

PATIENT INFORMATION

Corneal Diseases and Corneal Transplantation

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IMPORTANT

IF YOU HAVE ANY UNEXPECTED EYE OR GENERAL HEALTH PROBLEMS in the week before your operation, (e.g. sticky eye) please **INFORM US IMMEDIATELY**.

DO NOT WAIT UNTIL THE DAY OF YOUR OPERATION to tell us about a problem, because it may have to be cancelled due to the problem.

IF YOU GIVE US SUFFICIENT NOTICE OF A PROBLEM OR A LIKELY CANCELLATION, IT MAY BE POSSIBLE TO SAVE THE PRECIOUS DONOR MATERIAL FOR USE ON SOMEONE ELSE.

If your operation is cancelled on the day of surgery, the precious donor material may be wasted.

Introduction

This booklet is to give you information about corneal diseases and to help you make a decision about surgery, if needed.

It is written in chapters so you can easily find information before each visit telling you what to bring with you and what will happen during the visit.

Patients with many different eye conditions have corneal transplantation, so not every disease or eye condition or treatment mentioned in this booklet is relevant to you. Your specialist will have told you which eye conditions you have, so please read the sections that are relevant to you.

Some of the words used may seem confusing and scientific. At the end of this booklet you will find a list of explanations of commonly used medical words and phrases.

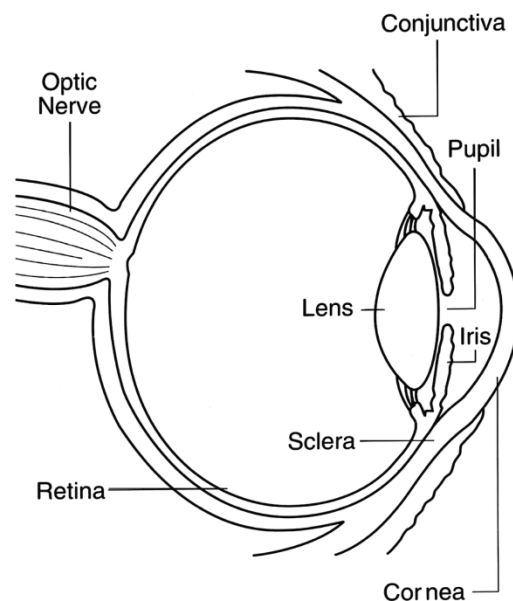
Ask your specialist if there are any issues that concern them about your case in particular and tell your specialist which issue(s) concern you the most.

If you think that there is anything that this booklet does not explain well enough, please tell us.

1. 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.

Diseases of the cornea (of which there are many) tend to cause the cornea to become opaque or thin or an uneven shape. These problems usually cause misty or blurry eyesight, or glare from bright lights. If the surface of the cornea is uneven or ulcerated it can cause pain, watering or redness of the eye.



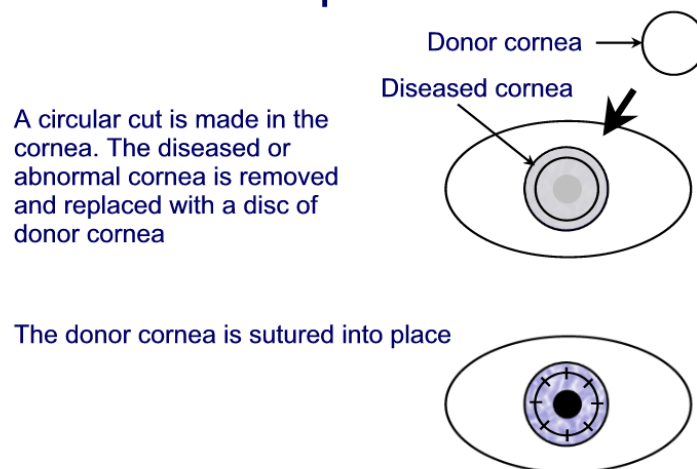
Much of this information concerns the standard technique of corneal transplantation which is called penetrating keratoplasty. There is a new alternative technique for some diseases called lamellar keratoplasty.

