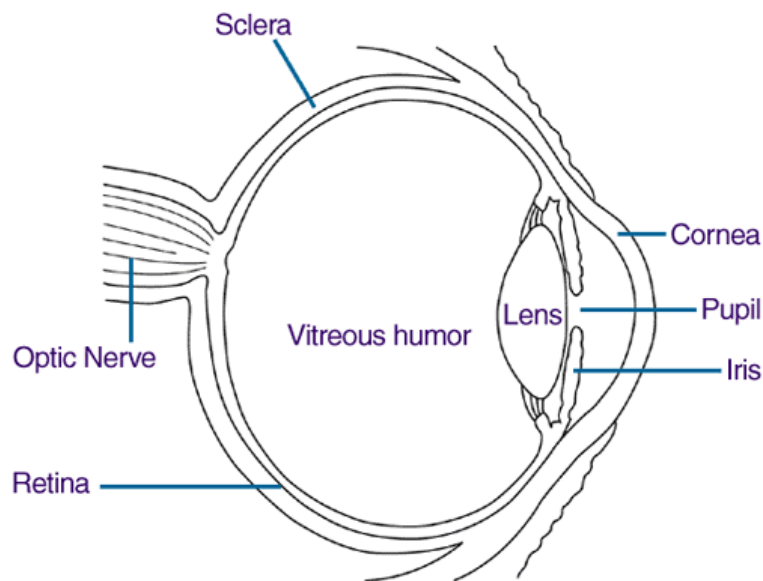




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Eye Conditions Correctable by Refractive Surgical Procedures



How does the eye focus?

Light rays are focused on to the retina (where the image is relayed to the brain) by the cornea and the lens of the eye. The cornea performs 80% of this focusing and the lens 20%. Because most of the focusing is performed by the cornea, changing its shape is very effective in refocusing eyes with nearsightedness, farsightedness or astigmatism. In both LASIK and PRK laser surgery, the laser beam is used to precisely change the curvature of the cornea by making the center of the cornea flatter to correct nearsightedness, steeper to correct farsightedness or rounder to correct astigmatism. In eyes with extreme nearsightedness a lens (Phakic implant) can be placed inside the eye to refocus the light rays without changing the shape of the cornea. In eyes with extreme farsightedness, the eyes natural lens can be removed and replaced with a new lens implant of a stronger power in a procedure called refractive lensectomy.



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How Do You See?

I can see things better up close than far away. Nearsightedness (Myopia)

I can see things better in the distance than up close. Farsightedness (Hyperopia)

I have blurred, sort of double vision in the distance and up close. Astigmatism

I have trouble reading but otherwise see pretty well far away. Presbyopia

I have blurry vision far and near even with recently prescribed glasses on. (This may mean you have Cataracts.)

I can see things better up close than far away.

Nearsightedness (Myopia). If you can see things clearly up close but not in the distance, you are probably nearsighted. The medical term for this is Myopia (and your eyes would be classified as Myopic). Nearsighted eyes have a focus point up close and the vision is blurred in the distance because light entering the eye focuses in front of the retina. Distant objects are seen more clearly only with the help of glasses, contact lenses or refractive surgery such as LASIK.

Surgical Procedures to reduce the symptoms of Nearsightedness (Myopia).

- **LASIK**
- **PRK**
- **LASEK**
- **EpiLasik**
- **Phakic Implants**

Mild to Moderate Case of Nearsighted Eyes. Mild to moderate amounts of nearsightedness (Myopia) where your prescription ranges from – 1.00 Diopters (thin glasses) on the low end and –10.00 Diopters (thick glasses) or more on the high end can usually be corrected with laser eye surgery (LASIK, PRK, LASEK, EpiLasik). A Diopter is the unit of measurement of your prescription (The term Diopter is commonly referred to with a “d”, so as an example, a prescription would read “-1.00 D” or “-1.00 d”). This is accomplished by reshaping the outer lens of your eye, your cornea, to refocus the light rays on your retina.



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Severe Case of Nearsighted Eyes. If your prescription is between -8.00 Diopters and -20.00 Diopters your eyes may be best corrected with the insertion of implants inside the eye. (The term Diopter is commonly referred to with a “d”, so as an example, a prescription would read “ -8.00 D” or “ -8.00 d”). These implants are called Phakic Implants. The two Phakic Implants approved by the FDA in the United States are the STAAR Visian implant and the AMO Verisyse implant. Phakic Implants are placed inside the eye behind your cornea and in front of your natural lens (the internal lens of your eye that helps focus your vision from far to near). Phakic Implants can be combined with another laser vision correction procedure to correct any residual nearsightedness (Myopia) myopia or astigmatism not corrected by the implant.

I can see things better in the *distance* but not up close.

Farsightedness (Hyperopia). If you can see things better in the distance than up close, you are farsighted. Farsighted or hyperopic eyes have a better focus for distance but are often blurred even for distance, particularly as you get older. Mild amounts of hyperopia (up to $+2.00$ Diopters to $+3.00$ Diopters) in younger patients under 40 are often not noticed as the eye has a mechanism (known as accommodation) for focusing the image. (The term Diopter is commonly referred to with a “d”, so as an example, a prescription would read “ $+2.25$ D” or “ $+2.25$ d”). In general, after the age of 40, the amount of accommodation decreases each year. Most mildly farsighted people around the age of 40 will first need glasses to read, but will eventually need glasses for both near and distance (either with bifocals glasses or two separate pairs, one for reading and one for distance). Higher amounts of hyperopia, usually above $+2.00$ Diopters or $+3.00$ Diopters usually will require correction with glasses or contact lenses early in life. These patients will also require either two separate glasses or bifocals at around age 40. Many people confuse Farsightedness with Presbyopia.

