

# EpiLase Advanced Surface Ablation

Clinical experience, impressions, and results.

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Since refractive surgery technologies received FDA approval 10 years ago, they have become further developed and varied in order to improve visual outcomes, increase safety, and reduce intra- and postoperative complications. One of the latest advances in refractive technology is EpiLase (also known as Epi-LASIK, Epi-K, advanced surface treatment, or advanced surface ablation).

The other names, in my opinion, did not adequately describe the procedure and confused patients. My husband and I coined the name *EpiLase* for this procedure and trademarked it. This laser vision correction is performed on the surface of the cornea. EpiLase melds the benefits of PRK and LASIK but eliminates most of the disadvantages.

I currently perform EpiLase using the Moria Epi-K epithelial separator (Moria, Antony, France). As of January 2007, EpiLase represented 60% of my refractive surgery cases, a 50% increase from the previous year. Initially, I was only using this procedure for patients with thinner-than-average corneas or dry eyes or those at increased risk for disturbed flaps (eg, athletes). I also favored this procedure for patients with subtle topographic and mild clinical abnormalities and for younger patients whose topographies were too immature to illustrate abnormalities. Increasingly, I am seeing patients who are excellent LASIK candidates asking for EpiLase because they do not want a corneal flap.

This article describes my EpiLase technique.

## THE EVOLUTION OF ADVANCED SURFACE ABLATION OR EPI-LASE

EpiLase has evolved since its introduction at my practice in June 2005. Initially, I was separating the surface cells from the cornea as a sheet, laying them back similarly to a LASIK flap, applying the laser ablation, and then replacing the sheet onto the cornea before positioning a bandage contact lens. My colleagues and I found that by reaffixing the epithelial sheet, we were actually prolong-

ing the healing time by 2 to 3 days. I came to believe that the sheet that was being supplanted did not actually survive. It seemed that a new layer of epithelium formed and that having the old sheet remain only delayed the regrowth of new epithelium. Sometimes, a "double" layer of epithelium would remain and delay visual recovery. By removing the sheet, new epithelium could grow in faster and unimpeded. We found that if we removed the sheet completely and placed a bandage contact lens after surface ablation, the eye would heal in 3 to 4 days.

EpiLase differs from PRK in that there is no scraping of the epithelial cells; instead, an epikeratome produces a smooth corneal bed. There is less subjective pain and a faster recovery associated with EpiLase than with PRK.

## THE EPI-LASE PROCEDURE

### Preoperative Workup

The preoperative workup for EpiLase is similar to that for any of the other laser vision correction procedures. A patient's ocular and medical history is important. We ask about past ocular trauma, specifically corneal abrasions or foreign bodies. We also inquire if patients underwent previous corneal surgery. A history of ocular surgery could affect my decision to perform EpiLase, because the translation of the mechanical device depends on having an intact Bowman's membrane. A scar on or a previous disruption of the Bowman's layer could lead to a stromal incursion. A surgical alternative for these patients would be PRK, transepithelial PRK, or LASEK, if surface ablation is necessary. A history of previous infection or corneal ulcer is also important. I also make note of contact lens intolerance and dry eye syndrome. Although surface ablation is better for these patients, I find that the pretreatment of their condition with Restasis (Allergan, Inc., Irvine, CA), punctal plugs, or some combination of modalities is oftentimes necessary for faster postoperative recovery.

Typically, I offer customized laser vision correction (if the patient is a good candidate) with the Visx WaveScan

Wavefront System (Advanced Medical Optics, Inc., Santa Ana, CA). Because customized treatments remove more tissue, EpiLase is a particularly good option for patients who otherwise are not candidates for laser vision correction, such as high myopes.

### Intraoperatively

After having administered the appropriate antibiotic and anesthetic medications, I place the Moria Epi-K epithelial separator on the eye and administer GenTeal Mild (Novartis Ophthalmics, Inc., Duluth, GA). Next, I make a pass over the cornea with the separator to create an epithelial sheet. The corneal sheet is quite superficial and spares 35% of the corneal tissue, unlike LASIK.

With a Weck-cell sponge (Medtronic Xomed Ophthalmics, Inc., Minneapolis, MN), I gently move the epithelial sheet to the side of the cornea. I wipe the bed and ensure that the sheet has been completely removed. Next, I complete the laser ablation. If it is deeper than 65  $\mu\text{m}$ , I will apply mitomycin C 0.02% for 15 to 30 seconds. I rinse the cornea with balanced salt solution and then place chilled balanced salt solution in an alcohol well on the cornea for 30 seconds. I have found that cold balanced salt solution decreases patients' pain postoperatively.

Next, I apply a bandage contact lens. I prefer to use the Acuvue Oasys (Johnson & Johnson VisionCare, Inc., Jacksonville, FL). I treat the patient's second eye in the same manner.

### Postoperatively

After surgery, I have patients wait in the office for a short time to ensure that the bandage contact lenses are fitting correctly. I see patients on postoperative day 1, and I remove the bandage contact lens on postoperative day 4. At this point, I usually see a minimal "suture line" of healing epithelium, which is much less than that seen with PRK.

