

# Myopia (Nearsightedness)

Nearsightedness, or myopia, as it is medically termed, is a vision condition in which close objects are seen clearly, but objects farther away appear blurred. Nearsightedness occurs if the eyeball is too long or the cornea, the clear front cover of the eye, has too much curvature. As a result, the light entering the eye isn't focused correctly and distant objects look blurred.

Nearsightedness is a very common vision condition affecting nearly 30 percent of the U.S. population. Some research supports the theory that nearsightedness is hereditary. There is also growing evidence that it is influenced by the visual stress of too much close work.

Generally, nearsightedness first occurs in school-age children. Because the eye continues to grow during childhood, it typically progresses until about age 20. However, nearsightedness may also develop in adults due to visual stress or health conditions such as diabetes.

A common sign of nearsightedness is difficulty with the clarity of distant objects like a movie or TV screen or the chalkboard in school. A [comprehensive optometric examination](#) will include testing for nearsightedness. An optometrist can prescribe spectacles or contact lenses that correct nearsightedness by bending the visual images that enter the eyes, focusing the images correctly at the back of the eye. Depending on the amount of nearsightedness, you may only need to wear glasses or contact lenses for certain activities, like watching a movie or driving a car. Or, if you are very nearsighted, they may need to be worn all the time.

Another option for treating nearsightedness is [orthokeratology \(ortho-k\)](#), also known as corneal refractive therapy. It is a non-surgical procedure that involves wearing a series of specially designed rigid contact lenses to gradually reshape the curvature of your cornea. The lenses place pressure on the cornea to flatten it. This changes how light entering the eye is focused.

Laser procedures are also a possible treatment for nearsightedness in adults. They involve reshaping the cornea by removing a small amount of eye tissue. This is accomplished by using a highly focused laser beam on the surface of the eye.

For people with higher levels of nearsightedness, other [refractive surgery procedures](#) are now available. These procedures involve implanting a small lens with the desired optical correction directly inside the eye, either just in front of the natural lens (phakic intraocular lens implant) or replacing the natural lens (clear lens extraction with intraocular lens implantation). These procedures are similar to one used for [cataract surgery](#) patients, who also have lenses implanted in their eyes (intraocular lens implants).

## What causes nearsightedness?



If one or both parents are nearsighted, there is an increased chance their children will be nearsighted.

The exact cause of nearsightedness is unknown, but two factors may be primarily responsible for its development:

- heredity
- visual stress

There is significant evidence that many people inherit nearsightedness, or at least the tendency to develop nearsightedness. If one or both parents are nearsighted, there is an increased chance their children will be nearsighted.

Even though the tendency to develop nearsightedness may be inherited, its actual development may be affected by how a person uses his or her eyes. Individuals who spend considerable time reading, working at a computer, or doing other intense close visual work may be more likely to develop nearsightedness.

Nearsightedness may also occur due to environmental factors or other health problems:

- Some people may experience blurred distance vision only at night. This “night myopia” may be due to the low level of light making it difficult for the eyes to focus properly or the increased pupil size during dark conditions, allowing more peripheral, unfocused light rays to enter the eye.
- People who do an excessive amount of near vision work may experience a false or “pseudo” myopia. Their blurred distance vision is caused by spasm of the eyes’ focusing mechanism. After long periods of near work, their eyes are unable to refocus to see clearly in the distance. The symptoms are usually temporary and clear distance vision may return after resting the eyes. However, over time constant visual stress may lead to a permanent reduction in distance vision.
- Symptoms of nearsightedness may also be a sign of variations in blood sugar levels in persons with [diabetes](#) or an early indication of a developing [cataract](#).

An optometrist can evaluate vision and determine the cause of the vision problems.

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## **How is nearsightedness diagnosed?**

Testing for nearsightedness may use several procedures in order to measure how the eyes focus light and to determine the power of any optical lenses needed to correct the reduced vision.



A phoropter and retinoscope are often used to determine the lenses that allow the clearest vision during a comprehensive eye exam.

As part of the testing, letters on a **distance chart** are identified. This test measures [visual acuity](#), which is written as a fraction such as 6/12. The top number of the fraction is the standard distance at which testing is performed, six metres. The bottom number is the smallest letter size read. A person with 6/12 visual acuity would have to get within 6 metres to identify a letter that could be seen clearly at 12 metres feet in a “normal” eye. Normal distance visual acuity is 6/6, although many people have 6/5 (better) vision.

Using an instrument called a **phoropter**, an optometrist places a series of lenses in front of your eyes and measures how they focus light using a hand held lighted instrument called a **retinoscope**. The optometrist may choose to use an automated instrument that automatically evaluates the focusing power of the eye. The power is then refined by patient’s responses to determine the lenses that allow the clearest vision.

