

# Astigmatism

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**Astigmatism** is a vision condition that causes blurred vision due either to the irregular shape of the cornea, the clear front cover of the eye, or sometimes the curvature of the lens inside the eye. An irregular shaped cornea or lens prevents light from focusing properly on the retina, the light sensitive surface at the back of the eye. As a result, vision becomes blurred at any distance.

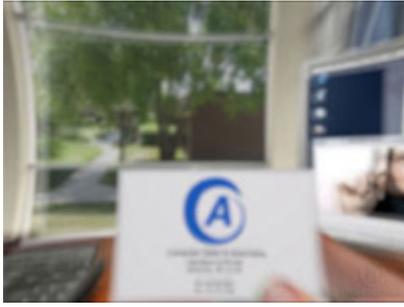
Astigmatism is a very common vision condition. Most people have some degree of astigmatism. Slight amounts of astigmatism usually don't affect vision and don't require treatment. However, larger amounts cause distorted or blurred vision, eye discomfort and headaches.

Astigmatism frequently occurs with other vision conditions like [nearsightedness \(myopia\)](#) and [farsightedness \(hyperopia\)](#). Together these vision conditions are referred to as refractive errors because they affect how the eyes bend or "refract" light.

The specific cause of astigmatism is unknown. It can be hereditary and is usually present from birth. It can change as a child grows and may decrease or worsen over time.

A [comprehensive optometric examination](#) will include testing for astigmatism. Depending on the amount present, your optometrist can provide spectacles or [contact lenses](#) that correct the astigmatism by altering the way light enters your eyes.

## What causes astigmatism?



When the cornea or lens of an eye is irregularly shaped, vision may be out of focus at any distance.

Astigmatism occurs due to the irregular shape of the cornea or the lens inside the eye. The cornea and lens are primarily responsible for properly focusing light entering your eyes allowing you to see things clearly.

The curvature of the cornea and lens causes light entering the eye to be bent in order to focus it precisely on the retina at the back of the eye. In astigmatism, the surface of the cornea or lens has a somewhat different curvature in one direction than another. In the case of the cornea, instead of having a round shape like a soccerball, the surface of the cornea is more like a rugbyball. As a result, the eye is unable to focus light rays to a single point causing vision to be out of focus at any distance.

Sometimes astigmatism may develop following an eye injury or eye surgery. There is also a relatively rare condition called [keratoconus](#) where the cornea becomes progressively thinner and cone shaped. This results in a large amount of astigmatism resulting in poor vision that cannot be clearly corrected with spectacles. Keratoconus usually requires contact lenses for clear vision, and it may eventually progress to a point where a corneal transplant is necessary.

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## How is astigmatism diagnosed?



A phoropter and a retinoscope are instruments commonly used by optometrists to measure refraction.

Astigmatism can be diagnosed through a [comprehensive eye examination](#). Testing for astigmatism measures how the eyes focus light and determines the power of any optical lenses needed to compensate for reduced vision. This examination may include:

- **Visual acuity** - As part of the testing, you'll be asked to read letters on a distance chart. This test measures visual acuity, which is written as a fraction such as 6/12. The top number is the standard distance at which testing is done, six metres. The bottom number is the smallest letter size you were able to read. A person with 6/12 visual acuity would have to get within 6 metres of a letter that should be seen at 12 metres in order to see it clearly. Normal distance visual acuity is 6/6.
- **Keratometry** - A keratometer is the primary instrument used to measure the curvature of the cornea. By focusing a circle of light on the cornea and measuring its reflection, it is possible to determine the exact curvature of the cornea's surface. This measurement is particularly critical in determining the proper fit for contact lenses. A more sophisticated procedure called corneal topography may be performed in some cases to provide even more detail of the shape of the cornea.
- **Refraction** - Using an instrument called a phoropter, your optometrist places a series of lenses in front of your eyes and measures how they focus light. This is performed using a hand held lighted instrument called a retinoscope or 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, your optometrist can determine if you have astigmatism. These findings, combined with those of other tests performed, will allow the optometrist to determine the power of any lens correction needed to provide clear, comfortable vision, and discuss options for treatment.

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## How is astigmatism treated?

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

- spectacles
- contact lenses
- orthokeratology
- laser and other refractive surgery procedures



Spectacles are a common form of correction for persons with astigmatism.

