

# A Real-World Study Comparing Atropine Monotherapy to the Synergistic Effects of Combination Treatment: Defocus Incorporated Multiple Segments Spectacle Lenses and Low Dose Atropine

Celso Marcelo Cunha, Jessica Teixeira Cunha, Giovanna Marchezine, Mariana Madrona Ribeiro, Matheus Bittencourt Novaes, Vinicius Dal Ponte Carvalho, José Eduardo Cesário Lindote.

## ABSTRACT

**Purpose:** The effectiveness of Defocus Incorporated Multiple Segments (DIMS) spectacle lenses have been demonstrated both as a stand-alone treatment and when combined in diverse populations. There is limited literature on the effectiveness of combination treatment using DIMS spectacle lenses and low dose atropine in the South American population. The objective of this study was to evaluate whether the combination of low dose atropine and DIMS was beneficial in children undergoing myopia control treatment.

**Methods:** Retrospective data for fifty-one patients aged 8 to 13 years who attended at private clinic between January and September 2020 were obtained. The subjects were selected based on their myopia progression history at last 12 months. Following the initial myopia diagnosis, participants were advised to spend 2 hours a day in outdoors activities (environmental control). If the axial length (AL) increased by 0.15mm in 6 months, participants were prescribed low dose atropine 0.025% for the next 12-month period. If at the 12-month visit, the AL continued to grow more than 0.2 mm/year, a combination treatment low dose atropine plus DIMS was prescribed for the next 12 months period. To observe changes, only data from the right eye were accepted. The treatment efficacy was calculated based on the differences of myopia progression across time periods. This study was approved by ethics committee of Centro Universitário da Várzea Grande, Brazil.

**Results:** The mean age of the participants was  $10.16 \pm 1.63$  years. Males comprised 25 (49.02%) of subjects. At baseline, the mean spherical equivalent refraction, median keratometry and AL were  $-3.01 \pm 1.22$  D,  $43.13 \pm 1.19$  D, and  $24.60 \pm 1.03$  mm, respectively. At the first six months of environmental control time, the mean progression in AL was estimated to be  $0.39 \pm 0.09$  mm per year. The combined treatment significantly reduced the progression of myopia compared to the 0.025% atropine monotherapy ( $0.21 \pm 0.03$  versus  $0.13 \pm 0.05$  mm,  $p < 0.0001$ ).

**Conclusion:** The combination of DIMS spectacle lenses and 0.025% atropine resulted in the most significant reductions in myopia progression and AL elongation

when compared to the use of 0.025% atropine monotherapy or environmental control in a Brazilian population.

**Keywords:** Refractive errors; Myopia; Atropine; Axial Length; Defocus Incorporated Multiple Segments.