

Keratoconus: causes and treatment options

Keratoconus is an eye condition that causes progressive thinning and distortion of the cornea. The cornea normally has a rounded shape, but in keratoconus the thinned area bulges forward to produce a cone like protrusion. This results in progressive distortion and reduced vision.

Keratoconus affects people of all races and both sexes. Most patients develop keratoconus in their late teens to early twenties although it can begin at any age.



The condition rarely develops after age 30 years. It is a progressive disorder that may progress rapidly or sometimes take years to develop. It may affect only one eye but more commonly occurs in both eyes.

Keratoconus - Progressive thinning and distortion of the cornea causing reduced vision

In general, the disease develops asymmetrically.

Keratoconus is a relatively rare disease – it is estimated that 1 person out of 1,500 is affected – and seems to have genetic components.

Many patients who have keratoconus report vigorous eye rubbing. Many patients with keratoconus also have allergies and eczema, but the link to allergic disease also remains unclear.



Two theories for keratoconus have been proposed:

- Keratoconus corneas are more easily damaged by minor trauma such as eye rubbing
- Keratoconus corneas lack the ability to self-repair routine damage easily repaired by normal corneas.

Management & Treatment Options

Contact Lenses

In the mildest form of keratoconus, glasses or soft contact lenses often provide adequate vision. As the disorder progresses and the cornea becomes increasingly distorted, specially designed soft lenses often work well. In more advanced keratoconus, rigid gas permeable (RGP or hard) contact lenses are usually the best choice for vision correction.

An RGP contact lens for advanced keratoconus is designed so that its front curve is spherical (to provide undistorted vision) but the back curves are tailored so the lens stays on the irregular cornea.

Fitting contact lenses on a keratoconus cornea is delicate and time-consuming. It will require frequent follow-up visits to fine-tune the fit and prescription. In some cases the process may take many months.

The lenses will also need to be refitted regularly to maintain good vision and lens comfort. A poorly fitting lens can cause scarring on the eye surface as well as discomfort and poor vision.

In New Zealand the Ministry of Health provides a subsidy for lenses and fitting fees for some keratoconus patients.



Corneal Collagen Cross-Linking

If there is progression a procedure called corneal collagen cross-linking can be performed. Corneal collagen cross-linking works by saturating the cornea with custom-made riboflavin drops, which are then activated by ultraviolet light to increase the collagen cross-links which are the natural “anchors” within the cornea. These anchors are responsible for preventing the cornea from bulging out and becoming steep and irregular.

Collagen cross-linking is not a cure for keratoconus. It does not reverse any change that has already occurred. The aim of this treatment is to arrest progression of keratoconus, and thereby prevent further deterioration in vision and the need for corneal transplantation. Glasses or contact lenses will still be needed following the cross-linking treatment (although a change in the prescription may be required).

Intacs

These are small semi-circular plastic rings that are implanted into the cornea. The idea is to support the central cornea, causing it to flatten and reduce the visual distortion. The results tend to be variable and although they may improve the vision to some degree in mild cases, they do not usually eliminate the need for contact lenses. They are seldom of benefit in more advanced cases of keratoconus. However, they are able to be removed should the need arise.

Corneal Transplant

Should keratoconus progress so much that contact lens wear becomes unsuccessful or the cornea becomes scarred then a corneal transplant may be indicated.

Although there is some risk of tissue rejection, and most people would not welcome the need for this procedure, corneal transplants enjoy a high rate of success.

The main limitation is the number of donated corneas and the NZ National Eye Bank relies on organ donors to provide the sight restoring corneal tissue.

Established in 1989, the Eye Bank has supplied over 4,700 corneas to New Zealanders - currently around 250 people require a corneal transplant each year, including people with advanced keratoconus.

Contact Lens Subsidy and WINZ Assistance

New Zealand residents with Keratoconus may be eligible for a Ministry of Health subsidy towards the fitting and supply of contact lenses. Clinical criteria apply and most optometrists who offer specialty RGP fitting are able to access this contact lens subsidy for eligible patients who are unable to have their vision corrected by spectacles. The subsidy generally does not cover all the associated costs and the patient will be asked to pay a part charge.

For those patients who are entitled to assistance from WINZ, further assistance to cover the patient part charge may be available from WINZ. These patients will need to be supplied with a statement that the patient has a medical condition that spectacles will not correct together with an account for the fitting consultations and the cost of the contact lens or lenses showing the amount already covered by the Ministry of Health subsidy. The optometrist will take care of this.

Care and treatment of keratoconus is not covered by the Children’s Glasses Subsidy available to community services cardholders up to age 15 and which is available only at some optometry practices. A GP referral to an optometrist who offers specialty RGP fitting will ensure the patient receives appropriate care and, if eligible, access to the available subsidies and the WINZ process.