Spectacles are the primary choice of correction for persons with astigmatism. They will contain a special cylindrical lens prescription to compensate for the astigmatism. This

provides for additional lens power in only specific meridians of the lens. An example of a prescription for astigmatism for one eye would be -1.00 -1.25 X 180. The middle number (-1.25) is the lens power for correction of the astigmatism. The "X 180" designates the placement (axis) of the lens power. The first number (-1.00) indicates that this prescription also includes a correction for nearsightedness in addition to astigmatism.

Generally, a single vision lens is prescribed to provide clear vision at all distances. However, for patients over about age 40 who have the condition called [presbyopia](#), a bifocal or progressive addition lens may be needed. These provide different lens powers to see clearly in the distance and to focus effectively for near vision work.

A wide variety 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. Spectacle frames are available in a many shapes, sizes, colors and materials that not only allow for correction of vision, but also enhance appearance.

For some individuals, [contact lenses](#) can offer better vision than eyeglasses. 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.

Soft contact lenses conform to the shape of the eye, therefore standard soft lenses may not be effective in correcting astigmatism. However, special toric soft contact lenses are available to provide a correction for many types of astigmatism. Because rigid gas permeable contact lenses maintain their regular shape while on the cornea, they offer an effective way to compensate for the cornea's irregular shape and improve vision for persons with astigmatism and other refractive errors.

Individuals with astigmatism have a wide range 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.

## Astigmatism FAQs

<b>Q.</b>	<b>What is astigmatism?</b>
<b>A.</b>	<p>Astigmatism is a vision condition in which light entering the eye is unable to be brought to a single focus, resulting in vision being blurred at all distances.</p> <p>Astigmatism is not a disease, but rather, a vision condition that is quite common. It often occurs in conjunction with other refractive errors like nearsightedness and farsightedness.</p>
<b>Q.</b>	<b>Why does astigmatism occur?</b>

<p><b>A.</b></p>	<p>Typically, astigmatism is caused by the front of your eye (the cornea) being more oval than round, and not allowing light to focus properly on the back of your eye (retina). The causes of this irregular shape vary.</p> <p>In some cases, it may be hereditary or it may result from such factors as pressure of the eyelids on the cornea, incorrect posture or an increased use of the eyes for close work.</p>
<p><b>Q.</b></p>	<p><b>How common is astigmatism?</b></p>
<p><b>A.</b></p>	<p>Most people have some degree of astigmatism. However, only individuals with moderate to highly astigmatic eyes usually need corrective lenses.</p>
<p><b>Q.</b></p>	<p><b>What are signs/symptoms of astigmatism?</b></p>
<p><b>Q.</b></p>	<p>People with significant amounts of astigmatism will usually have blurred or distorted vision. Those with mild astigmatism may experience headaches, eye strain, fatigue or blurred vision at only certain distances.</p>
<p><b>Q.</b></p>	<p><b>How is astigmatism diagnosed?</b></p>
<p><b>A.</b></p>	<p>A comprehensive eye examination by your doctor of optometry will include testing for astigmatism.</p>
<p><b>Q.</b></p>	<p><b>How is astigmatism treated?</b></p>
<p><b>A.</b></p>	<p>Astigmatism can generally be optically corrected with properly prescribed and fitted eyeglasses or contact lenses. In recent years, a number of options to surgically alter the shape of the cornea, to correct low or moderate astigmatism, have been developed. These include procedures called radial keratotomy (RK) and photorefractive keratectomy (PRK).</p> <p>Your doctor of optometry can help you decide if these procedures are right for you. There is also a procedure called orthokeratology which uses a series of rigid contact lenses to provide improved vision for extended periods of time for people with astigmatism.</p>
<p><b>Q.</b></p>	<p><b>Does astigmatism get progressively worse?</b></p>
<p><b>A.</b></p>	<p>Astigmatism may change slowly. Regular optometric care can, however, help to ensure that proper vision is maintained.</p>
<p><b>Q.</b></p>	<p><b>How will astigmatism affect my lifestyle?</b></p>
<p><b>A.</b></p>	<p>You may have to adjust to wearing eyeglasses or contact lenses if you do not wear them now. Other than that, astigmatism probably will not significantly affect your lifestyle at all.</p>

