

# Post-LASIK Surface Ablation

The role of PRK in enhancement surgery after LASIK.

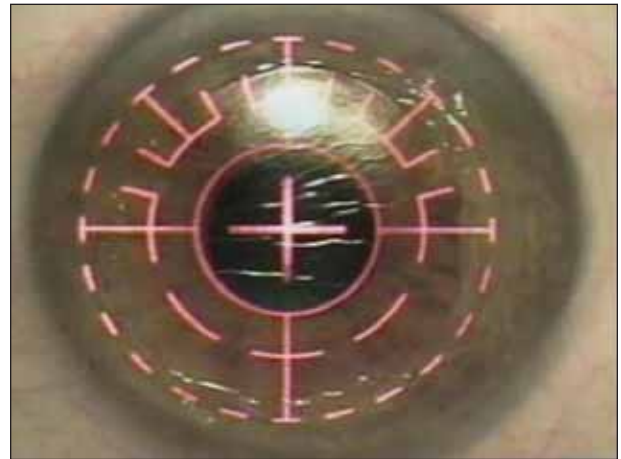
BY MARK A. KONTOS, MD

The past several years have brought a resurgence in the popularity of surface ablation. Advancements in the profiles of ablation beams, which result in smoother beds, and the use of mitomycin C (MMC) have significantly reduced the incidence of haze.<sup>1,2</sup> Improved postoperative healing and pain control have led to more rapid visual recovery and patients' increased acceptance of the procedure.<sup>3,4</sup> Coupled with surgeons' and patients' desire to reduce the risks associated with enhancement surgery, these changes have made PRK a viable option for the treatment of residual refractive error in certain post-LASIK patients.<sup>5</sup>

## INDICATIONS

For most patients who require a surgical enhancement after LASIK, a traditional lifting of the flap can safely and effectively treat the residual refractive error. In certain eyes, however, disrupting a healed flap or removing additional deep stromal tissue is associated with an increased risk of epithelial ingrowth and ectasia, which makes this approach less appealing.

At my surgical center, the most common reason to consider a PRK enhancement is the desire to reduce the risk of ectasia. For patients with a stromal bed that is less than 275 $\mu$ m thick after primary LASIK, the risk of ectasia with additional thinning of the bed is a significant concern. PRK does not affect the thickness of their stromal bed. Often, the patients seeking an enhancement underwent LASIK at a surgical center that no longer exists and/or have no ability to obtain the records of their prior surgery. For these individuals, surface ablation is a more viable option than a LASIK enhancement. In addition, patients with decentered or small flaps (< 8.5mm) that require larger treatment zones for hyperopia or customized treatments have an increased risk for epithelial ingrowth, because peripheral epithelium is ablated, which can activate growth into the opened stromal



(Courtesy of William Trattler, MD.)

Figure 1. Microscopic folds are visible after epithelial removal in a post-LASIK patient.

bed. Also, irregular astigmatism is possible, because protecting the hinge area may block a significant portion of the treatment.

Because we do not disrupt the stromal bed with a PRK enhancement, we have had no epithelial ingrowth in any of these patients. Nor have we seen significant irregular astigmatism with this procedure, possibly because the ablation pattern is not blocked. As mentioned earlier, PRK enhancement appears to eliminate these risks. Other indications for a PRK enhancement include a history of recurrent epithelial ingrowth, flap folds, and occult basement membrane disease.

## THE PROCEDURE AND POSTOPERATIVE CARE

Aside from a few minor alterations, surface ablation after LASIK is identical to typical PRK surgery. My colleagues and I always wait 6 months before performing an enhancement, and we treat each eye separately.

The most important aspect of a PRK enhancement is the removal of the epithelium without disturbing the flap. In patients with low degrees of correction ( $< -1.00D$ ), we perform a conventional treatment with the Visx S4 excimer laser (Advanced Medical Optics, Inc., Santa Ana, CA) and use the laser to remove the epithelium. For higher degrees of correction and hyperopia, we use Visx Customvue (Advanced Medical Optics, Inc.) and manually remove the epithelium. In the latter case, we place anesthetic drops on the cornea 10 minutes prior to surgery. Next, under the laser, we mark the cornea with a 9-mm ring. Starting centrally and working outward in a radial fashion, we use a blade to remove the epithelium. Care must be taken not to disrupt the corneal flap. We prefer not to use alcohol or a brush for these eyes.

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Often, after the epithelial removal, microscopic folds are visible on the surface of the Bowman's layer (Figure 1). The ablation of these folds during treatment may be a reason some patients note a significant improvement in the quality of their vision postoperatively.

Because we always use MMC for these patients, we reduce our nomogram calculation by 10%. We have noted an increased laser effect with mitomycin, and this adjustment helps reduce the chance of overcorrection. Following the ablation, we place a sponge soaked in 0.02% MMC on the cornea for 15 seconds. The eye is then irrigated with chilled saline solution. We administer Vigamox (Alcon Laboratories, Inc., Fort Worth, TX), Pred Forte (Allergan, Inc., Irvine, CA.), and Acular LS (Allergan, Inc.) and then place an Acuvue Oasis contact lens (Johnson & Johnson Vision Care, Inc., Jacksonville, FL). In an attempt to reduce the chance of interface inflammation, we instruct patients to instill Pred Forte every 2 hours while awake during the first 24 hours after surgery. They receive diluted, nonpreserved, anesthetic drops to manage their pain.

Epithelial healing times vary among patients, but they average 5 days for laser and 8 days for manual epithelial removal. The Vigamox and Acular are discontinued, and the contact lens is removed when the epithelial healing is complete. Steroid drops are tapered over a 6-week period.

We have performed 27 PRK enhancements during the past 2 years, and most of our patients have had a postoperative course that is identical to that of a primary PRK. Two patients experienced delayed healing of their epithelial defects (12 and 15 days). Additionally, we have seen +1 to +2 diffuse lamellar keratitis in three patients. After appropriate treatment, these postoperative problems have resolved without difficulty. None of our patients has experienced an infection or clinically significant haze. All patients achieved a significant improvement in their UCVA with 87% seeing 20/25 or better at 3 months. BCVA was well preserved except for one patient who lost two lines of BCVA and two patients who each lost one line of BCVA. Approximately 94% of our lifted flap enhancements achieved a UCVA of 20/25 or better, with the loss of BCVA at  $< 2\%$ . Visual acuity does take longer to stabilize than with enhancements that require the lifting of a corneal flap. A continued improvement in vision tends to occur during a 4- to 6-week period postoperatively. It is important that patients be aware of this difference from LASIK prior to surgery.

## CONCLUSION

The goal of enhancement surgery is to reduce or eliminate residual ametropia while exposing patients to minimal risk. Performing PRK with mitomycin C after LASIK avoids the risks of epithelial ingrowth and slipped or folded flaps, and it decreases the possibility of ectasia. The risks associated with PRK appear to be low, and its results compare favorably to those of a LASIK enhancement. For these reasons, PRK with mitomycin C is a viable treatment option for select patients with residual a refractive error after LASIK. ■

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