

DSEK and DMEK

Descemet stripping endothelial keratoplasty (DSEK) and Descemet membrane endothelial keratoplasty (DMEK) are partial thickness corneal transplants which replace primarily the endothelium (innermost portion of the cornea) rather than the full thickness of the cornea (as in standard corneal transplants).

DSEK and DMEK are indicated when there is corneal clouding due to a dysfunction of the endothelium but where the other layers of the cornea remain healthy. With Fuchs endothelial dystrophy or when there is swelling of the cornea after cataract surgery, it is the endothelium which is compromised.

What is the endothelium and how does it work?

The cornea is the clear dome that makes up the front part of the eye. It is about 1/10th of a centimeter thick and is composed of three primary layers: the epithelium, the stroma, and the endothelium. The epithelium is a thin surface layer. The stroma is composed mostly of fibrous proteins and acts like a sponge, absorbing fluid from inside the eye. The endothelium is a single layer of cells coating the inside portion of the cornea. Its job is to provide nutrients to the cells in the stroma and to make sure that the stroma has just the right amount of fluid. Too much fluid in the stroma can cause swelling of the cornea and decreased vision.

What is endothelial failure?

The cells of the corneal endothelium are very fragile. Two of the most common causes of endothelial failure are disease (like Fuchs Dystrophy) and trauma following cataract or other surgery. Once an endothelial cell dies it will not grow back. If an eye loses too many endothelial cells, it is not able to maintain the proper corneal thickness and clarity.

Advantages of DSEK and DMEK compared to standard corneal transplantation

- The eye surface is kept intact, thus remaining more resistant to injury and infection
- There is minimal change in refraction (eyeglass prescription) because only the endothelial layer (~5% of the cornea) is replaced
- Suture-related problems are significantly reduced/can be eliminated
- Visual recovery is significantly faster and better

What is the difference between DSEK and DMEK?

DMEK is very similar to DSEK, except that the donor tissue implanted does not include any stromal tissue. It is a pure replacement of endothelium. This tends to give slightly better visual results and sometimes a quicker recovery; however, donor disc dislocations and failures can be more common due to the delicate nature of the thinner tissue. Depending on your eye's condition, you may not be a candidate for one or the other of these procedures. You should discuss both options with your surgeon.

The Surgery

The procedure is done through a small incision on the side of the cornea and usually takes about 30 minutes to complete. DSEK and DMEK involve peeling the diseased endothelial layer

from the back of the cornea and leaving the healthy remainder intact (approximately 95%). Then, healthy corneal tissue (called a donor disc) is placed inside the eye through a small incision and positioned with a large gas bubble placed in the front of the eye.

Post-operative care

After surgery, the eye is covered with a shield and minimal discomfort should be experienced. You will remain lying flat in the postoperative recovery area to help the graft adhere for approximately 1 hour. You will then be discharged and will start your post-operative eye drops on the day of surgery. Standard over-the-counter pain medications can also be taken as needed. You will be instructed to lie down flat on your back or on up to one pillow for 75-90% of your time at home for the first day and thereafter anywhere from 3-7 days after surgery. This positioning is vital to ensuring your graft adheres and the surgery is a success.

Donor Disc Dislocation

On the first day after surgery and over the first week, your surgeon will make sure that your donor disc is still in the intended position. If the donor disc is NOT in proper position, then the disc will have to re-positioned or gas will have to be injected again into your eye. Sometimes this can be done in the minor operating room in the office, but other times it will require a repeat surgery in the operating room. The risk of this happening is anywhere from 5 to 10% for DSEK and DMEK.

Fortunately, a dislocated donor disc can be successfully re-positioned with good function and restoration of vision over 90% of the time. In the worst-case scenario, if the disc cannot be successfully repositioned, then the donor transplant can be replaced with a new tissue ordered from the eye bank in another repeat surgery.