Information on this technique can be found at the end of the booklet in 'Commonly used words and phrases'. However it is important to read the whole booklet because many of the issues discussed are relevant to more than one technique of corneal transplantation.

Corneal transplantation techniques

Penetrating keratoplasty: A circular cutter called a trephine is used to cut out the centre of the diseased cornea, leaving a circular opening in the front of the eye. A circular 'button' of similar size is cut from the donor cornea. The donor button is then sewn into your eye with fine sutures (stitches) that are usually made of non-absorbable nylon and are thinner than human hair. The sutures are usually left in place for at least a year and sometimes for several years

Corneal transplantation



Corneal transplantation can be performed under local anaesthesia (awake) or general anaesthesia (asleep). 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 extraction and could easily take more than 1 hour.

Under local anaesthetic, the anaesthetic is put into the soft fatty tissue around the eyeball. It not only anaesthetises the eye but also reduces what you can see and stops the eye moving around. However it still requires absolute stillness and co-operation from you for the whole of the operation.

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

2. 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 anticipated benefits and risks.

In almost all circumstances, a diseased or damaged cornea only needs to be replaced by transplantation if it is causing significant impairment of your quality of life and you understand the risks and want to have the operation. If you are suitable for surgery, the decision as to whether to go ahead is yours.

Spectacles or contact lenses are alternatives that may help some but not all optical problems and may postpone the need for surgery in some cases. For some diseases there are some newer surgical alternatives to traditional corneal transplantation that have not been as thoroughly tested and are not used routinely.

Benefits

Corneal transplantation (also known as corneal grafting) is done for different reasons in different patients.

In the majority of cases the aim is to improve the eyesight. Corneal transplantation is also carried out occasionally to treat painful conditions of the cornea and rarely as an emergency to treat conditions that cause ulceration or perforation of the eye. In these emergency situations the aim may not be to improve the sight but simply to save the eye.

RISKS and side-effects

- As with every operation, corneal surgery has risks.
- Success cannot be guaranteed.

In general, corneal transplants do not last forever. Either the graft fails gradually over years or your body rejects it. In some situations the original disease that caused the need for transplantation may re-occur within the transplant. The graft can be damaged by injuries or infections and may need to be replaced.

Slow recovery time

Although patients with severe corneal diseases often notice an immediate improvement, the eyesight can remain very blurry for many months until spectacles or contact lenses can be fitted. Allow at least a year for the eye to recover fully or longer if further treatment is needed.

Spectacles and contact lenses

A corneal transplant operation changes the focusing power of the eye. After the surgery your eye will be hyperopic (long-sighted) or myopic (short-sighted) and is likely to have astigmatism (an uneven shape). Therefore spectacles and/or contact lenses are needed usually to obtain the best possible vision. Even if you have never worn glasses before the operation they may help you afterwards. It is not possible before surgery to predict accurately the spectacle requirement that will be needed after the operation. Occasionally, further surgery may be needed to make the eye focus correctly.

Complications during the operation

- Severe bleeding inside the eye may result in complete and permanent loss of sight. Fortunately this is rare, occurring in approximately 1 in 200 operations.
- Other procedures done at the same time as the corneal transplant may have their own particular complications. For example during corneal transplantation 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.
- If lens implants are involved there may be difficulties inserting or removing them.

Complications occurring after the operation

Leaks

After the operation there may be a leak of fluid out of the eye. Most leaks are small and often stop spontaneously, but occasionally you may need to return to theatre to have the leaks closed.

Inflammation

Every eye that has surgery will have some inflammation in it for several weeks after the operation. This is usually mild, but if severe can lead to rejection of the graft. You will be given drops to settle the inflammation, which will need to be continued for at least 6 months, and often for several years or longer. See the section on Graft Rejection.

Infection

Surgery inside the eye exposes it to potential infection. Fortunately, infection inside the eye is rare (occurring in approximately 1 in 100 operations). But if it does happen, you may lose the sight in the eye. Superficial infections are more common, but less serious.

