York and Scarborough
Teaching Hospitals
NHS Foundation Trust

Corneal Transplantation

Information for patients, relatives and carers

ⓘ For more information, please contact:

Eye Ward on telephone number 01904 726064 or the Eye Clinic on 01904 726758

The York Hospital, Wigginton Road, York, YO31 8HE

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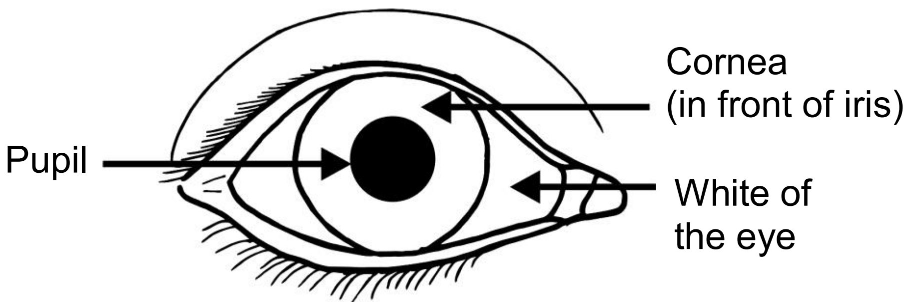
A corneal transplant is also known as a corneal graft.

What is a corneal graft?

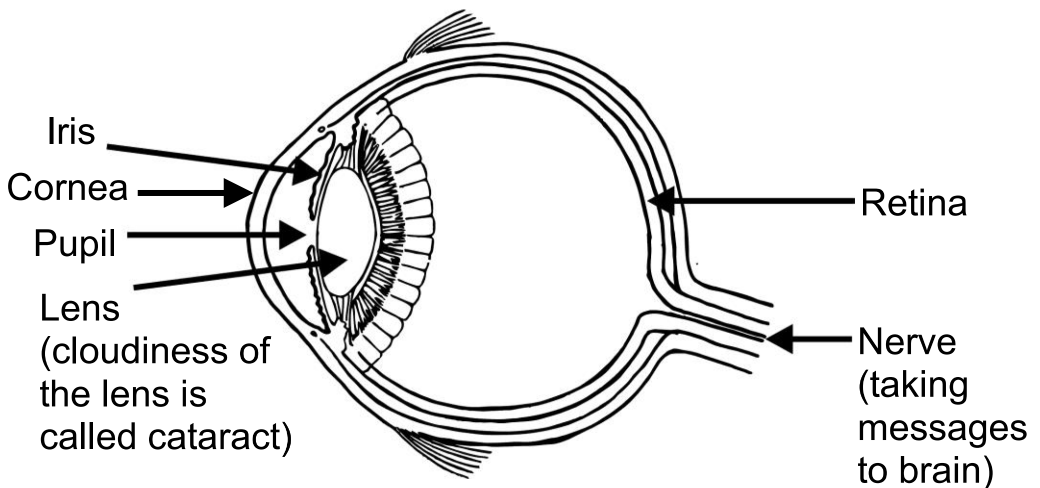
The cornea is the circular, curved window at the front of the eye that must be clear to enable us to see. It is in front of the iris (the coloured part of the eye) and the pupil (the round black hole in the centre of the iris). It is the part of the eye that a contact lens would sit on. See Figures 1 (front of eye) & 2 (cross-section of eye).

Figure 1: Front view of the eye



If the cornea is distorted or hazy, so that you can no longer see through it, then a corneal graft may be appropriate. The graft is taken from the healthy eye of a person who has died (where permission has been given by the family or by the deceased prior to death).

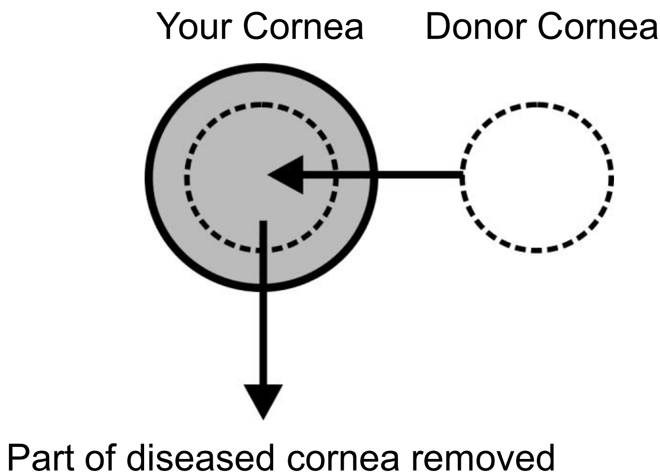
Figure 2: Side view of the eye



What actually takes place during the operation?

