

PATIENT INFORMATION

Corneal Transplantation: Endothelial Keratoplasty (DSAEK and DMEK) Surgery - Information for Patients

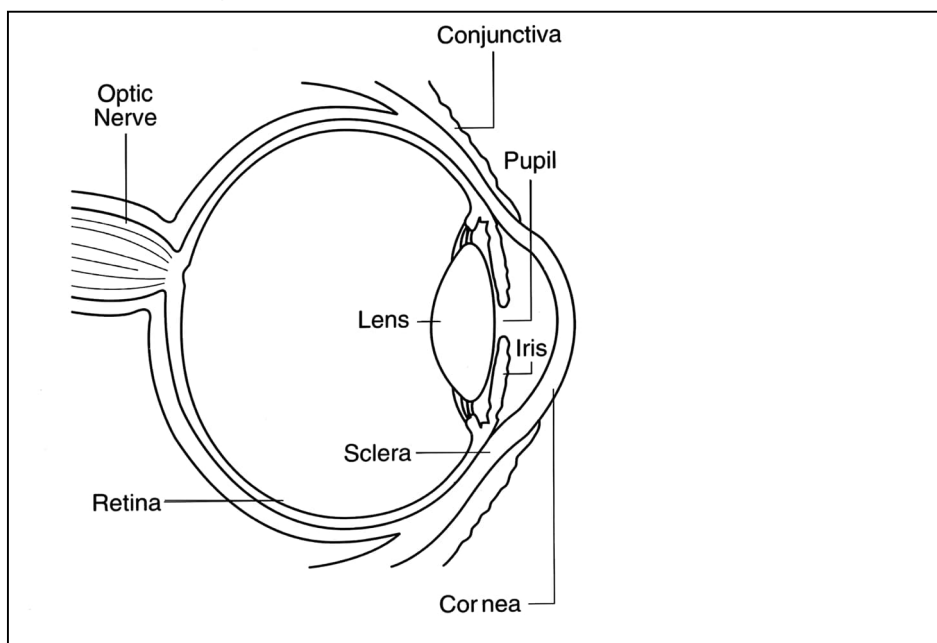
INTRODUCTION

This booklet will give you information about corneal transplantation (corneal grafting) and help you make a decision about surgery.

Please ask if there are any issues that concern you or if you feel anything needs further explanation.

THE CORNEA AND CORNEAL TRANSPLANTATION

The cornea is the clear window at the front of the eye (see diagram). The cornea is in front of the coloured part of the eye (the iris) and the pupil. It helps to focus light inside the eye to give a sharp picture of the outside world.



The cornea is made up of several layers.

The outer-most surface is called the epithelium. This is similar to the surface of your skin, but clear, and is replaced regularly as older cells are shed. A healthy epithelium is important to protect the eye against infection, and a smooth surface keeps the eye comfortable and the vision clear. A cornea that is swollen can develop blisters in this layer that can make the eye sore and put the eye at risk of infection and scarring.

The corneal stroma is the tough strong clear body of the cornea. The fibres are very neatly arranged in order to be clear. This layer can become opaque, white or cloudy in conditions that cause scarring such as infections or inflammation. Swelling of the cornea can cause inflammation that can lead to scarring, but this is usually only the case if it is swollen for a long time.

The corneal endothelium is a special layer of cells lining the inside of the cornea. You are born with these cells and they are gradually lost over a life-time. They do not regenerate well, but enlarge and spread out to maintain coverage of the inside of the cornea. These cells control how much of the fluid inside the eye soaks into the corneal stroma, and then actively pump it back out keeping the cornea clear and thin.

Most people have plenty of endothelial cells to keep their cornea clear throughout their lifetime and beyond. In some people these cells are lost quicker. The most common cause for this is a condition called Fuch's Dystrophy, which sometimes runs in the family. It can also be caused by other problems in the eye, and can sometimes happen after difficult or multiple eye operations, which is referred to as bullous keratopathy.