Dry eye

After corneal transplantation the eye surface is often bumpy, especially in the first year. The tear film, which keeps the eye moist, tends to dry out on the surface of the bumps. If the drying is severe, the eye can be damaged or prone to infection. Lubricant eye drops are sometimes needed, often long-term.

Suture loosening

If the sutures (stitches) remain tight, they stay buried just beneath the eye surface and it is not possible to feel them. Sutures can remain in the eye for many years without causing problems. With time they may become loose or break. Loose or broken sutures need to be removed because they cause a gritty sensation in the eye and may become infected.

Optically imperfect result

The instruments used to cut the cornea are made to very high standards of precision. However, the cornea that they are cutting is soft and moves around slightly as it is being cut. This means that the hole cut in your cornea is not perfectly round and the donor cornea does not fit the hole exactly. As a result the final shape of the graft is not perfect.

The effects of an optically imperfect cornea include glare (poor vision in bright light, haloes or rings around lights), blurry or misty vision or a 'ghost-effect' or shadow around objects. To correct these problems it may be necessary to wear glasses or a contact lens, or to have further surgery or laser treatment.

Not all problems can be corrected but fortunately many of the above-mentioned problems are mild.

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. It does not fall out of the eye.

For almost all corneal transplants, steroid eye-drops are usually given to try to reduce the chance of rejection, usually for a minimum of 6 months after transplantation. Steroid eye-drops are also used to treat episodes of graft rejection. Patients at high risk of graft rejection may need to use eye drops permanently.

Steroid eye-drops are fairly safe, but in some cases may cause a pressure-rise in the eye. The long-term use of steroid eye-drops can also contribute to cataract formation in the eye.

In patients at high risk of rejection, stronger drugs may be needed and are 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. Please discuss this issue with your specialist if you have any concerns.

Corneal ulceration

Conditions that cause the eye surface to be unhealthy, such as dry eye or conjunctivitis can lead to severe infection and ulceration of the graft. This may require treatment with antibiotics and can lead to scarring and opacity of the graft or, rarely, perforation of the eye. If the ulceration is severe, the graft may need to be replaced, sometimes as an emergency.

Recurrence of the original disease in the graft

Some eye conditions, for example some sorts of corneal dystrophy and herpes simplex infections, can reoccur in the graft. The effects depend on the original disease. For example, corneal dystrophies tend to cause the graft to become opaque. Herpes virus infections can cause ulceration and scarring of the graft in the same way that they can cause ulceration and scarring of your original cornea.

Glaucoma

In the months or years after the operation the pressure may rise inside the eye. If it rises too high and damages the sight, it is called glaucoma. The pressure can usually be treated with extra eye drops, or occasionally with tablets or surgery.

Injuries and weakness of the surgical wound

In the first few months after the operation the graft is held in place only by the sutures. If the eye were to receive a direct blow, the wound could split open. Following a corneal transplant the eye is unlikely ever to be as strong as an un-operated eye. Care must be taken to avoid injuries. Safety goggles should be worn for activities where there is an additional risk to the eye. In practice, taking extra care is not a major problem for most people. However, individuals who play contact sports or do other activities where there is a risk of injury should consider whether the potential risks of continuing with such activities outweigh the benefits.

The eye heals slowly and the strength of the eye can be poor after the sutures are removed. The surgical wound may open up even after a year or more following the surgery, in which case the sutures may need to be replaced.

Further surgery

Further surgery may be needed for leaks or weaknesses of the wound, to remove debris, to reposition the eye contents, to remove or replace lens implants (if used), to treat glaucoma or cataract, to improve the focusing of the eye, 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.

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 usually very small. Corneal grafts performed as emergencies, (for example, in severe infections or cases of severe ulceration or injury) are at higher risk.

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: CJD

Because a transplant is from another person the graft may carry infection from one person to another. Potential donors are screened for transmittable diseases such as HIV and hepatitis. However, it is not possible to rule out absolutely all infections. Creutzfeldt-Jakob Disease (CJD) is an extremely rare potential risk of transplantation.

