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Consultation by Appointment

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Myopia in Children

養和眼科部
HKSH Department of Ophthalmology

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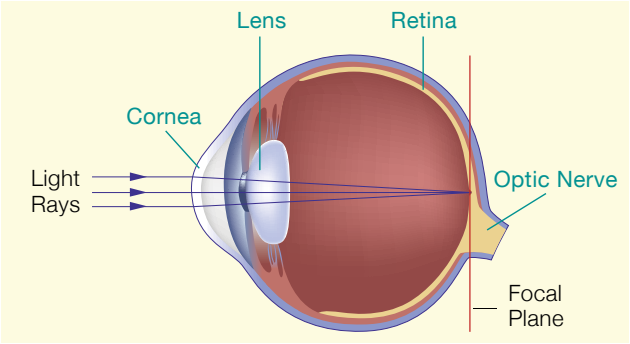
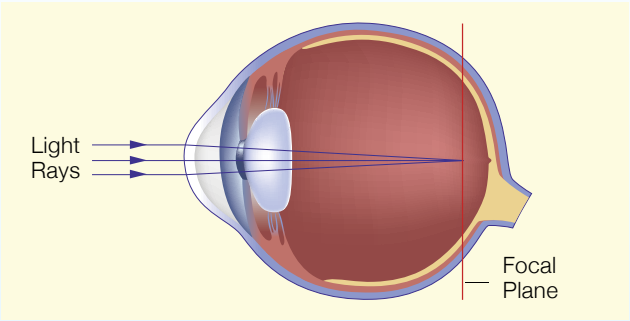
Normal Vision



Nearsightedness (Myopia)

Nearsightedness, also known as myopia, is very common in Hong Kong, with about 18% of six-year-old students being myopic, and the rate increasing to as high as 62% by the age of twelve. Nearsightedness is usually due to the elongation of the eyeball, causing objects to focus in front of the retina. A child with nearsightedness typically complains of blurred vision when viewing distant objects, but experiences less difficulty seeing near objects. The child will have difficulty reading the board in class and may also squint their eyes when looking at distant objects. The extent of nearsightedness will progress with age. During the developmental period, as children's eyeballs continue to grow, nearsightedness can progress rapidly. The condition continues to worsen with age until the eyeball's length stabilises after puberty.



Impact

Children with nearsightedness need glasses or contact lenses to correct blurred vision. However, for children, glasses with frames may cause inconvenience in daily life, and improper cleaning of contact lenses can increase the risk of eye infections. Wearing glasses or contact lenses, or undergoing refractive surgery in adulthood also comes with financial implications.

Moreover, if the progression of children's nearsightedness is not adequately controlled and becomes severe, above 500 degrees (-5 Dioptres), it is associated with the long-term risk of developing serious eye diseases such as retinal detachment, maculopathy, cataracts, and glaucoma when they grow up.

Therefore, nearsightedness is not just a matter of unclear vision but a condition that requires prevention and treatment. To diagnose nearsightedness in children early and slow its progression, it is recommended to have regular eye examinations and take effective measures to control nearsightedness. This approach may prevent the risk of developing other eye diseases in the future and protect the children's vision and overall eye health.

Risk Factors

The causes of nearsightedness and its progression are still unknown. Both genetic and environmental factors, including lack of outdoor activities, play a role.

- **Family history:** If one or both parents are nearsighted, their children are at a higher risk of developing the condition. Children with both parents being nearsighted have much higher risk of developing nearsightedness and experience a higher progression rate in their nearsightedness.
- **Near work and less outdoor activities:** Less outdoor activities and more near work are found to be associated with the development of nearsightedness.

A Comprehensive Approach to Prevent Onset and Progression of Nearsightedness

1. Keeping Good Habits for Eye Health

- **Increase outdoor activities:** Studies suggest that increased outdoor time may prevent the onset of nearsightedness and slow down the progression. It is advised that children should have at least two hours of daylight exposure per day
- **Establish a proper work routine:** More time spent on near work tasks is associated with a higher risk of nearsightedness. A working distance of greater than 30 cm is recommended
- **Ensure adequate lighting:** Children should avoid reading or working in dim light

2. Using Atropine Eye Drops

Atropine eye drops are a medication that helps to reduce the risk of developing nearsightedness and slow its progression in children. Atropine is a non-selective antimuscarinic blocker, which can inhibit excessive growth of the sclera, thereby reducing the progression of nearsightedness.

Atropine eye drops have been studied for their effectiveness in reducing the progression of nearsightedness since the 1970s. Studies indicate that atropine eye drops at concentrations of 0.5% and 1.0% can slow nearsightedness progression by 75% and 80%, respectively. However, use of atropine may cause pupil dilation and inhibit accommodation (focusing of the lens for near vision), leading to photophobia (light sensitivity) and blurry vision for near tasks. As a result, photochromatic and progressive lenses may be necessary for children using atropine eye drops.

Further studies have demonstrated that low-dose atropine eye drops (0.01%, 0.05%, and 0.1%) can slow the progression of nearsightedness with fewer side effects. Atropine at a 0.01% concentration can reduce progression by 60%, and the average increase in pupil diameter is less than 1 mm. In addition, no major side effect was found in the 10-year review. Recent research has shown that 0.01%, 0.025%, and 0.05% atropine eye drops reduce nearsightedness progression in a concentration-dependent manner, while being well-tolerated and not impacting vision-related quality of life.

In summary, topical atropine can help reduce the risk of developing nearsightedness and slow down its progression in children. Its application should be considered on an individual basis, with regular monitoring when using the eyedrops.

3. Fitting Glasses with the Right Prescription

If a child has developed nearsightedness, it is essential to wear appropriately prescribed glasses to improve vision. Additionally, newer types of lenses using defocus technology can help slow the progression of nearsightedness.

4. Using Corrective Contact Lenses

Specially designed daytime disposable contact lenses are proposed to reduce the progression of nearsightedness, particularly suitable for children who frequently engage in sports. However, using contact lenses may carry the risk of infection and may only be suitable for older children and for those with refraction within certain ranges.

Orthokeratology lenses (Ortho-K/OK lenses) are rigid gas-permeable (RGP) contact lenses that flatten the cornea, reducing corneal curvature and prescription. The lenses are progressively changed to flatter ones as treatment advances. Once the cornea has been sufficiently flattened, children must continue wearing the retainer lenses every night while sleeping to preserve the corneal shape. Discontinuing use for a few days will cause the cornea to revert, leading to the recurrence of blurred vision. It is crucial for parents to be aware of potential risks associated with wearing contact lenses, such as corneal damage, ulcers, or infections.

5. Combination therapies and newer treatment modalities are under investigations

The choice of treatments for children's nearsightedness should be individualised. It depends on multiple factors, including the age of onset, refraction status and changes, lifestyle, and overall risks. Parents should discuss with doctors to develop a comprehensive plan that includes lifestyle advice, refractive correction, and myopic control methods to reduce the progression of nearsightedness.