A SLACK Incorporated® Publication

OCULAR SURGERY NEWS®

20th Anniversary 1982-2002

The voice of 65,000 ophthalmologists worldwide™

Vol. 21, No. 7 • April 1, 2003

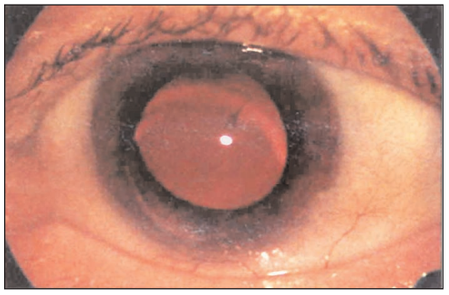
EPIKERATOPHAKIA MAY STILL BE SURGICALLY REVERSED EVEN AFTER LONG-TERM HEALING

Epikeratophakia may still be surgically reversed even after long-term healing

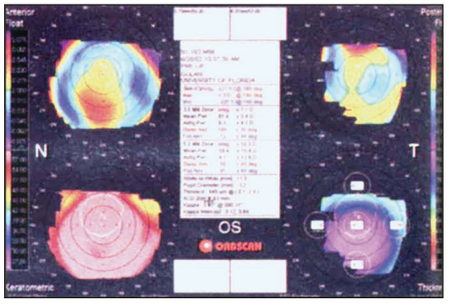
For an effective visual outcome, care should be taken to evaluate the patient's underlying cornea.

JACKSONVILLE, Fla.—The surgical reversal of epikeratophakia is possible even 18 years following surgery, according to a surgeon located here.

Arun C. Gulani, MD, said he was able to reverse an epikeratophakia procedure in one eye of a patient with a decentered and scarred lenticule. Dr. Gulani is director of refractive surgery and chief of the cornea service at the University of Florida College of Medicine.



A decentered and scarred epikeratophakia lenticule under retroillumination. This type of illumination is useful for assessing the clarity of the patient's cornea, the size of the epikeratophakia, the positioning of the epikeratophakia relative to the pupil and the edge, which indicates the technique used.



Orbscan topography measurement shows corneal thickness is around 900 um.

He said the reversal procedure was possible because the epikeratophakia lenticule does not attach to the underlying corneal tissue.

"An epikeratophakia lenticule with the stromal side placed on the recipient's Bowman's membrane never scars and can always be separated. That's one principle of lamellar surgery: that lamellar surgeries can always be separated," he said.

The level of difficulty of the separation depends on the tissue-to-tissue apposition, Dr. GuIani said. Stroma to Bowman's layer, as in epikeratophakia, is less difficult, whereas stroma to stroma, as in LASIK is moderately difficult but always possible, he said.

Dr. Gulani explained that in LASIK, healing occurs only at the edge of the flap, due to cytokine-mediated stromal and epithelial interaction at the edge of the cut. Once the healed tissue is broken through, the lamellar flap caIl be lifted.

"I've successfully lifted flaps even 8 years postop in LASIK," he said. Dr. Gulani said he devised his epikeratophakia reversal technique along with Lee T. Nordan, MD.

Case report

Epikeratophakia was originally intended as a so-called living contact lens for aphakic patients who were unable to wear contact lenses, Dr. Gulani said. Donor tissue was lathed into the desired shape and sutured onto a de-epithelialized recipient cornea with intact Bowman' layer and stroma. The change in curvature produced by the lenticule provided the desired refractive correction.

In the present case, a female patient had undergone bilateral epikeratophakia 17.8 years earlier to correct aphakia. The lenticule in the left eye was decentered and scarred, which decreased the patient's uncorrected vision to 2O/4O0 and best corrected vision to 2O/70. The patient also complained of intense blurring. She was referred to Dr. Gulani's service.

Dr. Gulani performed a detailed evaluation preoperatively using a specialized slit-lamp lighting system produced by AVI Systems, of New York, and cross illumination of the cornea. He visualized the epikeratophakia lenticule and determined the clarity of the patient's own cornea beneath the lenticule.

Orbscan measurements were taken to determine corneal thickness and lenticule depth. Confocal microscopy was used to locate the depth of the interface between the patient's own cornea and the epikeratophakia implant.

Surgical procedure

Dr. Gulani performed the surgery with the pupil dilated, using retroillumination. He said this allowed better visualization of the edges and features of the lenticule.

Based on the confocal measurements, Dr. Gulani used a diamond knife of his own design, set to the depth of the implanted lenticule, to make the initial incision.

Dr. Gulani gripped the lenticule and gently eased it off the patient's underlying cornea. The lenticule was removed entirely from the corneal bed, with no detached edges remaining in the cornea.

Once the lenticule was removed and a clear cornea was confirmed, Dr. Gulani used the Nordan-Gulani stitch-down technique to suture the over hanging edge at the periphery of the junction between the removed lenticule and the patient's cornea. He said this promoted reattachment of the corneal edge and enhance recovery of the epithelium. The patient wore a bandage contact lens while the cornea healed.

Postoperatively, the patient displayed the potential for improvement in vision. Dr. Gulani removed the 10-0 nylon suture and monitored the patient's corneal surface. He planned a secondary IOL implantation after the

anterior surface stabilized at approximately 3 months postop.

