CONDITION

Keratoconus

Keratoconus is a condition in which the clear front surface of the eye becomes thin and cone-shaped, causing distorted vision.

WHAT IT IS
Thinning and bulging of the cornea

BODY SYSTEM
Eyes and vision

MAIN SYMPTOMS
Blurred vision, distorted vision, glare, frequent prescription changes

WHAT CAUSES IT
Uncertain, with genetic and environmental influences

HOW IT IS DIAGNOSED
Eye examination, corneal mapping, and thickness measurements

MAIN TREATMENT
Vision correction and treatments that stabilize the cornea

CAN IT BE CURED?
No - treatment can stabilize or improve vision

IS IT AN EMERGENCY?
Sometimes - sudden painful vision loss needs urgent care

LONG-TERM OUTLOOK
Often manageable, though some people need surgery

Overview

Keratoconus affects the cornea, the clear, curved window at the front of your eye. A healthy cornea has a regular dome shape that helps focus light. With keratoconus, the cornea becomes thinner and bulges forward into an uneven cone-like shape.

This change prevents light from focusing evenly on the retina, the light-sensitive layer at the back of the eye. Vision may become blurred or distorted. Keratoconus can also cause irregular astigmatism, meaning the eye's surface is curved unevenly.

The condition usually affects both eyes, but one eye may be affected more than the other. It often starts during the teenage years or early adulthood. Progression may continue for years before slowing, although the timing and degree of change are different for each person.

Early keratoconus may be managed with glasses or contact lenses. If the cornea is continuing to change, corneal cross-linking may be offered to make it more stable. A smaller number of people develop advanced changes that require corneal surgery.

Symptoms

Early symptoms can be subtle. You may first notice that your glasses prescription changes more often than expected or that new glasses do not provide clear vision for long.

Possible symptoms include:

Keratoconus itself does not usually cause ongoing eye pain or redness. Contact lenses can become uncomfortable if they no longer fit the changing shape of the cornea, but discomfort should still be assessed rather than assumed to be normal.

Rarely, advanced keratoconus can cause acute corneal hydrops. This happens when a small break develops in an inner layer of the cornea, allowing fluid to enter it. The eye may suddenly become cloudy, painful, watery, and sensitive to light, with a marked drop in vision. This needs urgent eye assessment.

- Blurred or distorted vision
- Straight lines appearing bent or wavy
- Increasing short-sightedness or astigmatism
- Glare, halos, or starbursts around lights
- Difficulty seeing at night
- Sensitivity to bright light
- Frequent changes in glasses or contact lens prescriptions
- Vision that is much worse in one eye

Causes and risk factors

The exact cause of keratoconus is not fully understood. It probably results from a combination of genetic susceptibility and environmental or mechanical factors. It is not an infection, and it cannot spread from one person to another.

Keratoconus sometimes runs in families, but many people have no known affected relatives. Having a family member with the condition raises the chance of developing it, but it does not mean that you definitely will.

Repeated or forceful eye rubbing is associated with keratoconus and may contribute to progression in a susceptible cornea. It can be particularly relevant for people with itchy eyes caused by allergies or eczema.

The condition is also seen more often in people with certain genetic or connective tissue conditions, including Down syndrome. These associations do not mean that everyone with one of these conditions will develop keratoconus.

There is usually no single event or behaviour that explains why keratoconus developed. It is not your fault, and ordinary activities such as reading or using screens do not cause it.

Diagnosis

Keratoconus is diagnosed through an eye examination and detailed measurements of the cornea. A standard vision test alone cannot confirm it.

An optometrist or ophthalmologist may examine the cornea with a slit lamp, which is a microscope with a bright light. This can reveal thinning, scarring, or other changes, especially when keratoconus is more advanced.

Corneal topography or tomography creates a detailed map of the cornea's shape and curvature. Tomography can also assess the front and back surfaces of the cornea. These scans can detect early or uneven changes that may not be visible during a routine examination.

Pachymetry measures corneal thickness. Your eye care team may repeat scans over time to find out whether the cornea is stable or becoming steeper or thinner. Progression is assessed by comparing several measurements rather than relying on symptoms alone.

These tests are painless and usually do not touch the eye. Contact lenses can temporarily alter corneal measurements, so you may be asked to stop wearing them for a period before testing. Follow the specific instructions from the clinic performing your scans.

Treatment and management

Treatment aims to give you the clearest practical vision and, when necessary, prevent further weakening of the cornea. Improving vision and stopping progression are separate goals, so more than one type of treatment may be needed.

Glasses may correct vision in early keratoconus. Soft contact lenses may also work when the corneal shape remains fairly regular.

As the cornea becomes more uneven, specialist contact lenses can provide clearer vision by

creating a smoother focusing surface. Options include rigid gas-permeable lenses, hybrid lenses, piggyback systems, and scleral lenses. Scleral lenses are larger lenses that rest on the white part of the eye and hold fluid over the cornea.

Contact lenses improve focusing but do not stop keratoconus from progressing. A lens should be fitted and checked by an eye care professional with suitable experience. Poor fit can cause discomfort or damage to the corneal surface.

Corneal cross-linking is used for keratoconus that is shown to be progressing. During the procedure, riboflavin eye drops and ultraviolet A light are applied to the cornea. This strengthens links between collagen fibres, which form part of the cornea's supporting structure. The main goal is to stabilize the cornea, not to restore a normal shape or guarantee better vision.

Some people may be offered small corneal implants called intracorneal ring segments. These are placed within the cornea to alter its shape and may improve contact lens tolerance or vision in selected cases. They do not remove the underlying condition.

