# DSEK (Descemet's stripping endothelial keratoplasty)

Royal Berkshire NHS Foundation Trust

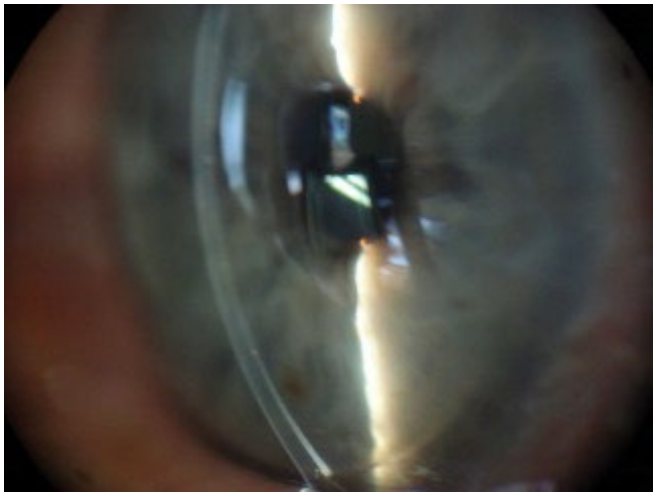
**This leaflet explains what DSEK (corneal graft surgery) entails. For further general information about corneal graft surgery please see the leaflet entitled 'Corneal graft surgery (keratoplasty)'.**

## Anatomy of the cornea

The cornea is a layered or lamellar structure, with different layers providing different functions. The surface layer is called the epithelium. It protects the cornea and provides a smooth surface for focusing light. The middle layer of the cornea, the stroma, provides strength. The deepest layer, facing the inside of the eye, is the endothelium. This is a single layer of special cells that work as a pump, draining fluid out of the stroma. Without the endothelial pump the stroma would become water-logged and cloudy.

## What is endothelial failure?

If the corneal endothelium fails, the cornea becomes waterlogged and opaque, reducing vision. In the early stages, this may only be apparent on waking, as eyelid closure overnight reduces endothelial function and allows the cornea to thicken. Blurred vision then wears off after 1-2 hours of eye opening as the cornea clears. With more severe endothelial failure, the cornea remains cloudy all the time.



*DSEK oblique slit*

In the worst cases, fluid blisters appear on the corneal surface, causing severe pain when they burst, and laying the eye open to infection.

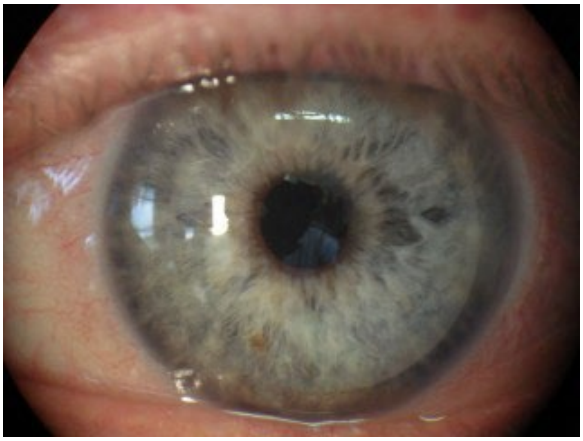
## What causes endothelial failure?

Endothelial failure most commonly arises because of previous eye surgery, e.g. cataract or glaucoma operations. It may also occur spontaneously in a condition called Fuch's Endothelial Dystrophy. This is a genetic condition, although not always inherited, whereby patients do not have enough cells to last lifelong. Patients develop symptoms between the ages of 40 and 60, often in both eyes.

## Descemet's Stripping Endothelial Keratoplasty (DSEK) surgery

Over the past 10 years, surgery for endothelial failure has improved dramatically, with the advent of selective endothelial replacement. Previously, the standard technique for endothelial failure was to provide a new sheet of endothelial cells from a donor eye as part of penetrating keratoplasty or PK.

PK is an established and effective operation, and is still useful in some cases, e.g. where the cornea has become scarred as a result of severe and prolonged corneal clouding. The majority of patients however are suitable for Descemet's Stripping Endothelial Keratoplasty (DSEK). In this procedure, the endothelium alone is replaced, leaving the healthy majority of the cornea in place. The donor cornea heals onto the patient's cornea and pumps fluid out of it, clearing the vision.



*Post-DSEK results*

In DSEK a very fine layer of endothelium and supporting tissues approximately 0.01 mm thick is removed from a donor cornea. The unhealthy endothelium is then stripped from the patient's eye.

The donor endothelium is gently inserted into the eye, where it unrolls and is floated into position. It sits in place without stitches because its fluid pumping action sucks it into position. The operation may be performed in eyes with or without previous cataract surgery. In some case DSEK may be combined with cataract surgery and lens insertion.

DSEK surgery may be performed under general anaesthetic (you are asleep throughout) or local anaesthetic and usually as a day-case procedure.

