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Title: Multi-Site Observational Study of Defocus Incorporated Multiple Segments (DIMS) spectacle lenses in UK children: 2-year results

Purpose: An observational study exploring efficacy of Defocus Incorporated Multiple Segment (DIMS) lenses in controlling myopia over 2-years in UK children. The results were compared to published findings in Chinese children wearing DIMS lenses, to evaluate efficacy across ethnicities (Lam et al, 2020).

Methods: Children aged 5-15-years with cycloplegic spherical equivalent (SE) of -0.50 to -8.50D, anisometropia ≤ 1.50 D and astigmatism ≤ 2.50 D were recruited. All participants were prescribed DIMS spectacle lenses. SE and axial length (AL) were measured at baseline and at 6-monthly intervals for 2-years. Axial elongation in the 1st and 2nd year was compared to age- and population-matched eye growth of myopes wearing single vision correction (virtual controls) (Bullimore & Brennan, 2024). Cumulative two-year changes in AL and SER from a subgroup (age and refractive error matched) were compared with published data on Chinese children wearing DIMS.

Results: One- and two-year change data are presented from 103 participants. SE and AL changed by -0.33 ± 0.41 D and 0.17 ± 0.19 mm, and -0.23 ± 0.36 D and 0.12 ± 0.13 mm over the 1st and 2nd year, respectively. Compared to virtual controls, children wearing DIMS showed on average 0.16 ± 0.13 mm less elongation over the 1st and 0.15 ± 0.12 mm over the 2nd year of wear. 85% of participants showed slower than untreated myopic eye growth in the 1st year, increasing to 89% in the 2nd year. The sub-group of UK children with baseline age and refractive error matched to a Chinese cohort (age 8-13-years, SE -1.00 to -5.00D, astigmatism ≤ 1.50 D; n=59) showed no significant difference in two-year cumulative change in SE (UK -0.46 ± 0.48 D vs Chinese -0.41 D; p=0.39) and AL (UK 0.23 ± 0.22 mm vs Chinese 0.21 mm, p=0.40).

Conclusions: Compared with the expected age-normative myopic eye growth, we found that DIMS spectacle lenses effectively slowed eye growth in most UK wearers in both year 1 and year 2 of wear. DIMS spectacle lenses performed equally well among UK and Chinese children.