Efficacy of Defocus Incorporated Multiple Segments (DIMS) Lenses in Retarding Myopic Shifts Among Pre-Myopic Preschoolers: Nine-Month Results of a Pilot Study

Hsin-Yu Yang^{*1,2}, Der-Chong Tsai^{2,3}

¹Department of Ophthalmology,, Taipei Veterans General Hospital, Yuan-Shan and Su-Ao Branch, Yilan, Yilan, Taiwan; ²Department of Ophthalmology,, National Yang Ming Chiao Tung University Hospital, Yilan, Yilan, Taiwan; ³School of medicine, National Yang Ming Chiao Tung University, Taipei, Taipei, Taiwan

Purpose

To evaluate the effectiveness of Defocus Incorporated Multiple Segments (DIMS) spectacle lenses in controlling pre-myopia in preschool children.

Methods

Pre-myopic preschool children (ages 5–6) with cycloplegic refraction from +0.75D to -0.50D were recruited for this study. Participants wore plano photochromic DIMS spectacle lenses and were monitored every three months for cycloplegic spherical equivalent refraction (SER), axial length (AL), and choroidal thickness (CCT). Spectacle-wearing time was recorded and analyzed for its association with changes in myopic parameters. Statistical analyses included the Wilcoxon signed-rank test for paired comparisons and Spearman's correlation for variable associations.

Results

The descriptive analysis of the 24 pre-myopic children is presented in Table 1. The average SER remained stable over nine months, shifting slightly from +0.375D (±0.319D) to +0.432D (±0.33D) (p = 0.471) (Figure 1), equating to +0.06D per year, compared to -0.15D per year in the pre-myopic control group (n = 378). Axial length increased significantly from 22.48 mm (±0.61 mm) to 22.64 mm (±0.63 mm) (p < 0.01) (Figure 2), while CCT remained stable (351.3 μ m ±55.9 μ m at baseline vs. 348.2 μ m ±50.7 μ m at nine months, p = 0.726) (Figure 3).

DIMS spectacle lens adherence was high, with an average wearing rate of 74%, surpassing the target of 52%. A negative trend was observed between changes in SER and axial elongation (Figure 4). Increased wearing time showed a mild positive association with hyperopic changes in refraction, though this was not statistically significant. No significant correlation was observed between axial length and average lens-wearing time.

Conclusions

Stability in SER suggests a protective effect on refractive status. High adherence and trends in wearing time support the potential efficacy of DIMS spectacle lenses in mitigating

myopia-related parameters. Larger studies are needed to confirm these findings and evaluate the long-term impact of DIMS lenses on myopia prevention.



Box and whisker plot of spherical equivalent refraction (Figure 1), axial length (Figure 2), and subfoveal choroidal thickness (Figure 3) over 9 months follow up