

Effectiveness of Defocus Incorporated Multiple Segments (DIMS) spectacle lenses on myopia control in Romanian children: 1-year results

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Abstract

Purpose: Defocus Incorporated Multiple Segments (DIMS) spectacle lenses have a proven efficacy in reducing myopia progression when compared to their peers in conventional single vision spectacle lenses in different populations. There is a dearth of evidence on the effectiveness of DIMS spectacle lenses in Romanian children. We conducted a single centre observational study and report on refraction and axial length changes at 1-year visit.

Methods: In this real-world, 12-month study, 122 children, aged 4-15 years with cycloplegic refraction between -0.50D to -8.50D and astigmatism ≤ 2.50 D, and no history of previous myopia control strategies were included. All eligible children were prescribed DIMS spectacle lenses. Spherical equivalent refraction (SER) and axial length (AL) were measured at baseline, 6M and 12M using Topcon KR 800 autorefractor and Pentacam AXL respectively. If the AL progression at 6M was greater than the age-matched emmetropic growth rate, 0.025% atropine was prescribed (combined treatment). Participants were evaluated based on the age at baseline: <8 years, 8-10 years, 11-13 years, and 14-15 years. Data from both eyes were analysed.

Results: Of the 122 eligible children, 4 were lost to follow-up, 108 children (39% boys, 61% girls) were prescribed DIMS only (Group A) and 10 children received combined treatment (Group B). The mean age of the full cohort (118 children) completing the 12M follow-up was 10.3 ± 2.7 years. The mean baseline SER for Group A and B was -2.43 ± 1.71 D and -1.56 ± 0.99 D respectively. The mean baseline AL for Group A and B was 24.24 ± 0.93 mm 24.19 ± 0.88 mm.

The mean SER progression for Group A at 6M and 12M was 0.09 ± 0.20 D and 0.22 ± 0.22 D, respectively $p < 0.001$. The mean AL progression for Group A at 6M and 12M was 0.02 ± 0.07 mm and 0.09 ± 0.11 mm, respectively ($p < 0.001$).

The mean SER progression for Group B at 6M and 12M was 0.19 ± 0.23 D and 0.32 ± 0.25 D, respectively $p = 0.043$. The mean AL progression for Group B at 6M and 12M was 0.14 ± 0.09 mm and 0.18 ± 0.13 mm, respectively ($p = 0.409$).

75% of boys and 73% of girls had an axial elongation equal to the emmetropes of their age, i.e. < 0.2 mm/year at 7-10 years and < 0.1 mm/year at 11-15 years. AL progression at 12M was significantly correlated with that at 6M ($\delta = 0.761$, $p < 0.001$).

Conclusions: DIMS spectacle lenses are effective in slowing myopia progression (SER and AL) in Romanian children at 12M. As AL progression at 6M is positively correlated with the AL at 12M, it can be used as guide for changes in myopia management strategies if there is progression at 6M. Further longer term studies are required for Romanian children wearing DIMS spectacle lenses (monotherapy) and in combined treatment.