

Treatments to Improve Quality of Vision

The treatment options noted below are listed in the order of severity of keratoconus they typically treat (mild to severe).

Gas Permeable Contact Lenses

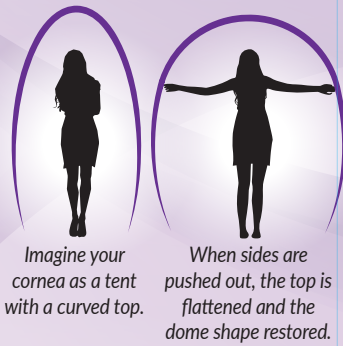
Gas Permeable lenses have been commonly used in the past to create regular curvature and improve vision. Now, for moderate levels of keratoconus, scleral lenses are more commonly used.

Scleral Lenses

Scleral lenses are larger than standard hard contact lenses and leave space between the lens and the natural cornea. This allows tears to be trapped below the lens and provide a more regular shape of light rays on the outside of the contact lens.

Corneal Inlays

There are a two main types of corneal inlay implants: plastic (Intacs), and donor corneal tissue (ALKRS). Each of these inlays are a semicircular segment inserted within the layers of the cornea in order to create a more regular curvature.

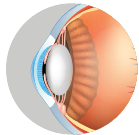


Corneal Transplants

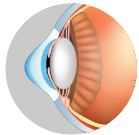
Corneal transplants replace the warped, distorted cornea with new corneal tissue from a donor. In KCN, often the back layer of the cornea is still healthy, and a partial thickness (or lamellar transplant) can be performed, replacing only the front layers of the cornea. This is often called a deep anterior lamellar keratoplasty (DALK). At times, both the front and back layers of the cornea are replaced in a procedure called a penetrating keratoplasty (PK). During these surgeries, sutures are placed and then gradually removed over a year or two, and the vision recovers slowly over time. Transplants are often used for very advanced stages of KCN.

Signs and Symptoms

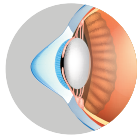
The first indication of KCN is a blurring and distortion of vision. In the early stages this may be corrected with glasses. Eventually vision cannot be completely corrected by glasses and contact lenses are required. Scarring or swelling of the cornea may also develop, and further blurring.



Early Stage:
Collagen Crosslinking, Glasses, Contacts



Moderate Stage:
Scleral Lenses, Corneal Inlays

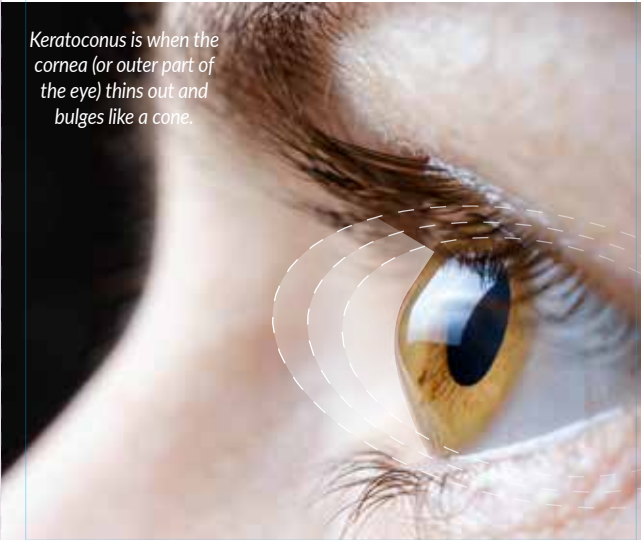


Severe Stage:
Deep Anterior Lamellar Keratoplasty (DALK), Penetrating Keratoplasty (PK)

What are the treatment options for Keratoconus?

Treatment options for keratoconus are directed toward two primary goals. The first goal is to halt progression of the irregular curvature, and “lock-in” your vision where it is today. This is accomplished with corneal crosslinking. The second goal in keratoconus treatment is to improve your quality of vision by neutralizing the astigmatism caused by the irregular curvature. This is accomplished with specialty contact lenses, corneal inlays, or corneal transplants.

Keratoconus is when the cornea (or outer part of the eye) thins out and bulges like a cone.



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As a team of clinical trial researchers, our surgeons have been actively involved in the development of vision correction procedures since their inception. Our practice serves as a teaching facility, training ophthalmologists and clinical professionals throughout the world on vision correction management.

Our surgeons are proud to be The Preferred Ophthalmologists of the Minnesota Vikings.

Our Mission

To preserve, restore and enhance vision through research, teaching and providing the highest quality medical and surgical care to patients.



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Cover Panel

Keratoconus

Halting progression of
irregular curvature to
improve your quality of vision



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Backs up to What is Keratoconus?

The Cornea

The cornea is the strong, transparent outer surface on the front of the eye that covers the iris (the colored part) and the pupil (the black center). The cornea allows the light waves from the image you are looking at to be transmitted into the interior of your eye. The smoothness and shape of the cornea, as well as the transparency of the cornea, are very important to proper vision.

If either the surface smoothness or the clarity of the cornea are disturbed, vision becomes blurry.

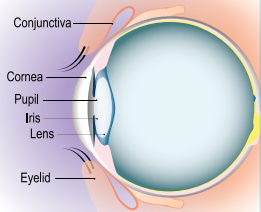
What is Keratoconus?

Keratoconus (KCN) is a thinning disorder of the cornea in which the round, symmetrical shape of the cornea is distorted and a cone-like bulge develops, resulting in significant vision problems. Images at times can appear as though you are looking through warped and distorted glass. Its progression is generally slow and the disease sometimes stops progressing as you get older, yet never gets better on its own.

