



## How to Quell the Renegade Cells

SOMETIMES, A COMPLICATION AFTER LASIK doesn't come from a surgical error or an infectious invader. Instead, the eye itself can be its own worst enemy. Such is the case with epithelial cells that find their way into the lasik interface. Unabated, they can cause irregular astigmatism, decreased vision or stromal melt. Here, surgeons experienced in dealing with ingrowth explain their technique.

The clinically significant, unwanted growth of corneal epithelial cells in the lasik interface occurs in about 1-2 percent of cases. To determine whether epithelial ingrowth is clinically significant, Arun Gulani, MD, chief of refractive surgery at the University of Florida, Jacksonville, looks at three criteria: visual; mechanical; and progressive. Visually, it can be directly significant by blocking the visual axis, or indirectly so by causing irregular astigmatism and tear film instability. Mechanically, it's significant if it's causing stromal melt or bulking under the flap. Ingrowth

**Though epithelial ingrowth after LASIK is infrequent, surgeons say it pays to be prepared.**

can also be significant if it's progressing quickly and moving toward the visual axis.

The cause of ingrowth usually just giving the epithelium enough space to grow.

"The only reason it appears is because you have a potential space for it in the interface after a primary lasik," says Tampa surgeon Stephen Updegraff. "It can occur if the flap isn't seated and sealed properly. If there's epithelial sloughing or sliding, it can cause some flap edema. This edema will cause the flap to retract from the edge and give the epithelium a space to grow into."

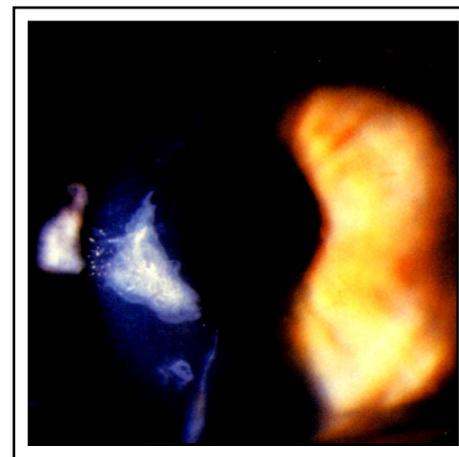
Dr Gulani agrees on the importance of a corneal passage. "Predisposing conditions could be dry eye, epithelial basement membrane diseases, epithelial defects, erosions and buttonholes," he says. "Facilitating factors could be previous RK or AK incisions, which act as a gutter to guide the epithelium under the flap as a path of least resistance." (See Figure 1)

### Prevention

Since the risk factors are known, and are related to surgical technique, surgeons say good management begins with prevention.

"In general, since it's more frequent in

the setting of an epithelial defect," says Teaneck, N.J., surgeon Peter Hersh, "then, to avoid it, properly lubricate



**Figure 1.** An existing RK incision can be a facilitating factor for epithelial ingrowth, guiding it into the interface.

the keratome, don't use prop drops or anesthetic solutions until right before the case, pretreat dry-eye patients with artificial tears or punctum plugs, and treat blepharitis with doxycycline to make sure the ocular surface is as pristine as possible."

Before the procedure, Dr. Hersh recommends instilling Celluvisc in the eye as the patient waits and having him close the eye.

Everything should be oriented toward



a strongly adherent flap after the surgery, experts say. "Handle the flap minimally and delicately during surgery with atraumatic forceps," says Dr. Gulani. "Look for an intact surface, good orientation and edge apposition when you put the flap back."

### Treatment

In some cases, surgeons say, the preventive measures fail, and epithelial ingrowth occurs. When it does, Sarasota, Fla., surgeon William Lahnert says it usually follows one of three potential courses:

- ingrowth, followed by cessation of growth and the formation of fibrosis, leaving behind a trail of scar tissue;
- limited growth into the interface, followed by cessation and a localized flap necrosis manifested as a peripheral melt of the edge of the flap; or
- ingrowth that progresses until it reaches the visual axis, impairs best corrected acuity or causes flap melting.

He says the first two situations can usually be observed, while the third requires treatment. He cautions, though not to be fooled by a seemingly short extension of cells. "Sometimes," he says, "the edge of the flap may be closer to the visual axis in one patient than another. It depends on the size of the flap and the location of that patient's visual axis." Experts also warn not to just lift the flap on any potential patient to treat the cells without good reason, because lifting it invites worse epithelial ingrowth.

Dr. Lahnert, who recently completed a study of ingrowth in 31 patients, says prompt action, if necessary, is key.

"There was a trend, though not statistically significant, toward patients'

doing better when their epithelial ingrowth surgical treatment was done promptly," he says. "We try to do it as quickly as possible."

When the ingrowth requires treatment, the protocol involves lifting the flap, scraping off the cells, irrigating the interface and then replacing the flap so that it's very adherent.

Dr. Updegraff has been fortunate enough not to have had any recurrences of ingrowth once he's removed ingrown cells. Here's what he does.

He lifts the flap and, under high magnification, delineates the borders of the growth. "The slit lamp shows about a third of what's there," he says.

Then, he uses a 64 Beaver blade to score around the edge where the epithelium would have been cut by the microkeratome. He resists the urge to scrape from the center outward. Instead, he starts where he scored the epithelium and scrapes toward the center. He then has the patient look down or to the side, depending of where the hinge is, to get at the undersurface of the flap. After the scraping, he "slops" a wet Merocel sponge over everything, including the undersurface of the flap. He follows by wiping with a dry sponge. He repeats these two steps two more times. He then makes sure that the epithelium is flipped back over on top of itself all the way around the edge on the limbal side, so none is tucked in under the flap. Next, he irrigates the area, floating the flap back. Minneapolis surgeon David Hardten, depends on how long the ingrowth was there and the reason for it. "If a patient had loose epithelium or anterior basement membrane dystrophy, he's more likely to have problems,"

he says. In such patients, the recurrence rate can be as high as 60 percent. In normal eyes, it's around 1 to 2 percent.

In addition to scraping, surgeons are trying other ways to eliminate cells.

Dr. Lahnert's study involved the use of scraping and 70% isopropyl alcohol in 17 patients, compared to just scraping in 16. He placed the alcohol on the tip of a Merocel spear and applied it to the area of ingrowth, followed by additional scraping. The hope, he says, was that alcohol would decrease the adherence of the epithelial cells, eradicating those that may not be detectable under the microscope. He notes, though that there wasn't statistically significant difference in the rate of recurrence between the two groups. He says a randomized, prospective study is in order.

Dr. Hersh occasionally uses a different adjunctive treatment: PTK. "In some cases, such as sublamellar epithelium, peeling and stripping isn't effective," he says. "So, since the epithelium is usually peripheral, I'll use a broad-beamed laser, making it 2-3-mm wide, and use a polishing technique like 'laser sandpaper' to apply a few pulses to the area that I've treated to clean up any residual cells.

"Be judicious," he says, "because you don't want to remove stroma that can cause refractive changes, use just a few pulses at 2-3 mm, maybe 15 pulses per unit area."

In the end, the result of the primary lasik is key. "This is one of those lasik nuances that's possible to miss if you move too quickly," says Dr. Updegraff. "But, if you take time to ensure that you've got excellent adherence, you'll do better.

