

# Eye health: Understanding childhood myopia

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## Professor Nicola Logan, Professor of Optometry & Physiological Optics at Aston University, helps us to understand childhood myopia (short-sightedness), stating that early management in this vein is crucial for eye health

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Myopia, commonly known as short-sightedness, is an eye condition where distant objects appear blurry. Myopia has been seen as a minor issue easily corrected with spectacles, contact lenses, or surgery. However, our view and understanding of myopia have evolved dramatically over the last two decades. This is due to several reasons:

- Myopia is rapidly increasing in prevalence, especially among children who spend a lot of time indoors and in intensive education.
- Myopia has been linked to a heightened risk of eye diseases and visual impairment.
- New evidence-based interventions have emerged to help delay the onset and slow myopia's progression.

The global rise in myopia among children has prompted discussions about the importance of proactive management strategies to mitigate its impact on eye health.

### The myopia epidemic: Understanding its scope

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Myopia has reached epidemic proportions, affecting millions of children worldwide. According to recent studies, the prevalence of myopia has increased significantly, particularly in urban areas and regions with high academic pressure.

In East and Southeast Asia, around 80% of children have myopia, and 10% to 30% have high levels of myopia. They are at high risk of uncorrectable vision loss later in life due to the increased risk of various eye diseases.

In the UK, the prevalence of myopia has doubled in the last 50 years. (1) Once myopia develops, it typically progresses in level throughout childhood into early adulthood.

### Impact of myopia on eye health

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The eye elongates with the level of myopia, and this increased length of the eye can lead to severe complications in later life. (2) Retinal detachment can occur from stretching of the retina because of elongation of the eyeball. Changes to the macula, myopic maculopathy, can also arise due to myopia and is one of the leading causes of visual impairment.

Although the prevalence of myopic maculopathy increases with the level of myopia, the impact at a population level is predicted to increase dramatically due to both the increasing prevalence of myopia and an ageing population.

Myopia is also associated with a higher likelihood of glaucoma potentially leading to irreversible vision loss. Another significant consequence is an elevated risk of developing cataracts.

## **Eye health: Factors contributing to childhood myopia**

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Several factors contribute to the development and progression of myopia in children. <sup>(3)</sup> Genetics play a role, with children having myopic parents being at higher risk.

Environmental factors such as increased near-work activities (e.g., prolonged screen time, reading) and limited outdoor exposure have also been linked to higher myopia rates.

## **Childhood myopia: The Importance of early intervention**

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Although the sight-threatening consequences of myopia occur later in life, interventions to delay its onset need to start early in childhood, and interventions to slow its progression need to be implemented as soon as possible after onset. <sup>(4)</sup> The aim is to reduce both the level of myopia in an individual and the overall prevalence of myopia and the associated pathological changes. Acting promptly to manage childhood myopia is crucial for several reasons:

**Vision correction:** Addressing myopia early helps provide appropriate vision correction, ensuring children can see clearly and perform daily activities.

**Slowing progression:** Implementing management strategies can help slow the progression of myopia, reducing the risk of developing high myopia and associated complications later in life.

**Quality of life:** Myopia can impact a child's quality of life, affecting academic performance, participation in sports and outdoor activities, and overall confidence and self-esteem. Early intervention can mitigate these impacts, allowing children to thrive academically and socially.

**Long-term eye health:** Managing myopia in childhood has long-term implications for eye health and vision preservation. By implementing interventions to control myopia progression, we can reduce the likelihood of vision-threatening complications.

## **Strategies for managing childhood myopia**

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There is a growing body of substantial-high-quality evidence for a range of interventions to slow myopia progression in children. <sup>(5,6)</sup>

## **Contact lenses for myopia management:**

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Dual-focus soft contact lenses provide both clear distance vision and a special optical design, which has been shown in clinical trials to slow myopia progression. MiSight® 1 day contact lenses (CooperVision) are the only FDA-approved intervention for myopia control at the time of writing. They have shown a good myopia control effect over three years sustained over a longer term. <sup>(7)</sup>

Evidence also shows that other multifocal soft contact lenses can effectively slow myopia progression.

Orthokeratology involves using specially designed rigid contact lenses worn overnight to reshape the cornea temporarily. This reshaping allows light to focus differently on the retina. Studies have shown that orthokeratology is also an effective intervention to slow down myopia progression in children. <sup>(6)</sup>

## **Novel designs of spectacle lenses**

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There is now a range of novel designs of spectacle lenses, which, like the contact lens options, alter the image the eye sees while simultaneously correcting the distance vision and are backed by good quality evidence from clinical trials. <sup>(6)</sup>

## **Are there other options for childhood myopia?**

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In addition to optical interventions, atropine eye drops have been studied for their efficacy in myopia control. <sup>(6)</sup> Low-concentration atropine eye drops have shown promising results in slowing down myopia progression.

However, concerns about potential side effects, the most suitable concentration and the need for long-term use are ongoing research and debate areas. Repeated low-level red light, which requires delivering relatively high levels of red light to the retina twice a day, is emerging as an option to slow progression, although there are some safety concerns.

We can also modify behaviour. Encouraging children to spend more time outdoors has been linked to a lower risk of myopia development. Natural light exposure and the visual stimuli provided by the outdoor environment seem to have a protective effect. While increased outdoor time alone may not be sufficient for myopia control, it is considered a beneficial and low-risk measure.

Educating parents and children about good visual habits, such as taking regular breaks from near work and maintaining an appropriate viewing distance, may contribute to myopia control. When combined with other optical interventions, these behavioural modifications can form a comprehensive approach to managing myopia. <sup>(6)</sup>

## **Childhood myopia: Act on eye health**

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Childhood myopia represents a significant public health concern with far-reaching implications for eye health and quality of life. Myopia control interventions provide clear vision and mitigate the long-term risks associated with progressive myopia. Although

none of the strategies halts myopia's progression entirely, all significantly impact slowing progression.

While no single intervention fits all, a mixture of approaches tailored to the individual needs of each child can be effective in slowing down myopia progression. Regular eye exams and open communication between optometrists, parents, and children are essential components of a successful myopia control strategy. We must advocate for myopia management to become the standard of care to safeguard the visual health of the younger generation. <sup>(8)</sup>

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