Using the information obtained from these tests, along with the results of other tests of eye focusing and eye teaming, your optometrist can determine if you have nearsightedness. He or she will also determine the power of any lens correction needed to provide clear vision. Once testing is complete, your optometrist can discuss options for treatment.

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## How is nearsightedness treated?

Persons with nearsightedness have several options available to regain clear distance vision. They include:

- spectacles
- contact lenses
- orthokeratology
- laser and other refractive surgery procedures
- vision therapy for persons with stress-related nearsightedness.

Spectacles are the primary choice of correction for persons with nearsightedness. Generally, a single vision lens is prescribed to provide clear vision at all distances. However, for patients over about age 40, or children and adults whose nearsightedness is due to the stress of near vision work, a bifocal or progressive addition lens may be needed. These multifocal lenses provide different powers or strengths throughout the lens to allow for clear vision in the distance and also clear vision up close.



Spectacles are frequently used to correct myopia.

A large selection of lens types and frame designs are now available for patients of all ages. Spectacles are no longer just a medical device that provides needed vision correction, but can also be a fashion statement. They are available in a wide variety of sizes, shapes, colours and materials that not only correct for vision problems but also may enhance appearance.

For some individuals, [contact lenses](#) can offer better vision than spectacles. They may provide clearer vision and a wider field of view. However, since contact lenses are worn directly on the eyes, they require [regular cleaning and care](#) to safeguard eye health.

[Orthokeratology](#) (Ortho-k), also known as corneal refractive therapy, involves the fitting of a series of rigid contact lenses to reshape the cornea, the front outer surface of the eye. The contact lenses are worn daily for limited periods, such as overnight, and then removed. Persons with moderate amounts of nearsightedness may be able to temporarily obtain clear vision for most of their daily activities.

Nearsightedness can also be corrected by [reshaping the cornea](#) using a laser beam of light. Two commonly used procedures are photorefractive keratectomy (PRK) and laser in situ keratomileusis (LASIK).

In **PRK**, a laser is used to remove a thin layer of tissue from the surface of the cornea in order to change its shape and refocus light entering the eye. There is a limit to how much tissue can safely be removed and therefore the amount of nearsightedness that can be corrected.

**LASIK** does not remove tissue from the surface of the cornea, but from its inner layers. To do this, a section of the outer corneal surface is cut and folded back to expose the inner tissue. Then a laser is used to remove the precise amount of corneal tissue needed to reshape the eye, and then the flap of outer tissue is placed back in position to heal. The amount of nearsightedness that LASIK can correct is limited by the amount of corneal tissue that can be removed in a safe manner.

People who are highly nearsighted or whose corneas are too thin to allow the use of laser procedures now have another option. They may be able to have their nearsightedness surgically corrected by implanting small lenses in their eyes. These intraocular lenses look like small contact lenses and they provide the needed optical correction directly inside the eye.

**Vision therapy** is an option for people whose blurred distance vision is caused by a spasm of the muscles which control eye focusing. Various eye exercises can be used to improve poor eye focusing ability and regain clear distance vision.

People with nearsightedness have a variety of options to correct their vision problem. In consultation with your optometrist, you can select the treatment that best meets your visual and lifestyle needs.

## Common Myopia Myths

- *Myopia is solely the result of how we use our eyes, therefore, we can control whether or not people become nearsighted.*

**Fact:** Like many conditions, myopia develops due to a combination of genes and environment.

- *Reading glasses or other devices such as pinhole glasses can prevent myopia.*

**Fact:** There is no credible research which demonstrates that pinhole glasses prevent myopia or retard its progression. In some patients, reading glasses or bifocals can be effective, but this is true for a select group in the population who can be identified by a comprehensive examination by your optometrist.

- *Wearing glasses makes your myopia worse.*

**Fact:** In actuality, the research has demonstrated that wearing glasses to provide clear vision for distance seeing does not cause more nearsightedness. For some people, these lenses are not optimum for their near vision and should be removed or a bifocal should be put in the glasses. Optometrists, who test both far and near vision, will advise when removing glasses or a bifocal is appropriate for reading and other close work.

- *It is better to wear weaker glasses so your eyes have to work harder.*

**Fact:** This assumption has been proven to be incorrect.

- *Contact lenses can prevent myopia or retard its progression.*

Fact: While success in this area has been minimal in the past, more recent research has demonstrated that contact lenses can help retard the progression of nearsightedness in some patients. Part of the explanation for this is due to the difference in focus between the center of the retina and the periphery of the retina. This research is new and is continuing.