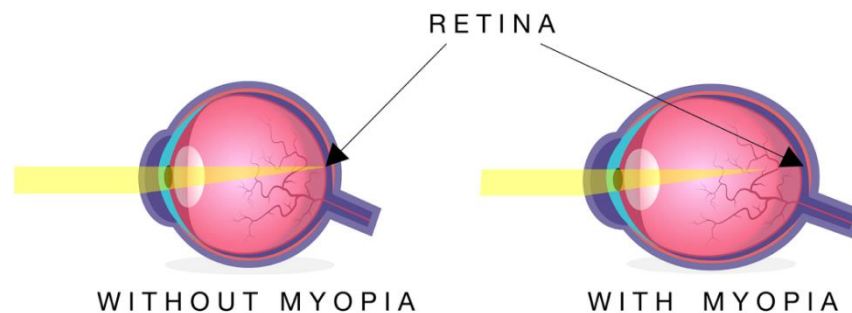


## Myopia

Myopia, also known as short-sightedness, is a prevalent eye condition characterized by blurred distance vision. This occurs when light passing through the eye focuses prior to reaching the fovea (located at the back of the eye), resulting in an unclear image. Myopia is frequently diagnosed in children and can be managed through the utilization of glasses, contact lenses, and if suitable, affordable and desired in adulthood, refractive laser surgery. Typically, the earlier myopia develops in a child, the more likely it is to advance more rapidly and longer.



Myopia generally develops via axial elongation of the eye, where the eyeball becomes longer than normal from front to back. This elongation causes light entering the eye to focus in front of the retina instead of directly on it, resulting in blurred distance vision. Various factors can contribute to axial elongation, including genetic predisposition and environmental influences such as prolonged near work and insufficient outdoor activity. Myopia progression is particularly common during childhood and adolescence when the eye is still growing, and it can stabilize in early adulthood but 15-20% keep progressing.

Myopia can lead to complications such as retinal detachment, glaucoma, and myopic maculopathy. Glasses and contact lenses correct the refractive error allowing clear vision but whether used or not myopia progression through axial elongation still occurs. Today we have a variety of tools (spectacle lens designs, special contact lenses, orthokeratology, medical intervention, vision therapy) available to our optometrists which slow myopia progression by 60-80% for 80-90% of myopes, reducing the lifetime sight threatening myopia associated risks.

## What causes Myopia?

Myopia develops due to a variety of factors:

- **Genetic Factors:** A family history of myopia significantly increases the likelihood of developing the condition. Specific genes associated with eye growth and development can predispose individuals to myopia.

- **Environmental Factors:** Prolonged activities that require focusing on close objects, such as reading, studying, or using digital devices, can strain the eyes and contribute to myopia development.
- **Lack of Outdoor Activity:** Insufficient time spent outdoors, where eyes can focus on distant objects and benefit from natural light, has been linked to an increased risk of myopia in children.
- **Behavioural Factors:** Poor reading habits, like holding books too close to the eyes, excessive use of computers, smartphones, and tablets have all been associated with higher rates of myopia in children and adolescents.
- **Abnormalities in the development of the eye,** such as a steeply curved cornea or an elongated eyeball, can lead to myopia.
- **Educational Demands:** Higher educational pressures and increased time spent on academics, particularly in environments with rigorous schooling systems, are correlated with higher incidences of myopia.
- **Prolonged use of steroids** affect eye development, causes cataracts and can contribute to myopia.
- **Diabetes and connective tissue disorders** can influence the development of myopia.



Strategies to manage and prevent myopia include encouraging outdoor activities, promoting good reading habits, and monitoring visual health.

## Signs and symptoms of Myopia:

- Squinting eyes to see distant objects.
- Difficulty seeing the whiteboard at school.
- Poor posture while reading.
- Lack of interest in playing outdoors.
- Headaches and sore eyes (eye rubbing).
- Blurred distance vision at night.

## Treatment options.

Myopia cannot be "cured," but we can help halt or slow its progression through teenage years. The patient age, genetic history, ethnicity, outdoor vs indoor activity, axial length, corneal curvature, degree of myopia, rate of progression, accommodative function, convergence function, eye health and tear film stability must all be assessed to determine the most appropriate vision correction and myopia control option.

Patients with over-convergence issues at near require progressive or bifocal lenses, which offer varying powers throughout the lens for clear vision at different distances. Patients whose eyes under-converge or have accommodative dysfunction require vision therapy.

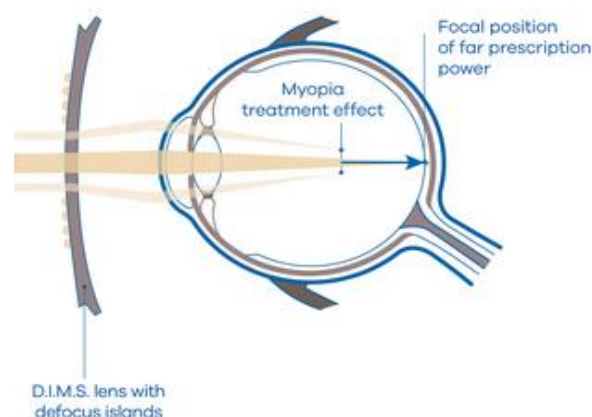


**Visual stress and improper visual habits**, such as excessive near work without breaks, contribute to myopia development. Vision therapy is a non-surgical treatment approach that involves a series of supervised exercises designed to improve visual skills and processing. Well-established for treating binocular vision disorders and learning-related vision problems, its role in reducing the progression of childhood myopia is effective as it improves coordination, focusing, visual processing and integration skills and reduces the effect of near point stress on the visual system. Vision therapy is often used in conjunction with other myopia control strategies rather than as a standalone treatment.