Who is Affected by Keratoconus?

Keratoconus is by no means rare. It has been estimated to affect vision in about 1 out of every 2,000 persons in a general population, yet may be present without symptoms in as many as 1 in 500 people. The disease usually shows up in young people in their teen years, but may be first diagnosed in individuals later in life. It is found in all parts of the world, and in both males and females.

RISK FACTORS: There is a genetic component, and it often runs in families. There are a few additional risk factors, including allergies, (which often leads to eye rubbing), and sleep apnea. Over time, eye rubbing can exacerbate corneal thinning and increase irregular astigmatism. Patients with sleep apnea often sleep on their stomach or side to avoid snoring. This positioning can put pressure on the eyes which can also contribute to keratoconus progression. In general, the earlier in life someone has symptoms, the worse the disease eventually becomes.



Treatments to Halt Progression

Most patients diagnosed with keratoconus, regardless of severity, qualify for corneal crosslinking.

Crosslinking

Corneal collagen crosslinking (CXL) is a technique that uses ultraviolet (UV) light and a photosensitizer called riboflavin (vitamin B2) to strengthen the cornea and is intended to reduce the progression of KCN.

Crosslinking of collagen refers to the ability of collagen fibers forming strong bonds with adjacent fibers. In the cornea, collagen crosslinking occurs naturally with aging, which may be one reason why KCN progression is thought to slow with age. This bonding process appears to be sped up through the application of ultraviolet light and riboflavin to the cornea.

During the crosslinking procedure, the patient is first given numbing drops. A lid separator is placed to hold the eyelids open. Depending on the patient, at times the epithelial surface cells may be removed. Riboflavin (vitamin B2) drops are used to moisten the front of the eye and deliver the riboflavin into the cornea until the riboflavin can be seen throughout the cornea and into the fluid in the back of the eye. This usually takes 10 to 30 minutes.

After the riboflavin is present throughout the cornea, the UV light is positioned in front of the eye and delivered to the cornea. This typically takes about 30 minutes. Various drops and a contact lens may be used to aid in the healing, and the patient is seen over the next few months to monitor the healing response. It is typically 4-6 weeks before a contact lens can be worn again after the treatment.

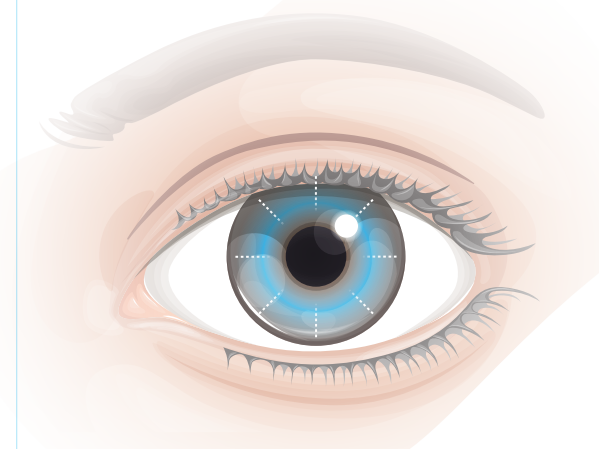
Epithelium-Off corneal crosslinking has been FDA-approved in the US. Minnesota Eye Consultants offers the FDA-approved procedure, and in certain cases the epithelium is left in place. Minnesota Eye Consultants is continually working to improve the treatment of patients with keratoconus, post-LASIK ectasia and similar eye problems.

What is an ALKRS procedure?

Anterior Lamellar Keratoplasty with Regional Segments (ALKRS) uses donor corneal tissue in a ring layer of the cornea. The concepts are similar to Intacs, but rather than using plastic, which can erode through your natural cornea, the tissue used in ALKRS is more similar to your natural cornea. The donor tissue is cut to a specific, individualized size based on each patient's pre-operative measurements. This allows your surgeon to target the most irregular sections of your cornea.

As opposed to a full thickness transplant, ALKRS tissue is placed into a pocket within your natural cornea created by a laser during the procedure. Because it is only a partial thickness tissue, and sutures are often not needed, it is far less likely to cause rejection (a process where your body recognizes the graft as foreign tissue/material).

At Minnesota Eye Consultants, we often perform ALKRS and corneal crosslinking on the same day.



What can I expect after my procedure?

The post-operative healing of ALKRS is rather quick. Your recovery will likely be similar to a typical corneal crosslinking recovery. Patients can expect some side effects such as light sensitivity, blurry vision, irritation and mild discomfort.

Do I need to take time off of work?

Vision following the procedure varies from patient to patient. Because we do one eye at a time, and the other eye isn't affected, most patients go back to work within a few days.

ALKRS is primarily done in conjunction with collagen crosslinking. Following crosslinking, patients usually experience some irritation and blurred vision early after the procedure. Most patients prefer to take these first couple days off of work. Glasses or contact lens prescriptions change for a few months after the procedure, and the other eye is typically done when the first eye has glasses or contacts that can work for the patient.

Will I have restrictions after my procedure?

As with many corneal procedures, patients are advised to avoid saunas, pools, or hot tubs for two weeks to prevent contaminated water from getting into your eyes.

All patients diagnosed with keratoconus are strongly encouraged to control allergies, avoid eye rubbing, and avoid sleeping on their face to prevent progression. Although collagen crosslinking aims to slow or halt the progression of keratoconus and ALKRS often improves your sight, your vision can worsen again if you continue to rub your eyes, or sleep with pressure on your eyes.

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