

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

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Purpose: Defocus Incorporated Multiple Segments (DIMS) spectacle lenses are well tolerated and effective in slowing myopia in Chinese children compared to single vision (SV) spectacle lenses. This observational study explored the efficacy of DIMS lenses in controlling myopia over two years in UK children. The results were compared to published findings in Chinese children, to evaluate efficacy across ethnicities (Lam et al, 2020).

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

Results: One- and two-year post-baseline change data are presented from 103 participants with mean baseline age 10.2 \pm 2.3 years. SER and AL changed by -0.33 \pm 0.41D and 0.17 \pm 0.19mm, and -0.23 \pm 0.36D and 0.12 \pm 0.13mm over the 1st and 2nd year, respectively. Compared to age-matched virtual controls, children wearing DIMS lenses showed on average 0.16 \pm 0.13mm less axial elongation over the 1st year of wear and 0.15 \pm 0.12mm less in the 2nd year (2-year reduction=0.31 \pm 0.19mm). 88 participants (85%) showed slower than untreated myopic eye growth in the 1st year of wear, increasing to 92 participants (89%) in the 2nd year. For a sub-group of UK children with baseline age and refractive error comparable to a Chinese cohort (baseline: age 8-13 years, SER -1.00 to -5.00D, astigmatism \leq 1.50D; n=59) two-year cumulative changes in SER and AL were -0.46 \pm 0.48D and 0.23 \pm 0.22mm. There was no significant difference between the DIMS spectacle lens-wearing UK and Chinese cohorts for the two-year cumulative change in SER and AL (Chinese SER mean change=-0.41D, p=0.39, and Chinese mean AL change=0.21mm, p=0.40). Compared to age-matched virtual controls with SV correction, the sub-group of UK children wearing DIMS lenses had a mean cumulative reduction in AL of 0.33 \pm 0.18mm, comparable to the reduction reported in Chinese DIMS wearers when compared to their SV control group (Chinese mean AL reduction compared to controls=0.34mm, p=0.62).

Conclusions: Compared with the expected age-normative myopic eye growth, we found that DIMS spectacle lenses effectively slowed eye growth in most wearers in both year 1 and year 2 of wear. The average reduction in axial elongation was sustained over two years. DIMS spectacle lenses performed equally well among UK and Chinese children.

Conflicts of Interest: Study funded by HOYA Vision Care