in the myopia control effect of DOT lenses.