

REFRACTIVE ERRORS (Nearsightedness, Farsightedness, etc.)

The eye focuses an image onto the retina by refracting (bending) light. If an eye requires glasses or contact lenses to sharply focus the image, then it is said to have a refractive error.

Glasses, contact lenses, and laser eye surgery correct refractive errors.

The procedure to determine a prescription for eye glasses or contact lenses is called a **refraction**.

The four common refractive errors are:

1. Myopia, or nearsightedness - clear vision close up but blurry in the distance
2. Hyperopia, or farsightedness - clear vision in both up close and the distance when one is young, but blurry vision up close followed by blurry vision in the distance as one gets older. The age at which one first needs glasses or contacts depends on the amount of farsightedness.
3. Astigmatism - problems focusing caused by the cornea
4. Presbyopia - inability to focus close up as a result of aging

Myopia (nearsightedness) If you have myopia you can see close objects clearly, but distant objects are blurry. Myopia is usually caused by the eyeball being too long. Myopia can range from minimal to extreme. The more myopic you are the blurrier your vision is at distance, and objects will have to be closer for you to see them clearly.

Myopia often starts between the ages of 8 and 12 years. Since the eyes grow with the rest of the body, nearsightedness commonly increases during the teen years. It tends to level off in the 20s but can progress until about age 30. Frequent changes in prescription eyewear may be needed until the myopia levels off. It is important to realize that the changes in prescription are not making the eyes "weaker".

Hyperopia (farsightedness) If you have hyperopia, you can see close and distant objects clearly at a young age. As you age, depending on the amount of underlying hyperopia, there will come a time when close objects blur and eventually a time when even distant objects blur. With minimal hyperopia, the need for distance glasses may not occur until one's 40s or 50s. With extreme hyperopia, glasses may be necessary in childhood.

With hyperopia, there is a period of time when vision is blurry up close, but still satisfactory for distance. This is the basis for the simplistic definition of farsightedness, "clear vision in the distance but blurry vision up close". People with hyperopia need glasses for reading at a younger age than normal.

Hyperopia generally occurs when the eyeball is too short for the light rays to focus clearly on the retina.

Eye-screening tests can fail to diagnose hyperopia. A comprehensive eye examination may be necessary.

Astigmatism The cornea (the front, clear window of the eye) is very important in helping the eye focus light rays onto the retina. If you have astigmatism, the surface of the cornea is not perfectly round, rather it is oval. Instead of being shaped like a basketball, the cornea has somewhat of a football's shape. This prevents the eye from clearly focusing an image on the retina.

Astigmatism is usually accompanied by myopia or hyperopia.

If the astigmatism is slight, corrective lenses may not be needed. If the astigmatism is enough to cause eyestrain, headaches, or distortion of vision, glasses or contact lenses will be needed.

Presbyopia is the loss of the ability to focus up close due to normal aging. People, with normal eyes, find in their early to mid 40s that seeing up close is a problem. The letters of the phonebook are "too small", or the newspaper has to be held farther away than normal. At the same time, the ability to focus on objects that are far away generally remains unchanged.

The treatment for presbyopia is prescription eyeglasses to help the eyes focus up close. If there is no other refractive error (nearsightedness, farsightedness, or astigmatism), glasses may be needed only for reading and close up tasks. If another refractive error exists, bifocal or progressive bifocal lenses are often prescribed. (With progressive bifocal lenses the power of the reading portion of the lens changes gradually. This eliminates the line that is otherwise visible in a bifocal lens.)