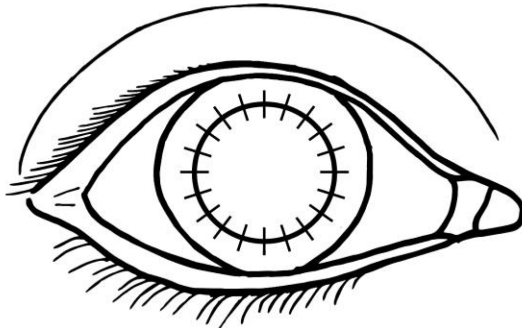
A circular portion is removed from the centre of your cornea. A similar circular portion is then taken from the centre of the donor cornea (this is the corneal graft) and it is placed into the hole in your cornea (Figure 3) and usually secured in place with very fine stitches.

Figure 3: Transfer of Donor Graft to Recipient



You will now have a new corneal graft replacing the central part of your cornea (Figure 4)

Figure 4: Corneal Graft with sutures (which can only be seen with a microscope)



What happens to the part of my cornea, which is removed?

In most cases, the part of your cornea which is removed is simply disposed of, in accordance with strict guidelines. Occasionally, corneas are sent from the operating theatre directly to the pathology laboratory and examined under a microscope for further information. Some tissue, with your express consent, may be kept for research into corneal disease.

Different types of Corneal Graft Techniques – see figure 5

Figure 5

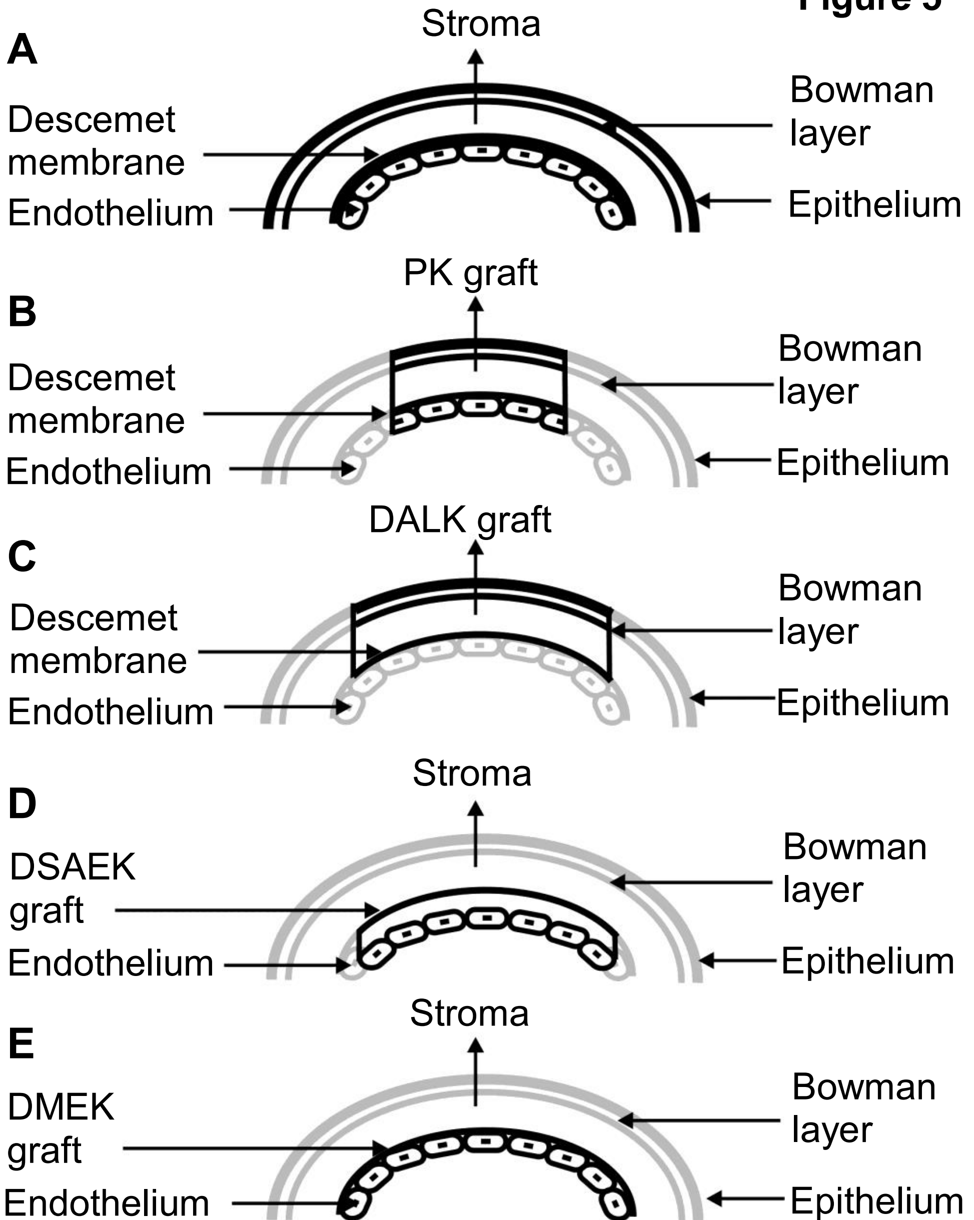


Figure 5A shows a normal cornea in cross section. Penetrating keratoplasty (PK) surgery was the most common type of corneal transplant operation performed (Figure 5B) replacing the entire cornea.