Corneal transplantation: Endothelial Keratoplasty (EK)

This is a partial thickness corneal transplant to replace the inside layer of your cornea only. This procedure is appropriate for diseases that involve the corneal endothelium such as Fuch's corneal dystrophy, or bullous keratopathy, where the rest of the cornea is healthy. The tissue for transplant comes from someone who has died and donated their cornea.

First, the tissue to be transplanted is prepared by the surgeon. Only the thin inner-most layer is needed, so this is cut away from the rest of the donor cornea by a special blade ('DSAEK'), or peeled away from the rest of the cornea on its very thin basement layer, called Descemet's membrane, ('DMEK'), then put into an instrument ready to insert it into your eye 'rolled up'.

Your eye is prepared for the graft by peeling away the thin inside layer of your cornea that is no longer working well (your endothelial cells on their Descemet's membrane). The graft is inserted into your eye through a small opening made at the edge of your cornea, and is either pulled into your eye (DSAEK) or injected (DMEK). Air is then used to open it up and push it against the inside of your cornea.

Because most of the cornea is left untouched, and sutures are not required to hold the graft in place, the complications of full-thickness transplantation that used to be used in this situation are mostly avoided. The operation can be performed safely under local anaesthetic. There is not a large wound to heal so the eye is not left weakened, and the shape of the cornea is largely unchanged so high astigmatism that can spoil the clear focusing of the eye is not a concern. A more rapid visual recovery should be expected than with full thickness transplantation, with improvement over around three months rather than up to 2 years.

Cataract Surgery and the Cornea

Cataract is a natural clouding of the lens in your eye that is common as you get older. Even routine uncomplicated cataract surgery will cause some loss of the

endothelial cells of your cornea, however usually this is not a problem and plenty of healthy cells remain.

If you have a condition such as Fuch's dystrophy then the stress to your endothelium from cataract surgery may tip the balance between your cells being able to keep your cornea thin and clear or not. This may lead to clouding or misting of the vision after surgery that doesn't clear away. You will then need a corneal transplant to replace your endothelium to clear your vision (a DSAEK or DMEK).

Sometimes, if your cornea is already showing signs that the endothelial cells are not working so well anymore, the doctor will recommend that you have cataract surgery and an endothelial transplant at the same time. This can be in one longer surgery or spaced apart by several weeks. The cataract is removed before the graft is performed to avoid any trauma to the newly transplanted endothelial cells so that your cornea may stay clearer for longer after surgery.

Anaesthesia

Endothelial corneal transplantation can be performed under local anaesthesia (awake) or general anaesthesia (asleep). Most patients have the operation under local anaesthesia and cope extremely well. The choice is based on the anticipated length and difficulty of the operation, your suitability for different sorts of anaesthesia, your own preferences and your surgeon's advice. Corneal transplantation can be a long operation, particularly if combined with other surgery such as cataract surgery and could take more than 1 hour.

Under local anaesthetic, the eye is anaesthetised by injection into the soft fatty tissue around the eyeball (not into the eye itself), and requires stillness and co-operation from you during the operation.

You will usually be able to go home on the day of your operation, but you will be asked to return for an eye check on the following day.

CONSENTING TO YOUR OPERATION

If you have decided that you wish to go ahead with surgery you will be asked to sign a consent form. You should sign the form only if you are satisfied with the explanations about the operation and you understand the expected benefits and risks.

In almost all circumstances, a diseased or damaged cornea only needs surgery if it is significantly affecting your quality of life and you understand the risks and want to have the operation. If you are suitable for surgery, the decision to go ahead is yours.

Benefits

Endothelial corneal transplantation (also known as corneal grafting) is performed to clear the corneal swelling (oedema) and improve the eyesight. Occasionally it is done in an eye that will never see well again to treat painful swelling of the cornea (bullous keratopathy).

RISKS AND SIDE-EFFECTS

As with every operation, corneal surgery has risks and success cannot be guaranteed.

Your corneal transplant may not last forever. Either the graft can fail gradually (usually after five or more years) because the transplanted endothelial cells are lost naturally over time, or your body rejects it. Failed graft tissue can be replaced with another operation in the future if needed.