Factors which influence the likelihood of a good result

Risk-factors for graft rejection or failure

Risk-factors for rejection include:

- Previous eye surgery
- Previous eye injury
- Failure of a previous corneal graft
- Emergency corneal transplantation
- Eye inflammation or infection
- Position of the graft near the edge of the cornea
- Corneal anaesthesia
- Corneal vascularisation
- Co-existing eye disease such as glaucoma dry eye, allergic conjunctivitis, reduced corneal sensation such as herpes simplex or zoster

The type of corneal disease for which transplantation is performed also has an influence on the outcome. Of the common reasons for transplantation, the best results are for keratoconus where up to 9 out of 10 grafts would be expected to last 10 years. The worst results are obtained when a graft is performed for infection, when only 2 out of 10 grafts would be expected to last 10 years.

Re-do corneal transplantation means replacing a previous corneal graft. The old graft is removed and a new graft sutured in place. The procedure is often successful initially, but the risk of graft failure becomes steadily worse with each new graft. Eventually, anti-rejection drugs may need to be used continuously, and a limit may be reached where it is decided that further transplantation is unlikely to be worthwhile. By the fifth time that a graft is performed, the survival rate for the graft at 1 year is less than 50%. (In other words 1 out of every 2 grafts would be expected to fail within the first year). At 5 years the survival rate for the 5th graft is less than 20%. (4 out of every 5 grafts would be expected to fail within 5 years).

Co-existing eye conditions

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

Visual results

The majority of patients experience an improvement in vision. However, very few patients have absolutely perfect eyesight after corneal transplantation. Because of the various problems outlined above, only about one third of all transplants result in a visual acuity of 6/12 or better (eyesight close to the driving standard), according to UK transplant data.

3. Your Pre-Assessment Appointment

Before your surgery is performed you will be asked to visit the pre-assessment clinic.

Please follow the appointment letter instructions carefully.

If you are unable to keep the date you have arranged with us, please let us know with as much notice as possible so another patient can use the appointment and yours can be rearranged. Our phone number can be found at the back of this booklet.

Your appointment may last up to 2 hours. During this time you will see a number of people including an ophthalmic nurse.

You will be asked questions about your eyesight, medical history and the drugs you are taking. We also need to know if you have any drug allergies. You will be asked about your personal circumstances to ensure that it is safe for you to have day case surgery, and ensure that you or somebody else will be able to put your drops in.

Please bring with you the following:

- The drugs which you currently take
- The completed medical questionnaire inserted in the centre of this booklet
- An up-to date sight test from your optician
- Your most recent spectacles for distance and reading (or bifocals/varifocals)
- This booklet

We may measure your weight and blood pressure and may also check your eyes.

Some patients need to take antibiotics as eye drops or ointment, before the operation. These will be given to you at this visit. The drops should be stored in the fridge until needed and any other treatment kept safe until the time of your operation.

We cannot give a guarantee that a particular surgeon will perform the operation. The surgeon will, however, have appropriate experience. Sometimes your surgeon will be assisted by a trainee who will do part or all of your operation under supervision.

You may, of course, ask questions during any stage of this visit. Please make sure that you have checked the following with us:

- Is any special treatment needed in the week before the operation?
- Will you be operated on as a day-case or will you be staying in hospital overnight?
- Do you have all the information that you need as regards admission to the hospital (if needed)?
- Do you have all the information that you need as regards the anaesthetic that will be used (e.g. when not to eat or drink)?

4. The Day of Your Operation

Date agreed.....

If you cannot keep the date made please phone us immediately.

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.

IF YOU GIVE US SUFFICIENT NOTICE OF A PROBLEM OR A LIKELY CANCELLATION, IT MAY BE POSSIBLE TO SAVE THE PRECIOUS DONOR MATERIAL FOR USE ON SOMEONE ELSE.

