

Cornea Diseases & Cornea Transplants

What is a cornea transplant?

A corneal transplant replaces a diseased or scarred cornea with a donor cornea. The procedure is often carried out when vision is affected because the cornea becomes cloudy, scarred or infected. These conditions prevent light from passing through the cornea and into the eye to reach the light-sensitive retina.

Unlike other forms of organ transplants, corneal transplants may be performed several times if previous attempts fail. However, the success rate of repeat transplants may be lower than a first-time graft and anti-rejection tablets may be needed to prevent rejection in these cases.

Who needs a cornea transplant?

A cornea transplant is an effective means of restoring vision in cases of corneal diseases, injuries, infections and age-related corneal degeneration.

Some of the common conditions leading to a need for a transplant are:

Keratitis

Cornea infection, or keratitis, is a common reason leading to the need for a transplant. The infection can

be bacterial, fungal or amoebic in nature. Serious corneal ulcers and corneal scarring which affect corneal transparency and vision will need cornea transplantation.

Keratoconus

Keratoconus is a disorder of the cornea that causes the cornea to become progressively thin. The thinned cornea will bulge forward and become cone-like, causing changes in the refractive power of the eye. It will especially increase astigmatism and lead to poor vision. In its early stages, the condition can be corrected with rigid contact lenses. If contact lens intolerance develops, a corneal transplant may be necessary.

Fuch's Dystrophy

In the early stages of the disease, there is blurry vision that gets progressively better as the day passes. But in its later stages, Fuch's dystrophy can cause swelling, distorted vision and pain. The condition affects corneal transparency and in severe cases, will require a corneal transplant to restore vision.

Lattice Dystrophy

This is the accumulation of abnormal

protein fibres in the middle layer of the cornea causing vision to become cloudy. If these protein deposits occur under the outermost layer of the cornea, corneal erosion can occur. Medical treatments such as eye drops or soft contact lens can help the condition but in severe cases, a corneal transplant may be needed.

How is a corneal transplant performed?

A cornea transplant is a microsurgical operation performed by a trained corneal transplant eye surgeon. Healthy donated corneal tissue is used to replace a diseased cornea to restore vision and eye health.

The operation involves removing the portion of the damaged or cloudy cornea. A clear and healthy donor cornea is then placed and sutured in place with very fine microsurgical nylon sutures. If a full thickness cornea transplant is performed, this procedure is also known as a Penetrating Keratoplasty (PK).

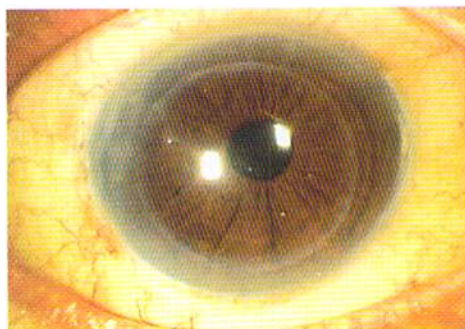
In certain cases when the cornea is not diseased throughout its whole thickness, only the diseased portion is removed and a partial thickness cornea transplant is performed. This procedure is known as **Lamellar Keratoplasty (LK)**.

Anterior Lamellar Keratoplasty (ALK) is performed only when the anterior (front) layers of the cornea

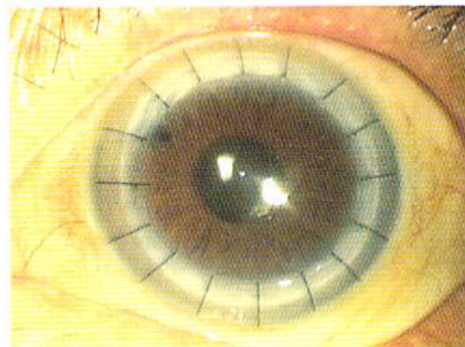
are removed. This is a technically more challenging procedure that preserves the deeper or posterior layers of the cornea.

When only the diseased posterior (back) layers of the cornea are replaced, the procedure is called **Endothelial Keratoplasty (EK or DSAEK)**.

The advantage of lamellar keratoplasty is that only the diseased portion of the cornea is removed so that the healthy normal layers of the cornea



Cornea transplant (without sutures) using DSAEK technique.



Conventional cornea transplant (with sutures).

are preserved. These procedures greatly reduce the risk of cornea graft rejection which is a significant cause of graft failure in corneal transplants.

Osteo-odonto Keratoprosthesis (OOKP) or 'Tooth-in-Eye' Surgery

Osteo-odonto Keratoprosthesis (OOKP) is another type of surgery that restores vision. It is an option for end-stage corneal blindness when conventional corneal transplant procedures are not suitable. Also known as 'tooth-in-eye' surgery. This surgery takes place in two stages.



The Singapore Eye Bank

The Singapore Eye Bank, in close collaboration with the SNEC Corneal Transplantation Program, secures a large number of donor corneas each year for transplants. The Singapore Eye Bank gets corneas from local donors in Singapore, as well as from internationally-accredited eye banks from the United States and the Philippines. As the Singapore Eye Bank is very successful in procuring corneal tissue today, it usually takes one to two weeks to receive a cornea. It also provides corneas for non-Singaporeans undergoing corneal transplants in Singapore.

Stage One: Osteo-odonto Keratoprosthesis (OOKP) or 'Tooth-in-Eye' Surgery

- A tooth – with its roots and part of the jaw intact – is removed from the patient.
- The tooth is fashioned into a cube with a hole drilled into its centre.
- An artificial plastic device called an optical cylinder is implanted in the tooth to focus light on the retina.
- The tooth structure is inserted into the patient's cheek to grow a new blood supply.
- While the tooth grows a new blood supply, the damaged layers of the patient's eyes are removed and the inner mucosal lining of the cheek is transplanted onto the surface of the eye to cover it.

Stage Two: Osteo-odonto Keratoprosthesis (OOKP) or 'Tooth-in-Eye' Surgery

- After about four months, the patient's covered eye is opened and the inner contents of the eye removed.
- A circular opening is made to receive the implant.
- The tooth structure in the patient's cheek is implanted within the eye.
- At the end of the procedure, light can pass through the plastic cylinder, and the patient will be able to see through this cylinder and enjoy good vision.