What is a refractive error?

Like a camera, the human eye must be properly focused to see an image clearly. If light does not bend or refract correctly and focus directly on the retina, the result is blurred vision, or a refractive error.

In order to better understand how certain problems can affect a child’s vision, it is important to understand how normal vision occurs. For children with normal vision, the following sequence takes place:

- Light enters the eye through the cornea, the clear, dome-shaped surface that covers the front of the eye.
- From the cornea, the light passes through the pupil. The amount of light passing through is regulated by the iris, or the coloured part of your eye.
- From there, the light then hits the lens, the transparent structure inside the eye that focuses light rays onto the retina.
- Next, it passes through the vitreous humour, the clear, jelly-like substance that fills the centre of the eye and helps to keep the eye round in shape.
- Finally, it reaches the retina, the light-sensitive nerve layer that lines the back of the eye, where the image appears inverted.
- The optic nerve carries signals of light, dark, and colours to the area of the brain (the visual cortex), which assembles the signals into images (our vision).
What is Hypermetropia? (Also known as Hyperopia)

In **hypermetropia**, or long-sightedness, the point of focus is behind the retina because the cornea is too flatly curved or the length of the eye is too short. Both distant and near objects are blurred. Often children with Hypermetropia can see clearly when watching the television or the blackboard but may find reading a book difficult. They may have to focus very hard to see near things clearly. This may cause eye strain and headache.

To correct this, a convex (plus) lens is used. The level of hypermetropia is measured in focussing power units called ‘dioptres’. Plus units are used to describe Hypermetropia. Mild hypermetropia is between zero and plus three dioptres. Moderate hypermetropia is between plus three and ten dioptres. Severe or ‘high’ hypermetropia is greater than plus ten dioptres.

Mild hypermetropia is a common and normal finding in most young children. Many children ‘grow out’ of hypermetropia by adulthood.
Why Can Objects At Long Distance Be Seen Clearly But Not At Short Distance?

For clear and comfortable vision light must be focussed sharply onto the retina at the back of the eye. Most hypermetropic eyes can focus the light from a far object. Many hypermetropic (or long-sighted) eyes have difficulty focussing the light from an object at short distance. Instead the light focuses to a sharp point in behind the retina. The vision is then blurred. If the object is taken further away from the eye, the point at which the light focuses sharply will move forwards onto the retina. An object at a longer distance then becomes clear: the eye is 'long-sighted'.

The smaller and shorter an eye is, the more likely light from a distant object will focus beyond the retina. The focussing power of the cornea and lens are also important in causing hypermetropia.

There are a few reasons why a child might develop Hypermetropia. Some of these include:

- Their parents are hypermetropic (long-sighted) and they 'inherit' Hypermetropia
- They have an eye condition that may cause Hypermetropia

Most children are long sighted by chance. They do not have a parent with long sight or any other condition of their eye.

What can be done to help?

Spectacles or contact lenses can usually sharpen vision. Sometimes the vision will not be perfect. This can be because of other problems with the eye such as microphthalmia, squint and amblyopia.

Other eye conditions such as squint can be treated by operations and wearing spectacles.

Useful website: [www.abdo.org.uk/eyecarefaq/refractive-errors](http://www.abdo.org.uk/eyecarefaq/refractive-errors)