IF YOUR OPERATION IS CANCELLED ON THE DAY OF SURGERY, THE PRECIOUS DONOR MATERIAL MAY BE WASTED.

If we are given sufficient notice of a problem or a likely cancellation, it may be possible to give the operating time to someone else.

We will have given you information about the date of your operation and instructions about where to go and at what time. **Please read the appointment information carefully.** You must ensure you have transport arranged to bring you to the hospital and take you home again. The hospital car service is available if you have a specific medical need

If you are having day-case surgery you will be with us for part of the day only. When you arrive we will be able to advise any companion who has accompanied you of the time you are likely to be ready to go home. If you have to stay overnight, you will go to a bed on one of the wards after your operation.

- Please wear comfortable clean shoes and clothes that button down the front.
- You may eat and drink on this day unless you have been told not to.
- Take your normal tablets, inhalers and eye drops unless you have been told not to.

The nurse may put eye drops into your eye to prepare you for surgery.

The anaesthetist or surgeon will ask you some questions about your health and discuss the anaesthetic procedure.

We will then take you through to the anaesthetic room in the operating theatre suite. Here you will meet the theatre staff.

5. After the operation

You will usually be asked to wear an eye-patch overnight. The operated eye may ache overnight, but this is replaced by a mild gritty sensation that can last for days or weeks afterwards.

If you are not admitted to the hospital you should be prepared to return the next day to have your eye checked if necessary. When the eye-patch is taken off the eyesight is usually very blurry. You will usually be given antibiotic eye-drops, such as chloramphenicol and a preservative-free steroid eye-drop such as prednisolone or dexamethasone. In the first week the antibiotic eye-drop is usually used four times per day and the steroid drop is used hourly (whilst awake). Make sure you know which drop is which.

Following the first post-operative visit most patients are asked to return after 1 week. After the first 1 to 2 weeks the antibiotic drops are usually stopped, but the steroid eye-drops are continued at a lower rate (usually 4 times per day after the first month).

The eyesight may remain poor for several months. It may not be possible to improve the sight in the operated eye with spectacles or contact lenses for many months. However, you can still use your normal spectacles for the other eye. These will not harm the operated eye.

In the first month, follow-up visits are usually every 1 to 2 weeks. After the first month, visits are usually at intervals of 1 to 4 months in the first year.

Eye drops are needed for at least 6 months and often long-term.

Allow a year or more for the eye to recover fully. The sutures are buried and cannot be felt afterwards unless they become loose. Occasionally, sutures need removing or adjusting within the first year, or new sutures may need to be added. After all the sutures are removed, the shape of the eye may change and a new spectacle prescription or contact lenses or refractive surgery may be needed. Follow-up visits are eventually yearly if the situation is stable. If there are no problems after 10 years, then patients at low risk of graft failure may be discharged, but they should still see their own optician yearly thereafter.

Important advice

Eye-drops

Make sure you know which eye drops you should be taking. Either remember the names or, if you cannot remember the names, write them down or bring the drops with you to every appointment. This is 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, vague discomfort, increase in blur or mistiness of vision, light sensitivity. **Any new problem, even if mild, needs to be checked. 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

Remember that your eye surface is vulnerable to infection until it has healed fully. This means that you must take every precaution to keep the eye clean. Grittiness or discomfort in bright light suggests that the eye has not fully healed. Do not do any activities that may introduce dirt or dirty 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.

Driving and safety

It will take some time to get used to your new eyesight, so take care to avoid accidental injuries. This advice applies particularly to driving or doing any other dangerous activity such as operating machinery.

Avoid driving for at least 48 hours. If you still meet the legal requirements for driving, which include the eyesight requirements for driving, and if your insurers are informed and are providing insurance cover, you can drive after 48 hours. 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.

Work

It is difficult to say exactly how much time you will need to take off work. This depends on individual eyes and individual jobs. Allow at least one week if you have a desk job. If you do a job that involves working in a dry, dusty or dirty environment you may need to take longer off work. If you do a job where there is a safety risk to yourself or others please discuss with your employer and with your eye doctor. With some types of corneal transplant you should avoid heavy manual work for 6 weeks. Please discuss with your employer and eye doctor.