Some types of corneal disease, however, can be treated by transplanting only the thick front of the cornea (preserving your own deeper corneal layers). This is called a deep anterior lamellar keratoplasty, or DALK (Figure 5C). The advantage of this technique is that retaining your own deeper corneal layers gives some extra strength to the healed graft, and there is a much lower chance of graft rejection when compared with a PK because you keep some of your own cornea. Unfortunately, the interface between the graft and the retained deeper layers can produce some cloudiness to vision compared with a PK where no such interface is created.

The dissection needed for a successful DALK is very difficult because of the delicate nature of the very thin deep layer which must be left intact. If a hole is made in this layer then the operation is converted to a standard PK. Conversion rates are up to 50%. The outcome of DALK to PK conversion is as good the outcome of a standard PK.

Other types of corneal disease can be treated by transplanting only the thin deep layer of the cornea or “inner lining” (preserving you own thick front layer). This is called a Descemet’s Stripping Endothelial Keratoplasty (DSEK or DSEAK – Figure 5D). The advantage of DSEK is that the eye is very strong after surgery and vision recovers quicker than with a PK. The disadvantage is that the interface is even cloudier than with a DALK, so those needing really good vision sometimes choose a PK. A DSEK can often detach in the early stages after surgery needing a second operation to reattach it. Often it will take around 12 months for you to achieve your best vision after DSEK.

A more recent development of DSEK involves transplanting only the very thin layer of endothelial cells on Descemet’s membrane (DMEK – Figure 5E). This is technically challenging and only performed in a few centres because of the high risk of wasting corneal donor material in the graft preparation stage. It is available in York and is favoured because of rapid visual recovery and reduced rates of graft rejection. If the graft preparation stage does not go well then the transplant operation cannot proceed.

The decision about which type of transplant is best for you will be made with your surgeon. The decision can change on the day of surgery depending on the corneal donor material received from the Eye Bank on the day.

Will I be asleep for the operation?

It is usual to do the operation with you asleep (general anaesthetic) but it can be done with the eye numbed by injection (local anaesthetic). The operation can be lengthy and you need to be very still during surgery. Your surgeon will discuss these options with you.

How long does the procedure take?

A routine corneal graft operation usually takes about an hour. If any other surgery is planned, such as cataract surgery, then it may take longer. This is only a guide as each patient is different.

What are the risks of surgery?

Loss of sight

During corneal graft surgery the inside of your eye is exposed to the outside and infection can get in. It is also possible for a spontaneous bleed inside your eye to expel the important contents of the eye when the cornea is removed. This is because the intact eye is usually under pressure and this pressure drops during the surgery. Infection and bleeding result in about a 1:500 chance of loss of sight as a consequence.

Inability to complete the surgery

Rarely, during preparation of your corneal graft, the graft might be damaged such that it cannot be used. This might result in cancellation of your surgery, if surgery on your own eye has not commenced. Alternatively, replacement of your original cornea might be necessary, temporarily.

Wound weakness

After a corneal transplant, the join between the transplant and your own eye will always be weaker, with or without stitches, than the original corneal tissue. It is, therefore, important to prevent knocks to your eye after surgery. An infection at the wound, or in a stitch, might also make the wound open. Opening of the wound is likely to result in permanent worsening or loss of vision.

Astigmatism and other refractive errors

The stitches in a corneal transplant usually distort the shape of the cornea. This results in a refractive error called astigmatism. The distortion might persist even after the stitches are removed. Additional surgery might be necessary to correct the astigmatism. If your surgery is to correct keratoconus it is likely that you will remain short-sighted after a transplant. Short sighted refractive errors are called myopia. In all cases, to get the best vision from a graft, you are likely to need glasses (or contact lenses) even if you did not need them before.

Some patients require additional surgery such as extra lens implants or laser refractive surgery to correct refractive errors.

Transmission of infection

Please see sections on “Could I catch any disease from the transplant?” or “What indicates a problem I should seek urgent advice about after a corneal graft?”

Corneal graft rejection

A corneal transplant can reject at any time after surgery; even decades later. Rejection makes the vision cloudy. The graft will not move or pop out of place if it rejects. Rejection can usually be reversed with appropriate early treatment.

