

Impact of contrast modulation spectacle lenses on astigmatism

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Purpose

Recent research has suggested that peripheral defocus spectacle lens wear may cause an increase in astigmatism in myopic children. The purpose of this research was to explore the impact of contrast modulation spectacle lenses (that do not incorporate peripheral defocus) on astigmatism progression in myopic children.

Methods

Twelve-month refractive data from two multicenter randomized controlled clinical trials evaluating Diffusion Optics Technology (DOT) spectacle lenses were selected for analysis. The first was a 4-year clinical trial (NCT03623074) that recruited North American children aged 6 to 10 years. The second was a 2-year clinical trial (NCT05562622) that recruited Chinese children aged 6 to 13 years.

Right eye data was evaluated to determine the number of children with astigmatism (>0.25 DC) at baseline and at 12-months, and the magnitude of change in astigmatic children after 12-months of wear of DOT and standard single vision control spectacle lenses.

Results

Data from 173 North American and 182 Chinese children were included in this analysis. After 12-months of wear, DOT spectacle lenses significantly slowed cycloplegic spherical equivalent refraction in North American (0.41 D; 74%; $p<0.0001$) and Chinese children (0.48 D; 75%; $p<0.0001$), compared to control.

The proportion of children 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, with no difference between study arms ($p>0.05$).

Compared to the control groups, the mean differences in astigmatism were similar to the DOT groups in North American (0.02 ± 0.42 DC vs -0.02 ± 0.32 DC; $p=0.485$) and Chinese (0.15 ± 0.39 DC vs 0.18 ± 0.43 DC; $p=0.679$) children.

Conclusion

After 12-months of wear, DOT spectacle lenses significantly slowed myopia progression in North American and Chinese children. There was no evidence to suggest that wearing DOT lenses leads to an increase in astigmatism in myopic children.