Other activities

Please do not rub your eye or take part in any activities that carry an extra risk of eye injury (such as contact sports) for a month. Wear eye protection for activities such as grinding, hammering or chiselling. Avoid working with any chemicals that may irritate the eye until the eye surface has healed fully.

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

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.

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.
- Wear your eye-shield at night for 6 weeks and also when doing any activities with a risk of direct injury to the eye.
- Wear whichever glasses are most comfortable.

Holidays

Remember to inform your insurers about any recent eye treatment and remember that insurance policies may not cover pre-existing eye problems or recent surgery.

Please consider how you would arrange to have your eye checked urgently by an eye specialist if needed whilst on holiday.

6. Commonly used words and phrases

Age-related macular degeneration

The macula is the central part of the retina and is responsible for sharp vision. The macula tends to degenerate with age; so many elderly patients who need corneal transplantation could have macular degeneration as well. Therefore macular degeneration may limit the benefits of corneal transplantation.

Aphakia

The absence of a lens in the eye

Astigmatism

Astigmatism is usually 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 blurry. Most if not all people have astigmatism. However it is often so mild that it is not noticed. In severe astigmatism an optical correction (glasses or contact lenses) is needed all or most of the time.

Bullous keratopathy

The term used for severe corneal oedema where tiny fluid blisters (bullae) form on the surface of the cornea. These can break and cause pain.

CJD

Creutzfeldt-Jakob disease (CJD) is a rare neurological illness that is incurable and fatal. Most people had not heard of CJD before 1996, when it became the subject of media attention following discovery of a new form, now called variant CJD (vCJD). This is believed to come from meat from cattle infected with BSE (bovine spongiform encephalopathy / "mad cow disease")

Corneal anaesthesia (loss of sensation)

A normal cornea is usually very sensitive to even minor irritation. In some conditions e.g. herpetic eye disease) the normal corneal sensation is lost. This means that the eye is less able to defend itself from injuries and infections. Corneal transplantation under these circumstances is more prone to failure because of the increased risk of infections and corneal ulcers.

Corneal dystrophy

Corneal dystrophies are a rare group of conditions that affect one or more layers of the cornea in both eyes. They can cause poor vision by distortion or opaqueness of the cornea, or sometimes discomfort due to tiny (often microscopic) abrasions on the eye surface. They may be present at birth or become apparent during adult life. One eye may be affected more than the other. They can be mild (never needing treatment) or severe. They can remain static or become slowly worse as the years go by. Corneal dystrophies include keratoconus and Fuch's dystrophy.

Corneal oedema

The cornea has a thin layer of cells on its inner surface called endothelial cells that pump water out of the cornea constantly to keep it thin and clear. These cells are vital. If they fail the cornea becomes thicker and more opaque (This condition is called corneal oedema). As a result the cornea is cloudy and the eyesight is poor. Corneal oedema can also be painful because the swollen surface of the cornea is bumpy and prone to abrasions.

The endothelial cells can be fewer in number in Fuchs dystrophy, and some are lost or damaged as a result of operations inside the eye such as cataract surgery. Corneal transplant rejection also destroys the endothelial cells on the transplant, so a rejected corneal transplant also becomes cloudy and thickened.

In the early stages of corneal oedema the vision is cloudy on waking but then clears during the day. In the advanced stages the vision is cloudy all the time and the eye can be painful. Lubricant drops or ointment may help the discomfort and may help the clarity of vision in some cases.

Sometimes, the use of concentrated saline or contact lenses or attempting to dry the cornea using a hairdryer may help the symptoms, although these treatments are more controversial, may be potentially dangerous and should only be used if recommended specifically by your eye doctor.

Corneal vascularisation (blood vessels)

A normal transparent cornea does not contain blood vessels. As a result of inflammation (for example from infections), new blood vessels may start to grow into the cornea. These blood vessels may help the body to reject a subsequent corneal graft.