The postoperative drug regimen I prescribe includes Lyrica (Pfizer, Inc., New York, NY) 75 mg b.i.d., an anti-epileptic drug that also controls pain. Alternatively, surgeons may prescribe 300 mg of Neurontin (Pfizer, Inc.) t.i.d.

I also use Xibrom (Ista Pharmaceuticals, Inc., Irvine, CA) b.i.d. because of its anesthetic effect. I find that Xibrom in combination with Lyrica works very well. Informal surveys of my patients indicate that, after 1 or 2 days of this combined treatment, they no longer require either of the medications.

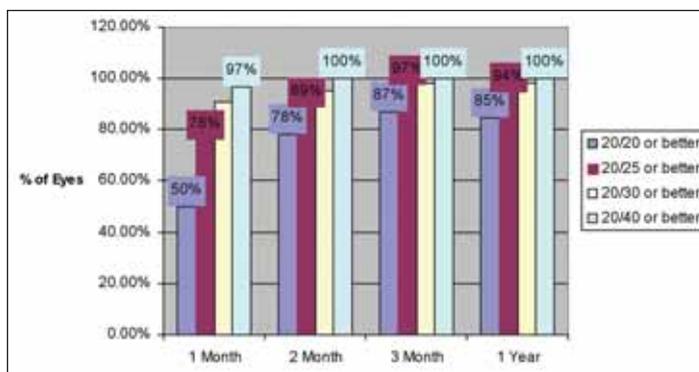


Figure 1. The visual acuity results in approximately 300 EpiLase eyes with the epithelial sheet removed and an intended result of plano is shown.

TABLE 1. PREOPERATIVE RANGES OF SPHERICAL EQUIVALENT

Ranges of Spherical Equivalent	Number of Patients
0 to 3.50 D	22
0 to -3.00 D	102
-3.10 to -6.00 D	106
-6.10 to -9.00 D	58
> -9.10 D	12

I also prescribe Zymar and Pred Forte (both from Allergan, Inc.) q.i.d. postoperatively. I stop the antibiotic after the patient's eyes have re-epithelialized, and I generally have the patient use the steroid for 3 weeks after surgery. With PRK, my patients used the steroid for 3 to 4 months postoperatively and 1,000 mg of vitamin C for 3 months.

In my experience, the incidence of postoperative dry eye is less with EpiLase than LASIK. If a patient's vision is not at as should be postoperatively, however, and he refracts well but has a dry cornea, I will also prescribe Restasis. Many of my EpiLase patients are having a surface procedure precisely because they have dry eyes. I have started these individuals on Restasis and perhaps even placed punctal plugs preoperatively in an effort to prepare them for surgery. I have found that most patients require a minimum treatment of 6 months with Restasis after EpiLase. Only a few of my patients required ongoing therapy for their dry eyes. These were generally patients with a preexisting condition. Combination therapy with Restasis and punctal plugs quickly rehabilitates EpiLase patients who have dry eye. I also have them use preservative-free artificial tears q.i.d. for approximately 1 to 2 months at least.

**RESULTS**

Over the past year, I have performed EpiLase on approximately 300 eyes for which the sheet was removed and the intended result was plano (Figure 1 and Table 1). At 1 month postoperatively, approximately 76% of eyes achieved a BCVA of 20/25 or better, 90% achieved 20/30 or better, and 97% saw 20/40 or better. By 3 months, 97% of eyes saw 20/25 or better, and 100% saw 20/40 or better, with similar results at 1 year postoperatively. Although the immediate visual acuity seen with LASIK is not typical of EpiLase patients, the recovery period after EpiLase is shorter than it is with PRK, and the final visual results are equal with all three procedures by 1 month.

**CONCLUSION**

I like the EpiLase procedure because it is an elegant way to perform surface laser vision correction that provides excellent results and a good safety margin for patients who are at risk of complications and risk averse. As a surgeon, I like the tissue-sparing aspect of this procedure, particularly as more cases of postrefractive ectasia appear in the literature. I have patients who underwent EpiLase approximately 1.5 years ago, and many of them have 20/15 or better UCVA. I am impressed with the technology, and I believe a few more days of healing time are worth years of worry-free vision.

I have seen a change in my patients' attitudes toward laser vision correction. Many simply do not want a corneal flap or a corneal-scraping procedure. Surgeons need to keep an open mind about utilizing newer surface procedures. My own attitude has certainly changed. Two years ago my predominant procedure was LASIK. I now am very open and enthusiastic about having multiple refractive options for the right patients.

Whether a surgeon performs EpiLase, PRK, or LASIK, each procedure has its own set of risks and benefits. Although I have not turned my back on LASIK and still perform the procedure on suitable patients, my threshold for "going to the surface" certainly is much lower these days.

In my practice, if anything in a patient's preoperative workup, mapping, or examination gives me pause, I plan EpiLase for him. I do not even give it a second thought. ■

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