

# KERATOPROSTHESIS

UNIVERSITY OF ROCHESTER  
FLAUM EYE INSTITUTE



WITH RECENT DEVELOPMENTS, KERATOPROSTHESIS SURGERY HAS BECOME SAFER AND CAN BE OFFERED TO A WIDER RANGE OF PATIENTS.

## THE BOSTON KERATOPROSTHESIS

Flaum Eye Institute uses the Boston keratoprosthesis. It was developed at Harvard University by Claes Dohlman, M.D., with help from the University of Rochester's James Aquavella, M.D. The surface of the device resembles a hard contact lens. The prosthesis is constructed so that a cylinder extends into the eye, like a periscope, and helps to project images to the back of the eye.

## INDICATIONS

Keratoprosthesis is indicated in cases of severe corneal opacity where donor-tissue transplants might have a high probability of failure or where best visual acuity is quickly desired. Keratoprosthesis may be an option in the following instances:

- Infants with Peter's Anomaly
- Patients with aggressive immune systems
- Multiple tissue graft failures
- Best visual acuity needed quickly

## RISKS AND DISCOMFORTS

Keratoprosthesis includes normal surgical risks such as reactions to anesthesia and infection. Other intra- and post-operative risks specific to keratoprosthesis include:

- Increased risk of glaucoma
- Retinal detachment
- Ex-plantation of prosthesis
- Developing a secondary membrane behind the prosthesis

Many of these risks may be managed medically or surgically. Post-operative discomfort or cosmetic changes may include:

- Light sensitivity
- Pain associated with increased eye pressure
- Dryness or scratchiness
- Change to the color of the iris
- Diminished vision due to deposits on therapeutic lens

Most of these will resolve on their own or be addressed through routine care and maintenance prescribed by your medical team. Special attention should be paid to infants as severe corneal opacities may also be present with extensive retinal disease.

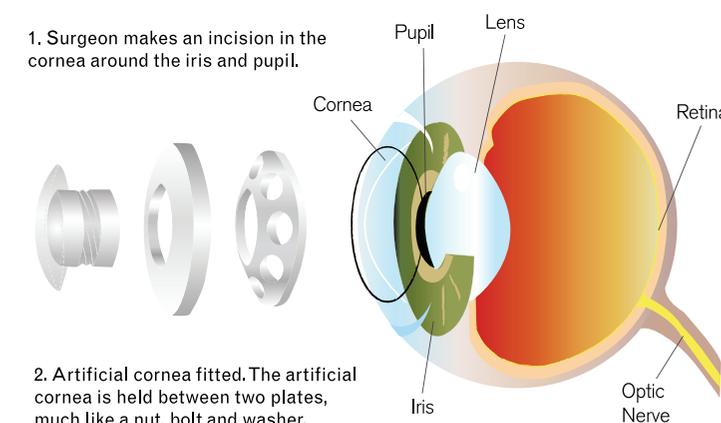
## THE SURGICAL PROCEDURE

The actual surgical procedure, performed on an outpatient basis, takes approximately sixty to ninety minutes. There is an additional half hour of preparation time before surgery and an additional half hour of recovery after surgery. Patients who undergo this type of procedure can be expected to be in the operating room area for at least three hours before being discharged.

In all cases, the patient is reevaluated on the morning following surgery. At this time, necessary prescriptions for special eye drops are given and instructions are provided. Follow-up examinations are usually made at one week, one month, and then at every three months throughout the first year. Special soft contact lenses are inserted over the plastic cornea at the time of surgery and are allowed to remain in the eye indefinitely. However, the contact lenses must be removed, cleaned and replaced regularly to avoid infection and complications. The contact lenses can be customized to help patients achieve best potential vision.

In the course of keratoprosthesis surgery, the eye's natural lens is removed. Focusing power is established through prosthetic or the implantation of the same type of intra-ocular lens used in cataract surgery. If glaucoma is threatening or has not been controlled, a special shunt valve may be implanted into the eye prior to or at the same time as the keratoprosthesis surgery.

1. Surgeon makes an incision in the cornea around the iris and pupil.



2. Artificial cornea fitted. The artificial cornea is held between two plates, much like a nut, bolt and washer.



# KERATOPROSTHESIS

# CLINICAL SUPPORT TEAM

## LIVING WITH AN ARTIFICIAL CORNEA

With the keratoprosthesis, the best possible vision is restored more quickly and patients often achieve their best possible visual levels within a few weeks. However, because the plastic that is used never becomes totally incorporated into the body, drops to prevent infection must be used indefinitely. In addition, in the early months following surgery, anti-inflammatory drops are required. Patients who have the procedure must also wear a special protective shield while they sleep at night.

## HOPE FOR PEDIATRIC PATIENTS

Flaum Eye Institute pioneered the use of keratoprosthesis in infants and small children. Young patients born with blindness caused by opaque corneas are at risk for permanent vision loss. Unfortunately traditional natural-tissue corneal transplants fail frequently as the result of a child's highly active immune system. By the time a child's immune system stabilizes enough to accept a natural-tissue transplant, it is too late to develop usable vision because the young brain was not stimulated by focused images early enough. Because the Boston keratoprosthesis is inert, children do not reject the transplant, and they go on to develop vision and lead relatively normal lives. Flaum Eye Institute is one of a handful of centers worldwide that has the experience and a cross-disciplinary team of ophthalmologists to perform these remarkable procedures.

## OUR CLINICAL DIRECTOR



### DR. RACHEL WOZNIAK

Rachel Wozniak, MD, PhD is a member of the Flaum Eye Institute's Cornea Service. She earned her medical degree and completed a doctorate in genetics at Tufts University School of Medicine. She completed her ophthalmology residency at the University of Rochester School of Medicine and Dentistry's Flaum Eye Institute. Here she also went on to complete a fellowship

in Cornea and External Disease at the Flaum Eye Institute under a Heed Ophthalmic Foundation Fellow Award. Dr. Wozniak is actively engaged in basic scientific research and has already authored an impressive list of peer-reviewed publications. Her particular area of research interest focuses on the pathogenesis of bacterial corneal infections and novel antimicrobial drug discovery. She is a member of the American Academy of Ophthalmology, Women in Ophthalmology, the Association for Research in Vision and Ophthalmology and the American Society of Cataract and Refractive Surgery.

## WHAT IS KERATOPROSTHESIS?

**Keratoprosthesis (artificial corneal transplant) is an innovative surgical procedure that brings new hope to those who are affected by corneal blindness by restoring vision.**

A team at the University of Rochester Eye Flaum Institute (FEI), under the supervision of Rachel Wozniak, MD, PhD, has been involved in research and development of keratoprosthesis for more than 40 years, and probably has a longer experience with this surgery than any other group in the United States. This technique is suitable in cases where previous traditional corneal transplants have failed or where, because of special circumstances, the chance of success with a traditional corneal transplant would be very poor.



James Aquavella, MD  
Cornea



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Retina



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