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 and 60s. Fuch's dystrophy occurs when endothelial cells gradually deteriorate without any apparent reason, such as injury or inflammation. Eventually, corneal oedema develops.

Herpetic eye-disease

Herpes (varicella-) zoster and Herpes simplex are virus infections from childhood that can lie dormant in the body and subsequently cause recurrent inflammation in the eye. They can also cause loss of sensation in the cornea and ulceration of the cornea. All of these problems can result in damage to, or failure of a corneal graft. The treatment may include antibiotic ointment (acyclovir), artificial tears or other lubricants, steroid drops, acyclovir tablets or further surgery to protect the eye.

Hyperopia (long-sightedness)

In mild hyperopia, near objects are blurry and far objects are clear. In hyperopia either the eye is too short or the cornea is not curved enough. This means that rays of light are not focused on the retina, causing blurred vision. Young people with mild hyperopia can often manage without glasses because the young eye's focusing ability can overcome the problem. However, this becomes more difficult with age. In severe hyperopia both distant and near objects are blurred and an optical correction (glasses or contact lenses) is needed most or all of the time.

Intraocular lens

Most human eyes need a lens inside in order to focus correctly. In cataract surgery the normal human lens is removed and replaced with an intraocular lens implant.

Keratectomy

Removal of part of the cornea

Keratoconus

In keratoconus the middle of the cornea thins and gradually bulges outward, forming a cone shape and causing blurring of the vision. In the majority of cases the cause is unknown. In a minority of cases there is a family history of keratoconus. Eye rubbing may make keratoconus worse.

Keratoconus usually become apparent in the teenage years or as a young adult. In the majority of cases it becomes worse very slowly over many years and tends to stabilise to some extent in middle age.

Spectacles can correct the blur initially. As the years go by, the blur may become so great that only contact lenses will correct it. As the keratoconus becomes more severe, contact lenses may become more difficult to fit. In a minority of cases the cornea will eventually become scarred or the patient will not tolerate contact lenses. Surgery may then be needed.

Researchers are studying new alternatives to corneal transplantation, such as Intacs where small plastic ring segments are inserted into the cornea to improve the shape. However, the long-term outcomes of alternative treatments are not yet known. Alternative treatments may not be successful in some cases or they may provide only a temporary solution.

Keratoplasty

An operation to repair, reshape or restructure the cornea.

Keratotomy

An incision (cut) into the cornea

Lamellar keratoplasty

Posterior lamellar keratoplasty

In posterior lamellar keratoplasty (PLK) the innermost layer of the cornea, (the endothelium) is removed and replaced by donor tissue. This procedure is appropriate for diseases that involve only the corneal endothelium such as Fuch's corneal dystrophy as an alternative to penetrating keratoplasty.

A small cut is made in the eye and the new graft is rolled up and inserted in to the eye. The graft unrolls inside the eye and then an air bubble is injected behind it to push it against the back surface of your cornea. It sticks in position without stitches.

Because the corneal surface and main bulk of the cornea are preserved and no sutures are required, the complications of high and/or irregular astigmatism, insufficient wound healing and suture-related problems are mostly avoided.

The operative time is potentially reduced and a more rapid visual recovery should be expected.

A potential disadvantage of posterior lamellar keratoplasty is that the transplant may not adhere to the inside of your own cornea and there is a relatively high initial failure rate, compared to penetrating keratoplasty. However another air bubble may be injected to push the graft back into position.

There is also a risk of scarring between the graft and your own cornea that could affect the quality of vision.

LASIK, LASEK and PRK

LASIK (laser assisted in situ keratomileusis), LASEK (laser epithelial keratomileusis) and PRK (photorefractive keratectomy) are all refractive surgery procedures. They are usually used on clear corneas to improve the shape. In LASIK and LASEK a flap is created from the outer layer(s) of the cornea and then the underlying cornea is reshaped with a laser.

In PRK the outermost layer (epithelium) of the cornea is removed and the underlying cornea is reshaped with a laser. The epithelium then re-grows to cover the treated surface.

