UPDATE ON TREATMENT OF CHILDHOOD MYOPIA PROGRESSION

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ABSTRACT

Ophthalmologists have used several different treatment modalities over the past few decades to prevent the progression of myopia. There is no evidence that bifocal lenses or contact lenses are effective in retarding the myopia progression. Atropine may be effective but there are a significant number of short-term and long-term side-effects associated with the use of atropine. At present, the routine use of atropine or pirenzipine eye drops, bifocal lenses, and contact lenses to prevent the progression of myopia by family physicians or eye care professionals are not recommended.

INTRODUCTION

Myopia is a common ocular disorder in Asian cities such as Singapore.[1] This refractive error disorder is associated with both economic and medical costs.[2] Economic costs include the costs of spectacle and contact lens wear, as well as visits to optometrists. High myopia (spherical equivalent at least –6.0 Diopters) is associated with medical complications such as retinal tears and myopic macular degeneration.[3] Children with early onset myopia and rapid progression of myopia have higher risks of high myopia in later childhood or adult life.

Common questions that parents may ask include: How do I prevent my child from developing high myopia later in life? Are there any eye drops I could give my child to prevent his or her myopia from progressing rapidly? There are no simple answers to these questions. Many different treatment modalities to retard the progression of myopia in children have been previously evaluated. Bifocal lenses, contact lenses and pharmacological therapies are examples of the main modalities that have been studied in randomized clinical trials and other types of study designs.[4] A summary of the evidence thus far indicates that none of these modalities may be recommended on a routine basis for the treatment of the progression of myopia.[5]

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ATROPINE OR PIRENZIPINE EYE DROPS

The most commonly used eyedrops for myopia treatment are atropine eye drops. Atropine, a muscarinic antagonist, has been tested in several randomized clinical trials and has been found to be effective in decreasing the progression of myopia in children.[6,7] Several possible adverse effects include problems with accommodation, photophobia and allergic reactions. The long-term effects of atropine are also unknown: chronic pupil dilatation and possible phototoxicity may lead to the development of cataracts as well as damage to the retina. Only monotherapy with atropine eye drops has been tested and more studies are needed to evaluate the effectiveness of bilateral atropine. At present, we do not advocate the routine use of atropine eyedrops to treat myopia. However, if a child has a very high risk of developing pathological myopia in later life, experienced ophthalmologists or optometrists may prescribe atropine eye drops if appropriate precautionary measures are taken. Frequent examinations of the eye should be made and the parents informed of all possible adverse effects. Pirenzipine eye drops, a selective M1 muscarinic antagonist, may be a better alternative as there may be possibly fewer side-effects such as difficulty with accommodation and pupillary dilatation. We do not know whether pirenzipine is effective as several studies are presently being conducted.

BIFOCAL LENSES

It has been suggested that defects in accommodation may lead to myopia and bifocal lenses may decrease accommodation. These lenses have been evaluated in several randomized clinical trials but there is no evidence that they are effective in decreasing the progression of myopia in children.[8-11] Progressive addition multifocal lenses may be more cosmetically acceptable and they allow children to have clear vision at all distances. However, prior studies have not shown that multifocal lenses may help to treat myopia. We therefore do not recommend the use of bifocal or multifocal lenses as treatment strategies to prevent the progression of myopia in children.

CONTACT LENSES

In the past few decades, both ophthalmologists and optometrists have used contact lenses to treat myopia. Contact lenses may flatten the cornea or retard the elongation of the eyeball of myopic children. There may be cosmetic benefits and increased peripheral vision associated with the wear of contact lenses. In addition, outdoor activity may be promoted and the child may spend more time outdoors and less time in near work activities.

However, there are no well-designed randomized clinical trials that have found that soft and rigid contact lenses are effective in treating myopia.[12,13] There are several other problems with the recommendation of the routine use of contact lenses in children. Complications such as corneal infiltrates, corneal abrasions, allergic conjunctivitis and infective keratitis may occur. Children may find it difficult to wear and care for contact lenses; a large amount of time and effort may be spent teaching the children how to wear contact lenses.

CONCLUSIONS

In summary, ophthalmologists have used several different treatment modalities over the past few decades to prevent the progression of myopia. There is no evidence that bifocal lenses or contact lenses are effective in retarding the myopia progression. Atropine may be effective but there are a significant number of short-term and long-term side-effects associated with the use of atropine. At present, we do not recommend the routine use of treatment modalities to prevent the progression of myopia by family physicians or eye care professionals.

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