At the start of the secondary IOL implantation surgery, the anterior hyaloid membrane showed potential for intruding into the pupillary region. Dr. Gulani performed a high-speed, closed-system vitrectomy under direct guidance with the Gulani IVI instrument from Volk Optical. The secondary IOL was then placed.

The patient currently can see 20/25 in the reversed eye.

"She is ecstatic and wants it in her other eye, which was in fact seeing 20/50 with a well-centered epikeratophakia," he said.

Dr. Gulani does not currently plan to perform the procedure on the fellow eye of this patient. However, he said he does have three additional cases waiting for surgery.

Preop evaluations needed

According to Dr. Gulani, preoperative measurements are important for locating the epikeratophakia lenticule.

"You may not get the right depth if you just start digging for the epikeratophakia lenticule, It is important to sturdy the cornea and plan your surgery. Special lighting, if needed, and confocal scans or in the near future ultrasound biomicrocopy or optical coherence tomography, and even Orbscan, can be used to plan depths,' he said.

"The second thing is to make sure the patient's cornea is clear underneath. Otherwise, you'll end up with the patient's scarred cornea and you might as well do a penetrating keratoplasty," he continued.

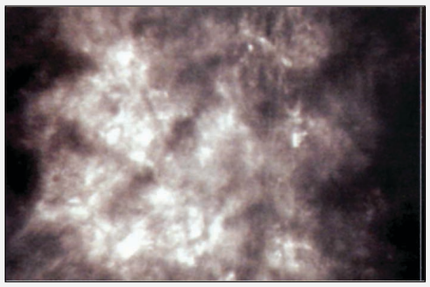
Dr. Gulani said care should be taken to remove the lenticule in full without tearing or breaking. Remaining fragments could distort the edge of the cornea and lead to a poor result if they are close to the visual axis.

He said the Nordan-Gulani stitch-down technique is also important for cases where a hinge is located peripherally. He explained the hinge would lift away from the corneal and leave a gap for the epithelium to cover before it can heal. This would result in longer healing times, irregularity and tendency toward repeated breaking.

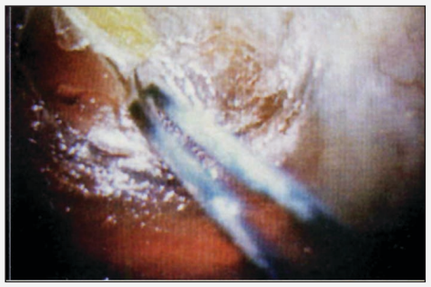
Dr. Gulani acknowledged other corneal surgeons for their previous work, particularly Lee T. Nordan, MD, Eric D. Donnenfeld, MD, Herbert Kaufman, MD, Carmen Barraquer, MD, Marguerite B. McDonald, MD, and Robert Arfaa, MD. ■

Epikeratophakia lenticule

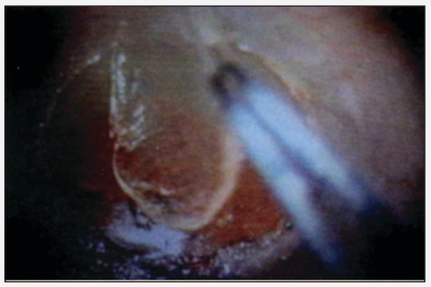
An epikeratophakia lenticule can always be removed from a patient because the lenticule does not adhere to underlying corneal tissue, according to ANn C. Gulani, MD. Care should be taken to remove the lenticule in full without tearing or breaking. Remaining fragments could distort the edge of the cornea and lead to a poor result if the fragments are close to the visual axis.



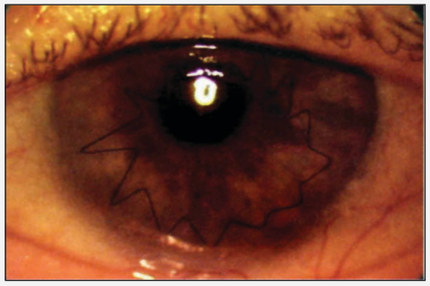
Confocal microscopy image show the interface and depth of the epikeratophakia.



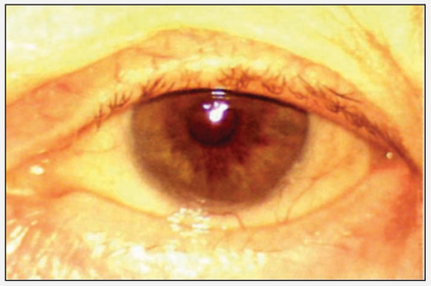
The epikeratophakia lenticule is grasped with forceps and removal from the patient's cornea is begun.



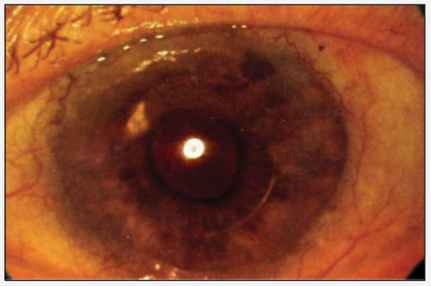
The epikeratophakia lenticule is fully removed from the cornea.



Nordan-Gulani stitch-down technique is used to suture the reversed cornea.



Patient's clear cornea after stitches have been removed.



Same eye after secondary implantation of IOL.