Myopia (short-sightedness)

In myopia, near objects are clear and far objects are blurred. In myopia either the eye is too long or the cornea is too curved. This means that rays of light are not focused on the retina, causing blurred vision. In mild myopia, objects in the distance may be slightly blurred. In moderate to severe myopia an optical correction (glasses or contact lenses) is needed for distance vision. However, individuals with myopia can often read clearly without glasses by holding the print up close. They can often do this even in old age.

Phototherapeutic keratectomy (PTK)

In PTK a laser is used to remove superficial tissue from the front of the cornea as an alternative to surgery. PTK is useful for treating some conditions (e.g. corneal dystrophies or superficial scarring) that only involve the outermost layers of the cornea.

Refraction

Refraction is the process where light rays change direction as they pass from one substance into another. It is also a term used to describe the way the eyes are tested for spectacles or contact lenses.

Refractive surgery

Refractive surgery means operating on the eye to reshape it in order to correct myopia, hyperopia, and/or astigmatism that can occur after corneal transplantation. Refractive treatments can include laser to the cornea (e.g. LASIK or LASEK), surgery to the cornea (keratotomy, keratoplasty) or intraocular lens implants. The type of refractive surgery needed depends on the type of refractive problem. Not all treatments are suitable for everyone.

Refractive surgery can usually be performed under local anaesthetic. Refractive surgery procedures are relatively safe when compared with corneal transplantation. However there are various potential risks and side-effects.

Refractive surgery may improve the sharpness of unaided vision but after corneal transplantation it is unlikely to remove the need for spectacles or contact lenses. A more realistic aim is to improve the shape of the cornea so that spectacles or contact lenses may be worn more easily.

Some refractive procedures, including laser and surgery may weaken the eye to a small extent. This is not a problem for most individuals, but people who have occupations or activities where the eye may be injured (for example contact sports) should consider this issue. After corneal transplantation the strength of the cornea is already reduced. Procedures that involve cutting into the eye carry a risk of perforation, in which case some sutures may have to be used and the effects of the surgery could be limited.

Every eye behaves differently to the treatments, and heals differently. Many eyes remain myopic or hyperopic or astigmatic after treatment. There may be under-correction or over-correction of the problem. Sometimes a good result is achieved initially but then the situation can become worse again. This is called regression. Re-treatment is possible in some cases.

The recovery period may be several months. The eye surface may be slow to heal, causing a foreign body sensation or dry eye symptoms. Whilst the surface is healing there is a small risk of corneal infection. Refractive surgery performed after corneal transplantation can cause an episode of graft rejection.

HOSPITAL INFORMATION

For eye surgery and the pre-operative assessment clinic, most patients will be required to attend the **Eye Surgery Unit**

The Eye Surgery Unit is located on the floor above the Eye Clinic and the entrance is from Car Park A with both a lift and staircase. This car park is accessible from Cadewell Lane and a bus service is also available.

Useful phone numbers

Eye Surgery Unit	(Mon – Fri 08.30 – 17.00)	(01803) 655176
Forrest ward	(Mon – Fri + weekends 17.00 – 08.30)	(01803) 655507
Eye Clinic	(Mon – Fri 08.30 – 17.00)	(01803) 655123
Hospital switchboard		(01803) 614567

Notes

Tear-out Medical Questionnaire: Please complete this and bring to your first appointment

Name

Date of Birth

Do you or have you suffered from.

Urinary tract infections?

Excessive bruising or bleeding?

Skin ulcers or infections?

Diabetes?

Chest pain on exercise or at night?

Asthma or bronchitis?

High blood pressure?

Heart attack or angina?

Fainting easily?

Convulsions or fits?

Jaundice?

Arthritis?

Mobility problems?

Claustrophobia ?

What other serious illnesses have you suffered?

Can you lie flat with one pillow for 30 minutes?

What drugs are you taking?

What allergies do you have?

Thank-you for completing this form, please remember to bring it to your appointment.

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