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Comparative Study

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Peripheral Defocus With Single-Vision Spectacle Lenses in Myopic Children

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Abstract

Purpose: To determine the impact of wearing single-vision spectacle lenses (SVLs) on the refractive errors at the periphery of the retina in myopic eyes of Chinese children.

Methods: Twenty-eight children (8 to 15 years) were divided into two groups: one (n = 17) comprising children with low myopia (spherical equivalent between -0.75 D and -3.00 D inclusive) and the other (n = 11), with moderate myopia (spherical equivalent between -3.25 D and -6.00 D inclusive). Cycloplegic autorefraction from right eyes was measured at the fovea and at 20, 30, and 40 degrees in the temporal and nasal visual fields. Measurements were taken on each subject both while uncorrected and while wearing SVLs.

Results: Hyperopic peripheral defocus was found with SVLs in both the low and moderate myopia groups. However, the increase in relative peripheral hyperopic defocus when wearing spectacle correction, when compared with the uncorrected state was statistically significant for the moderate myopia group only. In the moderate myopia group, relative peripheral hyperopic defocus when wearing spectacle correction was statistically significantly greater vs. the low myopia group at 40 degrees in the nasal field and at both 30 and 40 degrees in the temporal field ($p < 0.038$). An increase in astigmatism with correction was observed for J45 ($p < 0.05$) was also seen in eyes with moderate myopia, but this was limited to the nasal field.

Conclusions: Previous investigators have suggested that peripheral hyperopic defocus may play a role in the development and progression of myopia. We have shown that SVLs used to correct myopia can result in increased hyperopic defocus at the peripheral retina in the eyes of Chinese children. The magnitude of this increase tends to escalate with increasing refractive error and eccentricity, especially in cases with moderate levels of myopia.