Surgical Procedures for Farsightedness.

Mild and Moderate Cases of Farsightedness ($+2$ Diopters to $+5$ Diopters). Laser Vision surgery (LASIK, PRK, LASEK, EpiLasik) is capable of correcting only up to about $+5$ Diopters of farsightedness (Hyperopia).

Severe Case of Farsightedness. Higher amounts of hyperopia (over $+5$ Diopters) are usually best corrected by replacing the natural lens of the eye with an implant. This procedure is similar to cataract surgery but when it is performed only to correct the refractive error in eyes without cataracts and this refractive surgery is referred to as Refractive Lensectomy (RLE) or Clear Lensectomy (CLE).



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I have blurred, sort of double vision in the distance and up close. Astigmatism

Astigmatism – If you have astigmatism objects will be blurry and sort of double both far and or near depending on whether you have nearsighted or farsighted astigmatism.

Astigmatism is a condition which occurs when the cornea has more than one curvature (like a football as opposed to a basketball). These multiple curvatures bend light differently and blurred vision is the result. Normal and purely nearsighted (Myopic) or purely farsighted (Hyperopic) eyes have one focal point. There is no such thing as a pure astigmatism (where there is no nearsightedness or farsightedness). With astigmatism, your eyes have two different focal points. For nearsighted eyes with astigmatism, both focal points are either in front of or behind the retina or one is focused on the retina and one in front of the retina. For farsighted eyes with astigmatism, both focal points are focused behind the retina or one is on the retina and one behind the retina. Although the word astigmatism to a layman sounds somewhat more serious (stigmata) than nearsightedness (Myopia) or farsightedness (Hyperopia), in reality most eyes have some degree of astigmatism. Laser vision surgery is quite accurate at correcting astigmatism of up to 4 or 5 Diopters in combination with the correction of myopia or hyperopia.

Surgical Procedures for Astigmatism

- **LASIK**
- **PRK**
- **Toric Implants**
- **Limbal Relaxing Incisions or Arcuate Incisions**

I have trouble reading but otherwise see pretty well far away. Presbyopia

Presbyopia starts to become noticeable usually at around age 40 and it affects everyone. Presbyopia refers to the natural decrease in the eyes' ability to see up close as we get older. Even a patient with perfect vision (Emmetropia) all their life will require glasses to help them read, usually at some point in the early to mid forties.

Nearsighted people (with Myopia) can usually remove their glasses, hold the print up close, and read without glasses or have bifocals put in their distance glasses. Slightly farsighted people (with Hyperopia) will initially just need glasses to read but as they get older, they will need them for near and far. Moderately or severely farsighted people will



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already be wearing glasses for distance but will now need either bifocals or two separate pairs of glasses. Normal sighted people (called Emmetropia) who have never needed glasses will now need them in order to read small print.

Presbyopia gets worse as we get older and thus patients require changes in reading power every few years. If you are near age 40 or older, your laser eye surgeon should discuss Presbyopia with you and explain your options to minimize this annoying decrease in your near vision.

Surgical Procedures to reduce the symptoms of Presbyopia.

- **Conductive Keratoplasty (CK)***
- **LASIK (monovision)***
- **PRK**

***Conductive Keratoplasty** or CK and monovision LASIK are the only two procedures approved by the FDA for treating Presbyopia, although this does not mean PRK cannot be utilized. Although not FDA, PRK is considered an “off label” use of the FDA-approved lasers. In fact, many refractive surgeons used PRK and LASIK (which has now approved by the FDA) in both nearsighted and farsighted eyes to create Monovision, with one eye focused for distance and the other focused for near vision.

Although neither Conductive Keratoplasty (CK) nor laser vision monovision (LASIK or PRK) “cure” Presbyopia, both procedures can reduce the need for reading glasses for every day activities like reading a menu or looking at a cell phone. With “Mono-Vision” (or “Blended Vision”) one eye is focused better for reading while the other eye is focused primarily for distance. This is a common option for patients over the age of 40 who are considering laser vision surgery to correct their nearsightedness or farsightedness, with or without astigmatism. Mono vision is also an option for patients who have always had natural excellent distance vision (emmetropia) and desire to be able to read without glasses. The only FDA approved procedure for the correction of presbyopia in emmetropic eyes (normal eyes requiring no glasses) is Conductive Keratoplasty (CK) where radio-frequency energy is applied to 8 spots in the cornea to refocus one eye for a reading focus. The CK procedure results in a milder form of monovision than the typical laser procedure and it is often better tolerated by the patient because the CK eye is not usually as blurred for distance as it would be with laser induced mono-vision. However, not all patients are comfortable with mono or blended vision and it is best to have this demonstrated with either contact lenses or glasses before choosing this option



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***I have blurry vision far and near even with recently prescribed glasses on.
This may mean you have Cataracts.***

Cataracts are one condition that may explain why you have blurry vision far and near even with recently prescribed glasses on. With Cataracts, there is a clouding of the normal internal lens of the eye and are more common after the age of 60. Although many eyes have early cataract formation, not all cataracts require surgery as patients with early cataracts can have normal vision with no symptoms. These cataracts can be observed until the patient begins to experience problems with their vision (with glasses on) such as blurred vision for far and or near, and or glare and difficulty driving at night. Other explanations for why you may have blurry vision far and near even with recently prescribed glasses include glaucoma or problems in the retina. Typically the doctors listed at Trusted LASIK Surgeons can provide treatments for any of these conditions and if they cannot, they can find you an expert capable of helping you.

Surgical Procedures for Cataracts.

- **Cataract Surgery (similar to RLE or CLE)**