

# Initial axial length reduction in response to Diffusion Optics Technology (DOT) spectacle lens wear

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## Purpose

Multiple clinical trials have observed a small proportion of children undergo an initial reduction in axial length with defocus-based myopia control treatment, which has primarily been attributed to choroidal thickening. The purpose of this research was to explore the incidence of axial length reduction with contrast modulation spectacle lenses (Diffusion Optics Technology™, DOT), and to investigate interaction with other variables.

## Methods

One hundred and eighty-six Chinese children aged 6 to 13 years with myopia from -0.75 D to -5.00 D were enrolled in a 2-year randomised controlled clinical trial across 5 sites (NCT05562622). The children were allocated to wear either DOT spectacle lenses or standard single vision Control lenses in a 2:1 ratio. Axial Length (AL) and cycloplegic Spherical Equivalent Refraction (cSER) were measured at baseline and after 6 months of wear. The DOT and Control groups were subdivided into two groups based on AL progression after 6-months of study lens wear: AL reduction (<0 mm change) or AL elongation (>0 mm change). The relationships between change in AL and change in cSER, baseline AL, baseline cSER, age, gender and previous lens wear were explored.

## Results

After 6 months of wear, AL reduction was observed in 5% of the Control group (n=3, mean AL change  $\pm$  SD:  $-0.04 \pm 0.02$  mm) and 49% of the DOT lens group (n=63, mean AL change:  $-0.11 \pm 0.09$  mm). AL elongation was observed in 95% of the Control group (n=55, mean AL change:  $0.20 \pm 0.12$  mm) and 51% of the DOT lens group (n=65, mean AL change:  $0.13 \pm 0.11$  mm). There was a significant association between lens group and AL change (Fisher's exact test,  $p < 0.001$ ). Change in AL significantly correlated with change in cSER ( $R^2 = 0.584$ ,  $p < 0.001$ ). No significant relationships were observed between change in AL and the other variables investigated.

## Conclusion

Almost half of the DOT lens group experienced a reduction in AL after 6 months of wear. The magnitude of the observed AL reduction implicates remodeling of multiple ocular structures. Further longitudinal follow-up is required to determine whether initial AL changes can predict the myopia control efficacy of a treatment for an individual child.