Complications during the operation

Severe bleeding inside the eye may result in complete and permanent loss of sight. Fortunately, this is very rare.

Occasionally the donor material can rip or tear when it is being prepared or it is not suitable to be used. In this case the surgery cannot go ahead and you will be asked to come back another day.

Other tissues in the eye can be damaged during the surgery.

Other procedures done at the same time as the corneal transplant may have their own particular complications. For example, during a corneal graft combined with cataract surgery, some of the vitreous (a jelly like substance filling the back 2/3 of the eye) may move forward into the area of the operation and have to be removed. Rarely, part of a cataract or a lens implant may drop further inside the eye and may need to be removed at a second operation.

Complications occurring after the operation

Inflammation

Every eye operation causes some inflammation as part of the body's healing response. This is usually mild and settles after a few weeks, but if severe can lead to rejection of the graft. You will be given steroid eye drops to settle the inflammation. These will need to be used every two hours for the first week or two, then are reduced to 4 times a day for about 4-6 months before the frequency can be reduced further. Often these drops are taken once a day in the long-term. These drops are vitally important to prevent graft rejection and must be used every day. Your doctor will tell you how often to use the drops at each clinic visit.

Graft failure or rejection

A corneal transplant is recognised by your immune system as material belonging to someone else. Therefore, your immune system may try to reject it. A rejected corneal transplant becomes cloudy and thickened, making your vision cloudy.

If a rejection episode is caught early and treated, usually with very frequent steroid eye drops, the graft may be saved. This may reduce the lifespan of the graft in the longer term because some endothelial cells are damaged. Sometimes intravenous steroids or steroid tablets are required.

If you do not use your steroid eye drops regularly you will be at risk of rejecting the transplant. They must not be stopped unless on the advice of your eye doctor, and will be re-prescribed long-term by your GP.

Steroid eye-drops are fairly safe, but in some cases may cause a pressure-rise in the eye, which can lead to glaucoma. Your pressure will be monitored at your follow-up appointments. You may be at a very slightly increased risk of eye infections such as corneal ulcers, but this is rare.

Some patients are at high risk of rejection, and need stronger drugs usually given as tablets. Anti-rejection drugs taken by mouth are effective in many but not all cases. They also have various side-effects, depending on which drug is used. Some of the side-effects of strong anti-rejection drugs can be serious. Your specialist will discuss this if relevant for you.

Infection

Surgery inside the eye exposes it to potential infection. Fortunately, infection inside the eye is rare but, if it does happen, you may lose the sight in the eye. The risk of this is about one in a thousand.

Glaucoma

The pressure in the eye may increase temporarily after surgery. The pressure may also rise in the months or years after the operation. If it rises too high for too long and damages optic nerve, it is called glaucoma, which can damage your vision. The pressure can usually be treated with extra eye drops, or occasionally with tablets or surgery.

Further surgery - rebubbling

Further surgery may be needed to reposition the graft inside your eye (in up to 10%).

Air is used to open the graft and push it against the inside of your cornea until it starts to work and stick. Sometimes the graft does not stick completely, or detaches, and you may need more air injected into your eye to push it back against your cornea.

To help the graft stick you will be asked to lie flat with your eye looking at the ceiling after the operation. This makes sure the air that floats is up against the inside of your cornea, like the bubble in a spirit level.

When you arrive home after the surgery you should position yourself with your eye looking at the ceiling. You can get up for comfort breaks for 10 minutes each hour and stretch your legs. Try and sleep on your back for the first night after surgery. You are usually asked to posture until the morning after the surgery. You should then avoid bending your head forwards until the air bubble has absorbed and disappeared, usually after 3 days.

Much less commonly further surgery is needed for leaks of the wound, to treat glaucoma, or to replace a rejected or otherwise unsatisfactory transplant. Patients who have further surgery may also have complications arising from the additional surgery or treatments required.

Any surgery that is performed directly on the eye after corneal transplantation can cause an episode of graft rejection.

