Atropine and Spectacle lens Combination Treatment (ASPECT): 12-month results of a randomised controlled trial for myopia control using a combination of Defocus Incorporated Multiple Segments (DIMS) lenses and 0.025% atropine

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Purpose

Defocus Incorporated Multiple Segments (DIMS) spectacle lenses and atropine have proven standalone efficacy in controlling myopia progression in children. However, there is a scarcity of evidence of their efficacy when used in combination. This is the first randomised controlled trial (RCT) that evaluates and compares the efficacy of combination treatment using 0.025% atropine and DIMS spectacle lenses to 0.025% atropine and single vision (SV) spectacle lenses in slowing myopia progression in myopic children.

Methods

Children aged 4-16 years with myopia between -1.00D and -6.00D and astigmatism ≤2.00D were recruited and randomly allocated in two groups: 0.025% atropine and SV spectacle lenses treatment group (group A) or 0.025% atropine and DIMS spectacle lenses treatment group (group B).

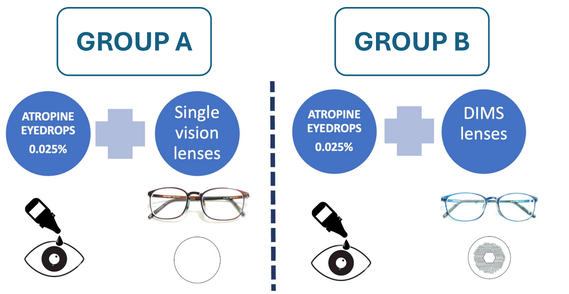

Figure 1. Study treatment groups

Cycloplegic spherical equivalent refraction (SER) and axial length (AL) were measured at baseline, 6 and 12 months. Statistical analyses using independent sample t-test or the non-parametric Mann-Whitney U test, as appropriate, were performed to test for significance between the two groups.

Results

102 patients completed the 12-month follow-up: n=49 in group A, mean age 9.50±2.78 years, and n=53 in group B, mean age 9.90±2.47 years.

At 12 months, mean AL±SD change was 0.18±0.16mm in group A and 0.07±0.16mm in group B (mean difference: 0.11, 95% CI: 0.05 to 0.17; p=<0.001).

Mean SER ±SD progression was -0.19±0.42D and -0.09±0.35D in group A and B at 12 months, respectively (p=0.13).

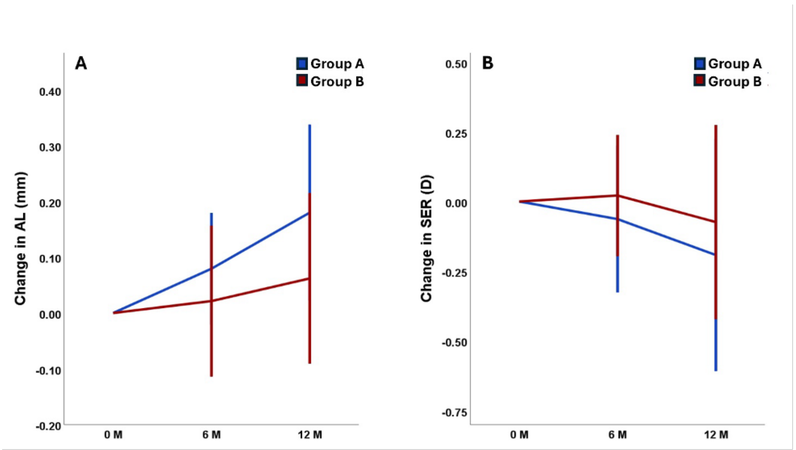

Figure 2. Changes in axial length (AL) and spherical equivalent refraction (SER) over 1 year in group A (blue) and group B (red).

39.6% of children in group B had no axial elongation over 12 months, compared to 12.2% of the children in group A (p=0.002).

Discussion

According to the Age-Matched Myopia Control (AMMC) system data, most patients treated with a combination of 0.025% atropine eye drops and DIMS spectacle lenses achieve comparable axial elongation to age-matched emmetropes during the first year of treatment. This suggests that combined therapy is a promising management strategy, especially for younger children with increased AL.

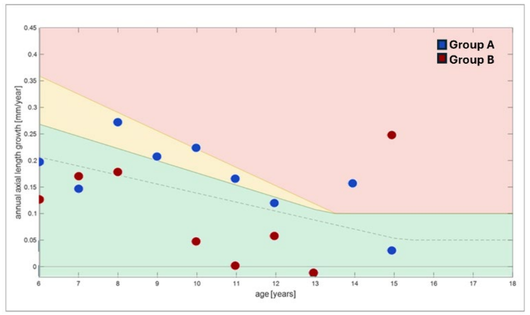

Figure 3. Axial length growth in groups A and B, plotted in the AMMC system. For each age, the mean annual AL growth value is plotted within the color-coded zones: "green" corresponds to the physiological AL growth rate, "yellow" corresponds to a moderately excessive AL growth rate (+25% but less than +50% of the average physiological AL growth rate), "red" reflects a highly excessive AL growth rate (more than 50% above the physiological AL growth rate). Each point represents the mean AL value for a given age.

Conclusions

Combination treatment with 0.025% atropine and DIMS spectacle lenses is more effective in controlling axial elongation than 0.025% atropine with SV lenses. Myopic children treated with combination treatment achieved emmetropic age-matched axial length growth over 12 months, and approximately 4 out 10 children had no axial elongation over 12 months, suggesting a promising approach for myopia management.

References

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Graff B, Lam CSY, Vlasak N, Kaymak Hof axial length growth in myopic children wearing defocus incorporated multiple segments spectacle lenses. Br J Ophthalmol. 2024;108(8):1060-1066. doi:10.1136/bjo-2023-324508. Age-matched analysis

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