Myopia Control with Contrast-Modulating Spectacle Lenses: A Two-Year Analysis Across Baseline Refraction

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Purpose

It has been well-established that the prevalence and severity of myopia increases with age.[i]

This study analyzed the effectiveness of Diffusion Optics Technology (DOT) spectacle lenses with contrast modulation in slowing myopia progression after two years of wear, with further analysis to determine if the level of myopia at the time of enrollment influenced the outcome.

Methods

This sub-group analysis utilized data from the CATHAY study (NCT05562622), a multi-center study evaluating myopic Chinese children, aged 6 to 13 years old at enrollment, who had worn DOT spectacle lenses or standard single vision spectacle lenses (SV) for at least 2-years.

Myopia progression was determined using the binocular average of cycloplegic Spherical Equivalent Refraction (cSER) in Diopters (D) and axial length (AL) measurements in millimeters (mm) at baseline and at 2-years. The low prescription (Rx) group (Low) was defined as initial baseline Rx up to -2.25D (≥-2.25D) and moderate Rx group (Mod) Rx was defined as Rx worse than -2.25D (<-2.25D).

Results

Results were available for 187 children with complete data. The mean (±SD) age was 9.35 (1.79) years in the Low Rx group (n = 108; 95%CI: 9.01 to 9.69) and 9.95 (1.74) years in the Mod Rx group (n = 79; 95%CI: 9.56 to10.34). The mean age difference between groups was 0.6 years (95%CI: -0.08 to -1.11; p = 0.024), indicating that younger children tended to have less severe myopia. This was supported by Pearson correlation between age and SER (r = -0.182; 95%CI: -0.039 to -0.317; p = 0.0129).

Mean (±SD) baseline cSER was -1.68 (0.32) D in the Low Rx group (95%CI: -1.61 to -1.74) and -3.09 (0.63) D in the Mod Rx group (95%CI: -2.95 to-3.23). At 24 months, cSER change from baseline was -0.45 D with DOT and -1.19 D with control in the Low Rx group, yielding a treatment difference of 0.74 D. In the Mod Rx group, cSER change was -0.26 D with DOT and -1.09 D with control, yielding a treatment difference of 0.83 D. DOT lenses were effective across refractive error groups, with highly significant treatment effects (p < 0.001) and no significant interaction by baseline level of myopia (AL p = 0.56; cSER p = 0.77).

Conclusion

This analysis highlights that DOT myopia control spectacle lenses effectively slowed myopia progression in children aged 6-13 years old, showing consistent outcomes across the initial prescription ranges enrolled in the study.

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[i] Kleinstein RN, Jones LA, Hullett S, et al. Refractive error and ethnicity in children. Arch Ophthalmol. 2003;121(8):1141-1147. doi:10.1001/archopht.121.8.1141