

A Review of Myopia Control for High Myopia

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Abstract

Purpose: Myopia and especially high myopia are recognised as major public health concerns. Although the prevalence of high myopia in young children is low, 10-20% of high school children in Asia have high myopia, with many still progressing, and one in three patients with high myopia develop visual impairment with age. Most participants in myopia control studies have low and moderate myopia; relatively little is known about myopia control in high myopia. The primary aim is to comprehensively review the efficacy of current myopia control strategies for high myopia. A secondary aim of the review is to report on the structural and pathological complications of eyes as a result of high myopia.

Methods: A comprehensive literature search was undertaken to identify publications in English, evaluating the efficacy of myopia control strategies (environmental, pharmacological and optical) in high myopia ($\leq -6.00D$) and the complications of high myopia using keywords in MEDLINE and EMBASE. Outcomes include change in spherical equivalent refraction (SER) and/or axial length (AL) to evaluate progression in high myopia.

Results: Eleven studies evaluating the efficacy of optical and pharmacological (none on environmental) interventions on axial elongation and myopic refractive error for high myopia control were identified. A statistically significant reduction in progression of refractive error in high myopia was reported with 0.5% atropine. Defocus Incorporated Multiples Segment spectacle lenses had lower efficacy in slowing high myopia progression compared to moderate and low myopia. Ortho-k lenses were equally effective in reducing myopia progression in low, moderate and high myopia. All myopic patients have an increased risk of myopic macular degeneration, retinal detachment, cataract and glaucoma. This risk increases markedly with higher degrees of myopia.

Conclusions: High myopia has significant effects on quality of life and risk of pathological complications and vision impairment. Young children, excluding those with some syndromic associations, who are fast progressing moderate and high myopes require early intervention and close monitoring. From the limited available research, a significant reduction in progression of refractive error in high myopia is likely when using 0.5% atropine and Ortho-k lenses were equally effective in reducing myopia progression in low, moderate and highly myopia. Further research investigating the efficacy of myopia control strategies in highly myopic patients, both independently and through combination treatments, are necessary.