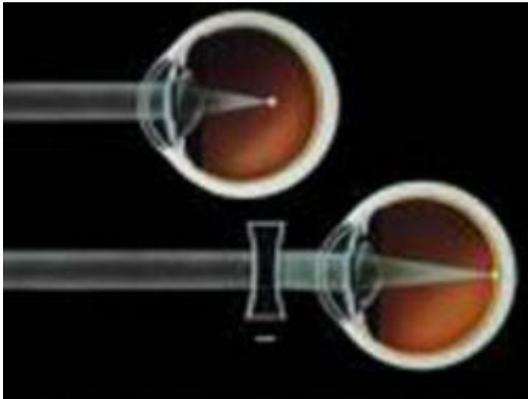


# Refractive Errors in Children

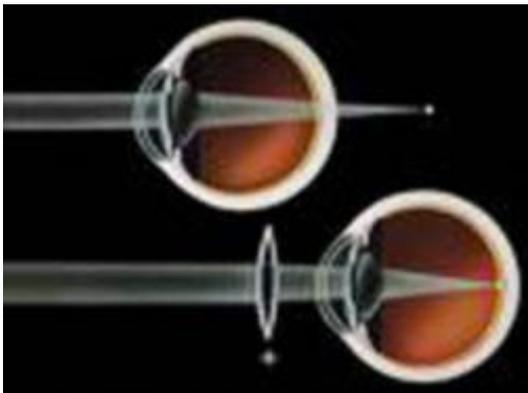
## HOW DOES THE EYE FOCUS LIGHT?

In order to see clearly, light rays from an object must focus onto the inner back layer of the eye [See figure 1]. The eye works like a camera. It has an opening at the front (the pupil), a focusing mechanism (the cornea and crystalline lens), and a light-sensing portion at the back (the retina). If light rays are not focused on the retina, a refractive error is present.

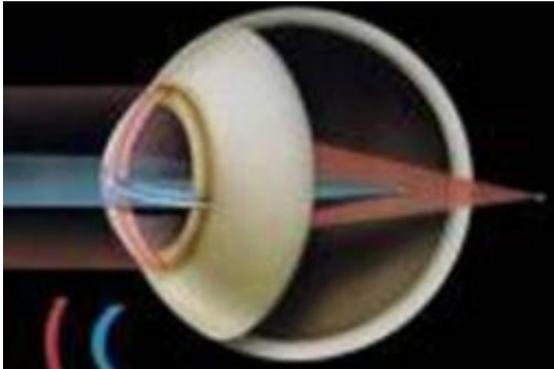
The refractive errors are: [myopia](#), hyperopia and [astigmatism](#) [See figures 2 and 3].



**Fig. 1:** In normal vision, light passes through the lens of the eye and is focused onto the retina.



**Fig. 2:** A refractive error occurs when light is no longer focused onto the retina.



**Fig. 3:** Myopia occurs when light is focused in front of the retina (blue). Hyperopia occurs when light is focused behind the retina (red).

### WHAT IS HYPEROPIA (FARSIGHTEDNESS)?

Hyperopia occurs when light rays focus behind the retina (because the eye is either too short or has too little focusing power) and causes near and distant objects to appear blurry. The signs and symptoms of farsightedness are more severe the closer the object of regard. Some hyperopia is normal in childhood and correction is typically not required. Children can compensate for this on their own using their natural focusing mechanism (accommodation). A large amount of hyperopia may require correction with converging or plus (+) power glasses, particularly when associated with crossed eyes ([accommodative esotropia](#)). Hyperopia usually increases in early childhood and then decreases during preteen to early teenage years. Contact lenses and laser surgery are alternatives to spectacles at the appropriate age.

### WHAT IS MYOPIA (NEARSIGHTEDNESS)?

Myopia occurs when light rays focus in front of the retina because the eye is too long or has excessive focusing power. Objects in the distance appear blurry and as they get closer to the eye, are seen more clearly. This condition may be inherited or associated with premature birth and can occur at any age. The prevalence of myopia is low in US children under the age of eight, but much higher in Asian countries. Diverging or minus (-) power glasses focus the light rays on the retina and improve vision. Myopia usually progresses yearly and stabilizes by the late teens to early twenties. There is currently no widely accepted treatment to stop progression. Some recent epidemiological data suggests that more time spent outdoors was associated with less myopic progression. There is no specific evidence that excessive use of computers or



handheld devices increases nearsightedness. Contact lenses may be utilized instead of glasses by those capable of independent care for the lenses. At the appropriate age, laser surgery may be an alternative if the refractive error is stable.

**More technical information on myopia may be found on the [EyeWiki Site](#).**

### **WHAT IS ASTIGMATISM?**

Astigmatism occurs when cornea is curved more in one direction than in the other. The shape of the eye is more similar to a football than a baseball. The prevalence of astigmatism is highest in infancy and childhood. Rays focus at several points (in front and/or behind the retina). Near and distant vision is affected. Cylindrical power glasses are prescribed for significant astigmatism, which, if not corrected, can lead to suboptimal adult vision. Contact lenses and laser surgery are alternatives to glasses at the appropriate age.

**Updated 10/2016**