Macular oedema and retinal problems

Sometimes there can be swelling called oedema at the back of the eye after surgery. This is usually temporary and can be treated. Detachment of the retina is rare, but requires an operation to fix it.

Complete loss of eyesight or loss of the eye

Any operation that involves surgery inside the eye carries a risk of complete loss of eyesight or loss of the operated eye. The risk is very small.

Sympathetic ophthalmitis

Sympathetic ophthalmitis is an eye condition where surgery inside one eye can lead to inflammation in the other eye. Fortunately, it is extremely rare. If it occurs it can be treated, but strong drugs (with side-effects) may be required.

Infections from the graft

Because a transplant is from another person the graft may carry infection from one person to another. Potential donors are carefully selected and screened for transmittable diseases such as HIV and hepatitis, and the tissue screened for bacterial and fungal infections. However, it is not possible to rule out absolutely all

infections. Creutzfeldt-Jakob Disease (CJD) is an extremely rare potential risk of transplantation.

Visual results

The majority of patients experience an improvement in vision. However, very few patients have absolutely perfect eyesight after corneal transplantation.

Co-existing eye conditions

Other co-existing eye conditions, besides the corneal condition being treated (for example previous eye injury, previous eye surgery, glaucoma or macular degeneration and in diabetics) may either increase the risk of complications or limit the eyesight after surgery. Further treatment may be needed for some conditions.

THE DAY OF YOUR OPERATION

If you cannot keep the date made, or if you have any unexpected eye or general health problems in the week before your operation, please inform us ***immediately***. **DO NOT WAIT UNTIL THE DAY OF YOUR OPERATION**, because it may have to be cancelled due to the problem, which may risk wasting the precious donated graft tissue. With enough notice someone else can benefit from the tissue, and we can rearrange your surgery for another day.

Please only drink water and do not eat for 6 hours before if you are having a general anaesthetic. The nurses will have discussed this with you at your pre-assessment appointment. Please check beforehand if you are unsure.

AFTER THE OPERATION

You will usually have a dressing over the eye for the first night which you can remove the next morning to start your eye drops. The operated eye may ache, but the pain should not be severe and should settle with paracetamol. If pain is severe you must contact us on the emergency number. The eye may feel gritty and watery for a week or so after the operation.

You will be seen the following day to check your eye and the graft. Most patients are then asked to return after one week.

You will have steroid eye drops (dexamethasone) to use every 2 hours during the day starting the morning after surgery. These are to settle the inflammation and prevent rejection and must not be stopped. The frequency will be reduced over the coming months but you will be on them long-term. You will be told how often to use them by your eye doctor at your appointments.

You will also have antibiotic eye drops (chloramphenicol) to use four times a day for 1-2 weeks. You may also use preservative free lubricants (artificial tears) as often as required.

You will be asked to wear a clear plastic shield over the eye to protect it at night for a week or so until the eye feel comfortable. Wear sunglasses or your usual glasses in the day.

The eyesight will be very blurred on day 1. This is normal because of the air bubble in your eye. It should steadily improve over the coming weeks as the graft starts to work and clear the swelling of your cornea.

You will be advised when you can see your optician to update your glasses after the surgery, usually after about 3 months.

In the first month, follow-up visits are usually every one to two weeks. After the first month, visits are usually at intervals of one to four months in the first year.

Important advice

Eye-drops

Make sure you know which eye drops you should be taking. It is a good idea to bring the drops with you to every appointment so the doctor can discuss the treatment with you.

If you run out of eye drops, do not wait until your next appointment. Please obtain a repeat prescription from your GP.

New eye problems

Take notice of new symptoms, e.g. increased grittiness, discomfort, increase in blur or mistiness of vision, light sensitivity. **Any new problem, even if mild, needs to be checked. Please call us and do not wait for your next routine appointment. Ideally, you should make arrangements for your eye to be checked within 24 to 48 hours at the eye department.**

Hygiene

Your eye will be vulnerable to infection until it has healed fully so please take every precaution to keep the eye clean. Do not do any activities that may introduce dirt or water into the eye. Wash your hands before touching the eye. Do not swim until you have been cleared to do so. Keep the nozzles of your eye-drop bottles clean by avoiding contact with the eye or fingers. Do not rub your eye.

