

Epikeratophakia for Keratoconus

In a normal eye, rays of light are focused onto the retina by being bent, not only by the lens of the eye, but also by the cornea – the transparent window at the front of the eye. Most of the bending of the light rays is in fact achieved by the cornea, and the lens of the eye only does the fine tuning to vary the focus for distance and near vision. In keratoconus, the central part of the cornea becomes thinned, and the surface of the cornea is irregular, and this causes the vision to be blurred.

Surgical correction of keratoconus thus needs to restore a normal thickness and profile to the cornea. An epikeratophakia graft is placed on top of the patient's cornea, and compresses the irregular corneal surface beneath it.



Living contact lens

Epikeratophakia has been called 'the living contact lens'. Donor corneal tissue is formed into a new shape in the same way as a contact lens is manufactured, and the tissue is then freeze-dried. The freeze-drying process kills all the cells in the donor cornea so there are no living cells in the tissue to stimulate any rejection of the graft. Instead of being temporarily placed on the cornea like a contact lens, the 'epi' graft is stitched in place. In time, the patient's corneal cells grow into the graft to make it like a permanent living contact lens. The stitches holding the graft in place can be removed and no further maintenance is needed.

The operation is usually carried out under a general anaesthetic. In an epi graft the surface layer (epithelium) of the patient's cornea is removed in the area where the graft is fixed. Within a few days the patient's epithelium grows over the surface of the graft. This process is speeded up if the eyelids are kept closed after the operation. For this reason a temporary stitch is generally placed in the eyelids to keep them closed until the epithelium has healed over the graft.

After the operation, a close check is kept on the eye until the epithelium has healed, since any delay in the healing may allow infection or other problems to develop in the graft. Once the epithelium has healed (usually after 4 – 5 days) the eyelid suture is removed and the eye can be left uncovered. It is necessary to put ointment in the eye for two or three months as the epithelium takes some time to stabilise on the graft. Occasionally if there are problems with instability of the epithelium, a bandage soft contact lens is used to protect the graft as it heals. If any of the fine sutures that are used to fix the graft work loose they may cause irritation and need to be removed after application of local anaesthetic drops.

Epikeratophakia is carried out on the outer surface of the cornea, and so the risk of damage to the inside of the eye is negligible. The procedure is potentially reversible. The visual recovery may be slow and the quality of visual result achieved may not be 100%. The purpose of the epikeratophakia operation for keratoconus is to restore a normal thickness and contour to the cornea. The vision will be generally improved, but to obtain the best vision spectacles or contact lenses may still be necessary. If there is a large residual optical error after epikeratophakia, further surgery such as relaxing incisions, or excimer laser photo-refractive keratectomy (PRK) may be carried out, to improve the unaided vision.