A corneal transplant may be considered if there is severe scarring, marked thinning, or vision that cannot be managed with lenses and other treatments. The damaged corneal tissue is replaced with donor tissue. Recovery takes time, and glasses or contact lenses may still be needed afterward.

Complications

Keratoconus can progress enough that ordinary glasses no longer provide useful vision. Irregular astigmatism may make reading, driving, studying, or working with fine detail more difficult.

Possible complications include:

Complications can also follow procedures or contact lens use. After cross-linking or surgery, follow the clinic's instructions and report increasing pain, redness, discharge, or worsening vision promptly.

- Corneal scarring that permanently reduces clarity
- Increasing difficulty wearing contact lenses
- Irritation or surface injury from poorly fitting lenses
- Acute corneal hydrops with sudden swelling and cloudy vision
- The need for corneal surgery in advanced cases

Prevention

Keratoconus cannot be reliably prevented. Its causes are not fully understood, and inherited susceptibility cannot be changed.

Avoid forceful or repeated eye rubbing, particularly if you already have keratoconus or have been told that your corneas are at risk. If allergies make your eyes itchy, treating the allergy may make rubbing easier to avoid. Try a cool compress or gently close the eye rather than pressing or rubbing it.

Relatives of someone with keratoconus may wish to mention the family history during an eye examination. Earlier testing can identify corneal changes before they cause obvious symptoms, but screening does not prevent the condition.

Regular follow-up after diagnosis is important because treatment to stabilize the cornea is most useful before advanced thinning or scarring develops.

Living with it and what to expect

Keratoconus often changes gradually over months or years. Progression is more common when the condition begins at a younger age, but age alone cannot predict what will happen to an individual eye. One eye may remain mild while the other needs more support.

Follow-up usually includes vision testing and repeat corneal scans. Appointments may be closer together when keratoconus has recently been diagnosed, appears to be changing, or has been treated. Stable cases may need less frequent review, according to the eye clinic's plan.

Many people achieve functional vision with glasses or specialist contact lenses and continue their usual education, work, exercise, and family life. You may need extra planning for lens care, replacement costs, bright lights, or night driving. If glare or reduced contrast affects driving, follow local eyesight rules and discuss practical limits during your routine eye care.

Keratoconus does not usually cause total blindness. However, vision without correction can become poor, and some people need cross-linking, specialist lenses, or surgery. Even after successful stabilization, glasses or contact lenses are often still required because cross-linking does not usually reverse the existing corneal shape.

Keep backup glasses if they provide useful vision, and follow safe contact lens hygiene. Do not sleep, swim, or shower in lenses unless your lens specialist has specifically said that the lens and situation are suitable.

When to get medical help

Arrange a routine eye examination if your vision is becoming increasingly blurred or distorted, your prescription changes frequently, or one eye sees much less clearly than the other. If you have diagnosed keratoconus, keep planned appointments even when your vision seems unchanged, because scans may detect progression before you notice it.

Contact your eye clinic promptly if a contact lens becomes persistently painful, repeatedly falls out, or no longer gives its usual vision. Remove the lens if it is causing pain, redness, or marked irritation.

Seek urgent same-day eye care for:

A chemical splash is an emergency. Rinse the eye immediately with plenty of clean water and seek emergency help. Sudden vision loss should also be assessed urgently rather than waiting for a routine appointment.

- Sudden loss or major worsening of vision
- A suddenly cloudy or white-looking cornea
- New eye pain with watering or strong light sensitivity
- Significant redness, discharge, or pain while using contact lenses
- Eye injury or a chemical splash

Common questions

Does keratoconus make you blind?

It does not usually cause complete blindness. It can cause substantial blur and distortion, especially without glasses or contact lenses. Specialist lenses, cross-linking, and corneal surgery can help manage more advanced cases.

Can glasses fix keratoconus?

Glasses may work well in early or mild keratoconus. They become less effective when the cornea develops a very uneven shape. Specialist contact lenses can then create a smoother focusing surface, although they do not stop progression.

Can keratoconus stop getting worse on its own?

It may become stable, often after progressing for a period, but this cannot be predicted from symptoms alone. Repeat corneal scans are needed to show whether the shape or thickness is changing. Progressive keratoconus may be treated with cross-linking.

Can I wear contact lenses if I have keratoconus?

Yes. Many people use specialist contact lenses successfully. The best type depends on the corneal shape, comfort, vision needs, and eye surface. Regular fit checks are important because the cornea can change over time.

Does corneal cross-linking improve eyesight?

Its main purpose is to slow or stop progression by strengthening the cornea. Vision may improve, worsen temporarily, or remain similar. You may still need glasses or contact lenses afterward.

Is keratoconus inherited?

Genetics can contribute, and the condition sometimes affects more than one family member. However, inheritance is not straightforward. A person can develop keratoconus without a family history, and an affected parent does not mean a child will definitely develop it.

Sources

- National Eye Institute. "Keratoconus."
- American Academy of Ophthalmology. "What Is Keratoconus?" EyeSmart.
- Royal College of Ophthalmologists. "Corneal Cross-Linking for Keratoconus." Patient information.
- Gomes JAP, Tan D, Rapuano CJ, et al. "Global Consensus on Keratoconus and Ectatic Diseases." Cornea . 2015;34(4):359-369.
- Santodomingo-Rubido J, Carracedo G, Suzaki A, et al. "Keratoconus: An Updated Review." Contact Lens and Anterior Eye . 2022;45(3):101559.
- Sykakis E, Karim R, Evans JR, et al. "Corneal Collagen Cross-Linking for Treating Keratoconus." Cochrane Database of Systematic Reviews . 2015;2015(3):CD010621.