Driving and safety

It will take some time to get used to your new eyesight, so take care to avoid accidental injuries.

Avoid driving for at least 48 hours. If you still meet the legal requirements for driving using your other eye, which includes being able to read a number plate at 20 metres, you can drive after 48 hours if you feel safe to do so. However, most people sensibly wait a few weeks until the operated eye is clearing and they are used to their change in vision. Do not drive if you have double vision or if the eyes are uncomfortable or watering.

Remember that you are required to inform the DVLA if you have any medical condition (including eye problems) that may affect your driving.

Please do not take part in any activities that carry an extra risk of eye injury for 6 weeks. Avoid working with any chemicals that may irritate the eye. As always, wear eye protection for activities such as DIY or gardening.

Please do NOT do the following:

- Rub your eye.
- Lift heavy objects (or do anything that requires you to strain) for 6 weeks.
- Bend forward without taking care to protect your eye from injury (for example when watering or cutting plants)
- Immerse your head completely underwater.
- Get soap in your eye whilst hair washing.
- Participate in strenuous activities such as manual work, lifting heavy weights, gardening, golf or swimming for 6 weeks or until we have confirmed that it is safe to continue.
- You cannot fly until the air bubble is gone (usually within the first week, but you will need to be available to attend regular follow-up appointments after the surgery).

If you are uncertain whether you can continue one of your normal activities, please ask us.

You can do the following:

- Continue with normal daily activities as long as they do not involve strenuous physical exertion or threats such as infection or injury to the eye.
- Wash your hair with head tilted backwards for the first 6 weeks.

Types of Endothelial Graft

DSAEK: Descemet's Stripping Automated Endothelial Keratoplasty

The donor corneal tissue is cut with a machine leaving a thin piece of tissue for transplant including a layer of stroma as well as the endothelial cells. It is a bit thicker than DMEK tissue. It opens in the eye more easily and is less likely to detach requiring another air bubble to be injected into the eye to help it stick, but may take a little longer for the vision to clear.

DMEK: Descemet's Membrane Endothelial Keratoplasty

An extremely thin layer of tissue is peeled away from inside of the donor tissue rather than it being cut, so only the endothelial cells and their basement membrane they lie on (the Descemet's layer) is transplanted. There is no extra layer of stroma and the thinner tissue clears quicker, which may give a faster improvement in vision, and there is evidence from research that the risk of rejection may be less. However, the tissue can be trickier to handle during the surgery, and tends to want to peel away more, making the need for another injection of air into the eye after the surgery more common.

The decision about which type of surgery is most suitable and appropriate for you will be decided by your surgeon based on your eye. If you have any concerns or preference please discuss this with your surgeon in clinic before the day of the operation.

GLOSSARY

Astigmatism

Astigmatism is where the eye surface is more curved in one direction than another. Not all parts of an object are in focus at the same time, so objects may appear blurred. Most, if not all people have astigmatism. However, it is often so mild that it is not noticed. In severe astigmatism, glasses or contact lenses are needed all or most of the time.

Fuch's Dystrophy

Fuch's dystrophy is a slowly progressing disease that usually affects both eyes and is slightly more common in women than in men. Although doctors can often see early signs of Fuch's dystrophy in people in their 30s and 40s, the disease rarely affects vision until a person reaches their 50s or 60s. Fuch's dystrophy occurs when endothelial cells gradually deteriorate without any apparent cause (such as injury or inflammation). Eventually, corneal oedema develops.

USEFUL PHONE NUMBERS

Hospital switchboard	24 hours	01803 614567
Ask for On-Call Eye Dr		
Eye Casualty Nurse	(Mon to Fri 08.30 – 17.00)	01803 655088
Option 5		

For further assistance or to receive this information in a different format, please contact the department which created this leaflet.