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CHARACTERISTICS OF MYOPIA CORRECTION IN SCHOOL-AGED CHILDREN

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Abstract: Myopia, also known as nearsightedness, has become one of the most prevalent visual disorders among school-aged children worldwide. Its increasing incidence has raised significant public health concerns due to its potential impact on academic performance, visual comfort, and long-term ocular health. This paper explores the specific characteristics of myopia correction in school-aged children, including optical, pharmacological, and lifestyle approaches. The purpose of this study is to emphasize the importance of early diagnosis, appropriate correction methods, and preventive strategies to control the progression of myopia during critical developmental years.

Keywords: Myopia, myopia correction, school-aged children, pediatric ophthalmology, myopia progression, orthokeratology, atropine eye drops, multifocal lenses, DIMS lenses, outdoor activity, near work, visual hygiene, axial elongation control.

Introduction

Myopia is a refractive error characterized by the elongation of the eyeball, resulting in the image of distant objects being focused in front of the retina. Over the last few decades, the global prevalence of myopia has increased dramatically, particularly among children and adolescents. Environmental factors such as excessive near work, prolonged use of electronic devices, limited outdoor activity, and genetic predisposition are considered key contributors to this phenomenon.

School-aged children are especially vulnerable because their eyes are still developing, making them more susceptible to axial elongation. Uncorrected myopia in this age group can lead to reduced academic performance, headaches, and eye strain, while progressive myopia can increase the risk of developing serious ocular complications such as retinal detachment, glaucoma, and myopic maculopathy later in life.

Therefore, the correction of myopia in school-aged children requires a multifaceted approach that not only addresses optical correction but also focuses on controlling the progression of the condition through pharmacological and behavioral interventions.

Optical Correction Methods

Optical correction remains the primary approach for managing myopia in children. The most common methods include eyeglasses and contact lenses. Single-vision spectacles are typically prescribed to correct refractive error and provide clear distance vision. However, these lenses do not slow myopia progression. In recent years, specialized optical solutions such as bifocal, multifocal, and defocus-incorporated multiple-segment (DIMS) lenses have been developed to reduce peripheral hyperopic defocus and thereby control eye elongation.

Contact lenses, especially orthokeratology (Ortho-K) lenses, are gaining popularity for myopia control. These lenses temporarily reshape the cornea during sleep, allowing for clear unaided vision during the day. Numerous studies have shown that Ortho-K lenses can slow axial elongation by up to 50% in children. Despite their effectiveness, proper hygiene, supervision, and follow-up are essential to minimize the risk of corneal infections and other complications.

Advances in myopia control optics continue to provide promising tools for pediatric vision care, yet individualization of treatment based on visual demands, lifestyle, and tolerance remains crucial.

Pharmacological Approaches

Pharmacological control of myopia progression has become an increasingly researched area. Low-dose atropine eye drops are currently the most effective and widely accepted pharmacological option. Studies have demonstrated that atropine concentrations as low as 0.01% can significantly reduce myopia progression with minimal side effects such as photophobia or near blur.

The mechanism of atropine in controlling myopia is not fully understood but is thought to involve the inhibition of excessive scleral remodeling and axial elongation. Other pharmacological agents, such as pirenzepine and 7-methylxanthine, have been investigated, but their clinical use remains limited due to safety or efficacy concerns.

Pharmacological interventions are typically used alongside optical correction and lifestyle modifications to achieve optimal outcomes. Regular monitoring by ophthalmologists is essential to adjust dosage and ensure ocular health.

Lifestyle and Environmental Factors

Lifestyle modification plays a significant role in both the prevention and management of myopia in school-aged children. Increased outdoor activity—at least two hours per day—has been shown to reduce the risk of developing myopia and slow its progression. Exposure to natural light stimulates dopamine release in the retina, which helps regulate eye growth.

Conversely, prolonged near work, including reading, studying, and screen use, has been strongly correlated with increased myopia incidence. Implementing the “20-20-20” rule—looking at something 20 feet away for 20 seconds every 20 minutes—can help alleviate accommodative stress. Proper posture, adequate lighting, and maintaining a reading distance of at least 30–40 cm are also important preventive measures.

Parental education and school-based vision programs also play a vital role in early detection and prevention. Integrating these behavioral strategies with optical and pharmacological correction ensures a holistic approach to managing pediatric myopia.

Conclusion

The correction of myopia in school-aged children requires a comprehensive strategy that incorporates optical, pharmacological, and lifestyle interventions. Early diagnosis and individualized treatment plans are essential for preventing rapid progression and associated complications. As myopia becomes an increasingly common public health issue, continuous education for parents, teachers, and healthcare professionals is necessary to ensure effective management and prevention strategies.

Future research should focus on optimizing combination therapies and developing innovative interventions that target both refractive correction and axial elongation control.

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