Corneal graft failure

Grafts for keratoconus have the best survival rates. 95% of them will still give clear vision five years after surgery. By 10-15 years about 80% will still survive. With luck, a graft will last between 20-50 years. Grafts for perforations or infections have a much poorer survival rate. Those done for conditions such as the corneal dystrophies have a survival rate in between the rates for the best and worse conditions.

Other complications

Other possible complications include glaucoma or pressure problems, cataract, ocular inflammation, retinal detachment or macular oedema, etc.

Any of these conditions might affect your eyesight as a consequence of corneal transplant surgery

How long will I be in hospital?

Usually you will be admitted the day of surgery and can go home the same day after a DALK or PK if you live nearby. DSEK/DMEK surgery usually means you will go home the day after. Occasionally it may be necessary to keep patients in for a little longer to allow the eye to settle further.

What will it feel like the day after surgery?

Your eye may feel irritable and some discomfort is expected (which should settle within a few days). Significant pain is not common so if your eye is painful then you should contact the eye hospital. Eyes undergoing a graft to treat pre-existing corneal pain are often much more comfy straight after surgery.

Will I need drops after the operation?

Drops are put in frequently for the first few days; later they are used less frequently but for many months. You will probably be on a weak once a day drop for the rest of your life to keep the graft healthy and prevent rejection.

How often will I need to be seen in outpatients after the operation?

Your first visit is usually within one week after leaving hospital. We then increase the period between visits, often to four weeks, then two months etc. Again this will depend on each individual. You can expect to be seen at least six times in the first year.

You will be followed up for a minimum of five years after the operation.

Is there anything I should avoid after the operation?

You might need time off work, depending on your own particular line of work, and your response to surgery or the anaesthetic. A week off work would be usual if the vision in your other eye is adequate for work purposes. Swimming should be avoided for at least a month and you should never do contact sports e.g. rugby, football, boxing etc. since the healed graft will always be weaker than a normal cornea. Otherwise try to live as you would normally.

Could I catch any disease from the transplant?

The medical history of the donor is checked to exclude the following conditions: rabies, Creutzfeldt-Jakob disease (CJD) and diseases of the nervous system of unknown cause. Blood is taken from all donors to exclude herpes, hepatitis B, hepatitis C and the AIDS viruses. In spite of these checks there are rare cases of transmission of the herpes virus and CJD in a graft. Whilst the cornea is in the Eye Bank it is very carefully examined to reduce the risk of infection with bacteria and fungi. As a result of these checks the risk is tiny. However, because of this tiny risk, once you have a corneal transplant you will not be able to be a blood donor or organ donor.

What will my vision be like, eventually?

It depends on the particular features of your eye but your vision in the grafted eye will not be perfect after the operation. It might be very blurred for many months as the graft settles in and takes up its final shape. If you have a good second eye your vision with both eyes open is likely not to limit your lifestyle any more than your vision in the weaker eye did before the operation.

When will I notice any improvement in my vision?

Each person varies in their response to the operation. Some notice a big improvement early on whereas in others the vision will improve gradually over several months. Sometimes additional surgery, up to two years later, might be needed to achieve good vision.

Will I needs glasses afterwards?

In some cases it is possible to see quite clearly without glasses. However, most people usually require glasses or contact lenses; how long after your operation these are organised depends on a number of things, including when the stitches are removed or if further surgery is needed.

What indicates a problem I should seek urgent advice about after a corneal graft?

Graft infection or rejection are our main concerns. Rejection results from your immune system recognising the graft as being ‘foreign’ to you. Infection in the graft or around the stitches can occur and a broken stitch can let the graft wound open. If you experience any **R**edness, **S**ensitivity to light, disturbance of **V**ision, or **P**ain, please contact our Urgent Referral Clinic number as soon as possible. Our telephone number is 01904 726758 or out of hours is 01904 726064.

Do not wait until your next routine appointment

If you have any queries about your eye there will always be someone available to help.

Because each patient is different, the information provided in this leaflet is a general guide only. Remember your operation is the beginning of a long course of treatment, not the end of it.

Tell us what you think of this leaflet

We hope that you found this leaflet helpful. If you would like to tell us what you think, please contact:
Mr J Gormley, Consultant Ophthalmologist,
The York Hospital, Wigginton Road, York, YO31 8HE or telephone 01904 726758.

Teaching, training and research

Our Trust is committed to teaching, training and research to support the development of health and healthcare in our community. Healthcare students may observe consultations for this purpose. You can opt out if you do not want students to observe. We may also ask you if you would like to be involved in our research.

Patient Advice and Liaison Service (PALS)

PALS offers impartial advice and assistance to patients, their relatives, friends and carers. We can listen to feedback (positive or negative), answer questions and help resolve any concerns about Trust services.

PALS can be contacted on 01904 726262, or email pals@york.nhs.uk.

An answer phone is available out of hours.

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