**MiYOSMART spectacle lenses** use the revolutionary technology to correct the myopic refractive error and provide clear vision. Defocus-Incorporated Multiple Segments (D.I.M.S.) Technology uses a honeycomb-shaped segment treatment area ('defocus zone') to slow down myopia progression, and a clear zone ('focus zone') with your child's prescription, providing clear vision and managing myopia at the same time. The DIMS lens consists of a central zone (9mm diameter) correcting distance vision surrounded by honeycomb-like multiple segments (33mm diameter) providing +3.50 diopter addition which introduces controlled myopic blur on the peripheral retina.



Multiple clinical studies provide high-quality evidence that MiYOSMART spectacle lenses slowed down myopia progression on average by 60% compared to wearing standard single vision spectacle lenses. The myopia management effect was sustained over 6 years, demonstrating that there is benefit in wearing the spectacle lenses long term.

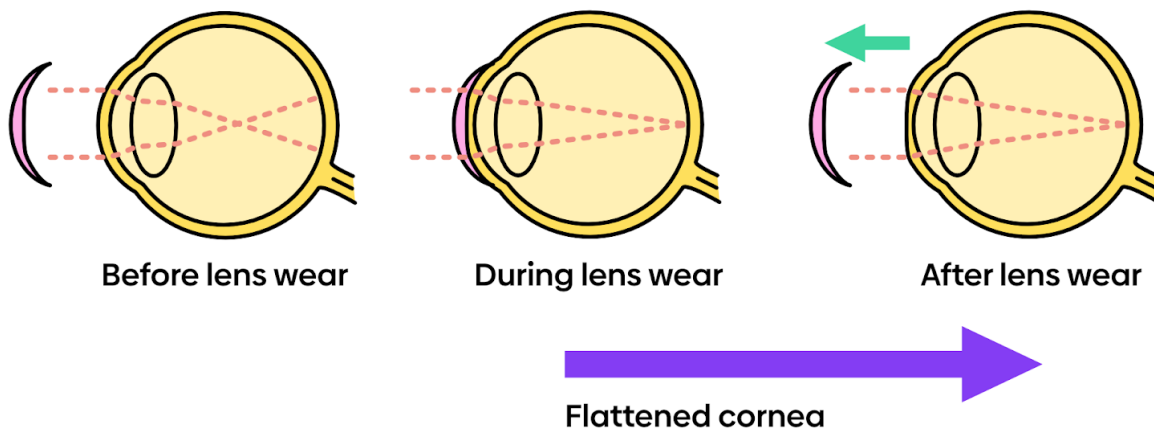


**Myopia control daily wear soft contact lenses** such as MiSight® 1-day contact lenses with ActiveControl® Technology not only correct short-sightedness they also have proven to significantly reduce the progression of myopia in children. Your child can experience clear vision, freedom from glasses and continue to enjoy the activities they love. MiSight® slows the progression of short-sightedness in children by 59%.

- 90% of children said they prefer wearing their MiSight® 1-day contact lenses over wearing their glasses.
- 90% of children were able to insert and remove MiSight® 1-day lenses on their own.

**Orthokeratology (Ortho-K) lenses** which reshape the cornea by wearing retainer lenses during sleep provided the first insight into the possibility for myopia control. Being the longest available myopia control mechanism, they offer 24/7 active myopia control without daytime glasses or contact lenses. Ortho-K myopia control treatment slows myopia progression by up to 80%. For more information on Ortho-K lenses, please visit our website's overnight vision correction page, listed under our 'services' section.

## How Ortho-k Works



**Low-dose atropine drops** have emerged as a promising treatment for slowing the progression of childhood myopia. Atropine is an antimuscarinic agent that works by blocking the muscarinic receptors in the eye, which are thought to play a role in the growth of the eyeball. The precise mechanism by which atropine slows myopia progression is not fully understood, but it is believed to involve:

- **Inhibition of Eye Growth:** Atropine may reduce the elongation of the eyeball, a key factor in the development and progression of myopia.

- **Reduction in Accommodation:** By paralysing the ciliary muscle (responsible for focusing), atropine reduces the need for accommodation, potentially decreasing the stimuli for eye elongation.

Clinical studies have shown that low-dose atropine (typically 0.01% to 0.05%) can significantly reduce the rate of myopia progression in children. Low-dose atropine is generally well-tolerated with fewer and milder side effects compared to higher concentrations.

Common side effects include:

- **Photophobia (light sensitivity):** This occurs because atropine dilates the pupil, allowing more light to enter the eye.
- **Near Vision Blurriness:** Atropine can impair the eye's ability to focus on close objects, though this effect is less pronounced with low doses.
- **Allergic Reactions:** Rarely, some children may experience an allergic reaction to atropine.

Atropine eye drops are typically administered once daily, usually at bedtime to minimize daytime side effects. Long-term data on the use of low-dose atropine indicate sustained benefits in slowing myopia progression, although some rebound effect (a temporary increase in myopia progression) can occur after cessation of treatment. Therefore, the treatment duration and tapering strategies should be carefully managed by eye care professionals.

Regular follow-up with an eye care professional is necessary with all treatment options to monitor the effectiveness of the treatment and adjust as needed. **Combination therapies:** In some cases, atropine may be used in combination with other myopia control methods, such as orthokeratology (special contact lenses worn overnight) or multifocal contact lenses, to enhance treatment efficacy.

In essence, myopia occurs when the eye fails to receive light properly, resulting in blurred distance vision for the patient. While myopia itself isn't curable, various interventions exist to correct vision and mitigate the progression of symptoms. If you suspect that you or your child may have myopia, don't hesitate to reach out to our team today or complete our 'Welcome Forms' on our website to arrange an eye examination.

