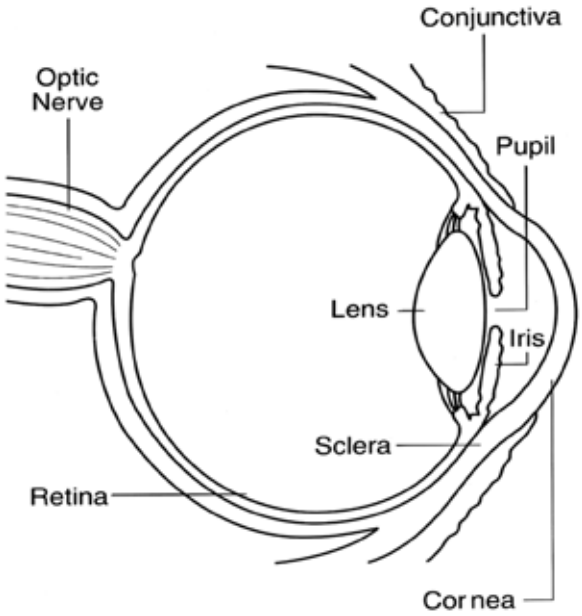
Patient Information

Royal Devon and Exeter
NHS Foundation Trust

Keratoconus

What is Keratoconus?



The Cornea is the clear window at the front of the eye.

Keratoconus is a condition of the cornea which causes it to become gradually thinner and bulge. The cornea develops a more conical and uneven shape. The change in shape tends to progress from adolescence until middle age, when the condition becomes more stable. The rate of change varies. For this reason regular monitoring is highly recommended. If progression is identified, corneal cross-linking may be indicated (see below).

Usually both eyes are affected but sometimes only one eye may be affected while the other may show very little sign of the condition or may change very slowly over many years. Keratoconus is sometimes not detected until later in life.

How does keratoconus affect the eyesight?

The abnormal shape of the cornea is not good at focusing and therefore the vision is blurred. In severe cases the cornea can also become scarred.

How common is Keratoconus?

Keratoconus may affect approximately 1 in 500 to 1 in 2000 people.

What causes Keratoconus?

Although it may sometimes run in families keratoconus is not a clearly inheritable condition. It can also be associated with allergic diseases such as asthma and eczema. There is also an association with eye-rubbing so patients with keratoconus should avoid rubbing the eyes.

Can the eyesight be improved?

In the early stages of keratoconus, spectacles can often improve the eyesight. If the eyesight cannot be improved by spectacles, hard/rigid gas permeable contact lenses may help. In some patients for whom contact lenses are unsuitable, intracorneal ring segments (ICRS) may help. ICRS are small C-shaped plastic strips which are inserted into the cornea to give it a more even shape.

If all the above are unsuitable or unsuccessful, a corneal transplant may be needed.

However, none of the above stop the progression of the condition and even the surgical options do not always provide a permanent solution.

There is a relatively new treatment called corneal cross linking which may stop the progression of keratoconus. It normally stops the eyesight getting worse but does not usually improve vision.

Treatments which MAY IMPROVE the eyesight (optical correction)	Treatments that MAY STOP the progression of keratoconus
Spectacles Contact lenses ICRS Corneal transplant	Corneal cross linking (Avoidance of eye-rubbing is also recommended)
However, these do not stop the progression of keratoconus	**However, these do not improve the eyesight**

A combination of the above treatments may be needed.

Contact lenses

Contact lenses do not cure or treat keratoconus, but they may improve the vision. The smooth outer surface of the contact lens focuses the incoming light more evenly than the uneven cornea and thus allows the eye to see more clearly. Some eyes, particularly with mild keratoconus, can be fitted with standard contact lenses by community optometrists/opticians. Some eyes can be difficult to fit with contact lenses, but many specialised types of contact lenses have been developed. They may need to be fitted by a specialist contact lens practitioner. In some circumstances this is undertaken in the hospital setting. Several fittings requiring several visits may be needed to find a lens with the best comfort and vision.

Traditionally, contact lenses for keratoconus have been the 'hard' or rigid gas-permeable variety, although some manufacturers are producing specialised 'soft' lenses and more oxygen permeable silicone hydrogel lenses. These often require specialist fitting and the visual outcome can vary.

Some patients also find good vision correction and comfort with a "piggyback" lens combination, in which gas-permeable rigid lenses are worn over soft lenses, both providing a degree of vision correction.

Scleral lenses are sometimes prescribed for cases of severe keratoconus; these lenses cover a greater proportion of the surface of the eye and hence can offer improved stability.

There is a risk of infection when wearing contact lenses and the risk becomes much greater if the lenses are not kept clean. Regular visits to the contact lens practitioner are essential.

Corneal cross-linking

This process stiffens the cornea which stops the keratoconus from getting worse. In the most common type of cross linking procedure the corneal surface is removed temporarily and the eye is treated with ultraviolet light. It usually does not improve the eyesight, so contact lenses may still be needed. Cross linking is a relatively new procedure which is available on the NHS in Bristol and London.

Corneal cross linking has not yet been fully researched, but early results from research studies are very promising. As with any procedure, not all cases benefit and in some cases the eyesight may be made worse. The long-term results are not known and cross linking may need to be repeated.

Intracorneal ring segments (ICRS)

A very small cut is made in the cornea and one or two thin C-shaped strips of plastic are slid between the layers of the cornea on either side of the pupil. The plastic strips push out against the curvature of the cornea, returning it to a more regular shape. The procedure can be carried out under general or local anaesthetic.

ICRS are most suitable for milder cases of keratoconus and preferably eyes without corneal scars, but not all cases improve. ICRS are fairly safe, but like any surgical operation, there are some risks and glasses or contact lenses are still likely to be needed afterwards. ICRS can usually be removed if necessary.

Corneal transplantation

A minority of cases of keratoconus can progress to a point where vision correction with glasses or contact lenses is no longer possible.

Full visual recovery after a corneal transplant can take 1 to 2 years, or sometimes even longer. Corneal transplantation usually improves the

eyesight but an absolutely perfect result from surgery is unlikely and there is a strong possibility that the eye will still need to be fitted with a contact lens afterwards. Surgery is therefore not a shortcut to perfect eyesight and is not a way of avoiding contact lens wear.

The operation is commonly performed under a general anaesthetic (asleep). All cases require careful follow-up with an eye specialist, usually for many years. A corneal transplant can last for many years but does not last forever. Repeat surgery may be needed.

Related disorders

Several other non-inflammatory eye disorders, generally rarer than keratoconus, also cause thinning of the cornea:

Keratoglobus

Keratoglobus is a very rare condition that causes corneal thinning primarily at the edges of the cornea.

Pellucid marginal degeneration

Pellucid marginal degeneration causes thinning of a narrow band within the lower part of the cornea. It causes blur that can often be corrected by spectacles.

Further information

- http://www.keratoconus-group.org.uk/
- http://www.nkcf.org/

Summary

Keratoconus can affect people in a variety of different ways. Several treatment options are available. Not all options are suitable for everyone. More than one consultation with more than one specialist is often needed to determine which options may best suit a patient's needs.

More than one treatment may be needed. Good vision can often be achieved, although the eyesight may not be perfect. Keratoconus very rarely results in blindness. In many cases time and patience are required to obtain a good result, with regular visits to an eye specialist.

Developments in contact lenses, treatments and research are ongoing.

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