Donor endothelium is prone to rejection by the patient's immune system; this may happen after any kind of graft procedure. Steroid eye-drops are prescribed post-operatively and may need to be continued for a year or sometimes long-term depending on the individual case. If at any time after a graft operation, even years later, if the eye becomes red, painful or blurred then urgent ophthalmic advice must be sought. Rejection can usually be reversed as long as treatment starts within a few days of onset.

## What are the advantages and disadvantages of DSEK surgery?

The advantages of DSEK over penetrating keratoplasty (PK) result from the much smaller incision (cut) made. The eye recovers much more quickly, with good vision usually achieved after 1 to 2 months, but with further improvement (another 10-20%) occurring gradually over several months. Refractive error, i.e. the need for glasses, contact lenses or further corrective surgery is greatly reduced. Because the incision is much smaller, the risks of wound leaks or infection are less, and the eye is much less vulnerable to injury than after a PK.

The disadvantages are that in some cases, it may not be possible to complete the operation, and full-thickness grafting (PK) would instead

be needed. The donor endothelium may scar where it adheres to the patient's cornea, creating a haze between the donor and patient's tissues, which may reduce final visual acuity.

## What are the risks of DSEK surgery?

The most common complication after DSEK is **donor dislocation or separation**, where the donor graft fails to adhere properly. This is seen in up to 20% (2 out of every 10) cases and requires an additional operation 'rebubble' to reposition the donor. In some cases, adhesion or satisfactory endothelial function is not achieved and the graft will need to be replaced.

In most cases of DSEK failure, replacement with another DSEK graft is the best option. Depending on the cause of failure it may be better to switch to penetrating keratoplasty (PK) as an alternative approach.

**Rejection:** Donor corneal grafts may be rejected by your body if your body recognises the foreign tissue and your immune system then tries to damage it. This is not an 'all or nothing' condition, and provided it is diagnosed early enough it can usually be successfully treated. Please seek prompt medical advice if you experience one or more of the following:

- Decrease in sight
- Redness of the eye
- Pain

Rejection can occur at **any** time after a corneal graft, even years later after your discharge from the hospital's care.

Failure to obtain the correct treatment early can result in permanent loss of sight and the need for a repeat operation, which carries a higher risk of failure than the first.

## Other problems

Serious complications are uncommon following graft surgery. However, it is a major eye operation and like all operations may be accompanied

by complications, including haemorrhage (bleeding in the eye) and damage to other parts of the eye. The period after the operation can be complicated by infection, rejection, glaucoma, cataract and retinal detachment, as well as other, less common complications.

It is therefore very important that you keep your follow-up appointments, and seek prompt medical help should sudden or severe symptoms (such as those of rejection, detailed below) occur.

## Follow-up and aftercare

Most people are able to go home on the day of surgery, or if not, the following day.

Once the DSEK graft is fully adhered (usually after 2-4 weeks) it is very strong. However, to begin with, the graft is only loosely attached, and it is v**ery important not to rub the eye or undertake strenuous activity** to avoid dislodging the graft.

There will be a post-operative review appointment one week after surgery. Further appointments will depend on post-operative progress. You will be advised when it is possible to see your optician for a new glasses prescription; this is usually around two months after surgery.

## Eye drops

Antibiotic eye drops and anti-rejection (steroid) eye drops are required following surgery. The antibiotic drops are usually stopped at 2 weeks. The steroid eye drops are used for much longer (a year or more), as they guard against rejection. You will be advised in the Outpatient Clinic how may drops to use, but please do not stop steroid eye drops unless advised to do so by the clinic doctor. It will be necessary to obtain repeat prescriptions from your GP before your eye drops run out.

## Further information

- www.berkshireeyesurgery.co.uk
- www.nhs.uk/Conditions/corneatransplant/Pages/Procedure.aspx
- www.rcophth.ac.uk/patients/corneal-disease/

- www.rnib.org.uk/eye-health-eye-conditions-z-eye-conditions/corneal-transplantation
- www.eyecaretrust.org.uk/view.php?item_id=128

## Contacting us

If you have a minor eye problem, please seek advice from your GP, optician or pharmacist. If urgent, please attend Eye Casualty or call 111.

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| Eye Casualty (Reading): | Mon-Fri 9am to 5pm; Sat & Sun & bank holidays 9am-12.30pm; Closed Christmas Day and New Year's Day. |
| Eye Casualty: Prince Charles Eye Unit (Windsor): | Mon-Fri 9am to 5pm; Sat 9am-12.30pm; Closed Sun & bank holidays. |
| Dorrell Ward (Reading): | 0118 322 7172<br>(24 hours a day) |
| Eye Day Unit (Reading): | 0118 322 7123<br>(Mon-Fri 7am to 6pm) |

Outside of Eye Casualty hours, you should telephone your GP's out of hours' service, ring NHS 111 or if you have serious concerns, visit your nearest Emergency Department (A&E).

To find out more about our Trust visit www.royalberkshire.nhs.uk

**Please ask if you need this information in another language or format.**

M Leyland, RBFT Ophthalmology, February 2023
Next review due: February 2025