

Post-LASIK Dry Eye and Macrostromiae

BY ALAN R. FAULKNER, MD; STEPHEN F. BRINT, MD;
 G. BROCK MAGRUDER, JR, MD; AND PAUL H. HUGHES, MD

CASE PRESENTATION

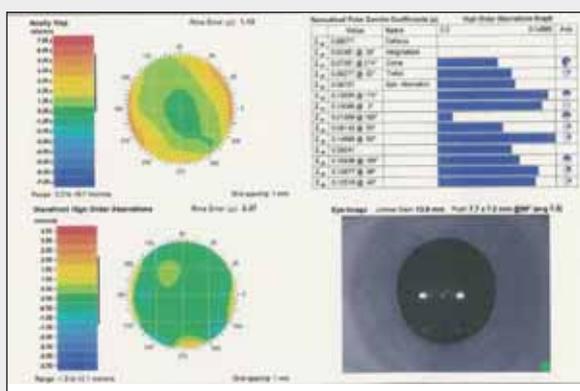


Figure 1. This Visx CustomVue image was difficult to obtain.

A 40-year-old female underwent myopic LASIK 1 year ago. Her preoperative manifest refraction was -4.25 D OU. The surgeon used a mechanical microkeratome and the Visx Star S4 laser (Advanced Medical Optics, Inc., Santa Ana, CA). The procedure was uneventful in her right eye. Intraoperatively, there was grade 4 loose epithelium in her left eye, and the surgeon placed a bandage contact lens at the conclusion of surgery.

One day postoperatively, the epithelium of the patient's left eye was intact, but the surgeon noted microstromiae in the flap. The bandage contact lens remained in place for 1 week, at which time the referring surgeon elected to remove it and lift the LASIK flap in order to treat the microstromiae and perform a corneal scraping procedure to address poor epithelial healing. The patient's UCVA was 20/60-2 OS, and her BCVA was 20/30 OS with a manifest refraction of -1.75 +1.00 X 100.

The patient's postoperative course over the next several months was complicated by dry eye disease, which the surgeon treated with punctal occlusion, Restasis (Allergan, Inc., Irvine, CA), oral supplements, and maximal medical therapy. Six months after the original surgery, he elected to treat the patient's residual refractive error of -1.50 +1.50 X 10, which yielded a BCVA of 20/25 OS.

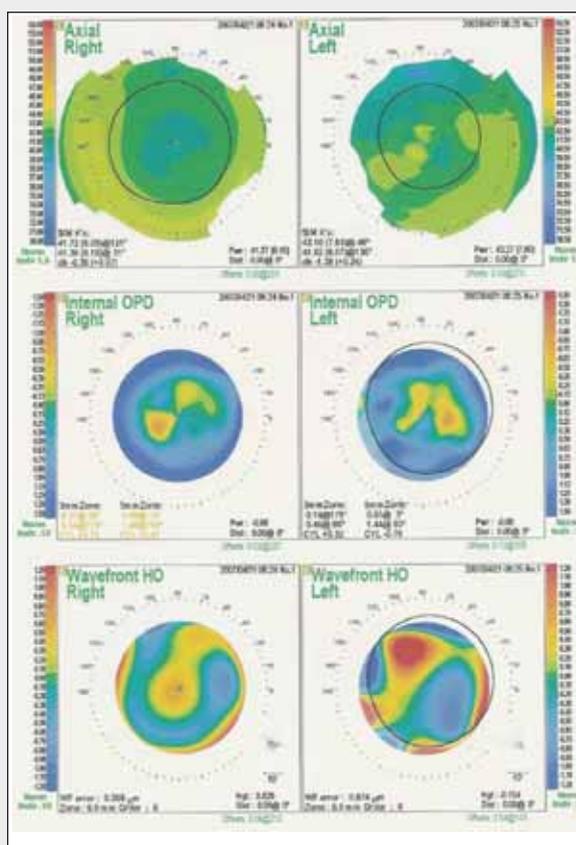


Figure 2. The Nidek OPD highlights the well-centered treatment OD and noted irregularity on computed topographic analysis and wavefront analysis OS.

Two months after the flap-lift LASIK enhancement, the patient is referred to you for evaluation and treatment. Her UCVA measures 20/15+1 OD and 20/25+1 OS. She describes seeing blurred and irregular shadowed letters with her left eye. A refraction of +0.75 +0.25 X 30 does not improve her symptomatic complaints but does allow her to read more letters on the 20/20 line. Her central pachymetry readings measure 498 μ m OD and 476 μ m

OS. The slit-lamp examination is remarkable for significant macrostriae through the visual axis of her left eye. Bilateral dry eye disease is evident, with decreased tear break-up times of less than 4 seconds and staining with Lissamine Green (Accutome, Inc., Malvern, PA) of the nasal and temporal conjunctiva of +4 and +3 out of 4 in her right and left eyes, respectively. Moderate corneal staining with fluorescein is present in both eyes.

The patient's recent medical evaluation revealed reduced thyroid function that did not require intervention. The patient notes that she has allergies to tetracycline antibiotics and is currently on hormonal replacement therapy. She requests treatment to address the visual complaints in her left eye. Figures 1 through 3 illustrate computed topographical and wavefront analysis of the patient's left eye upon her presentation to your practice. How would you proceed?

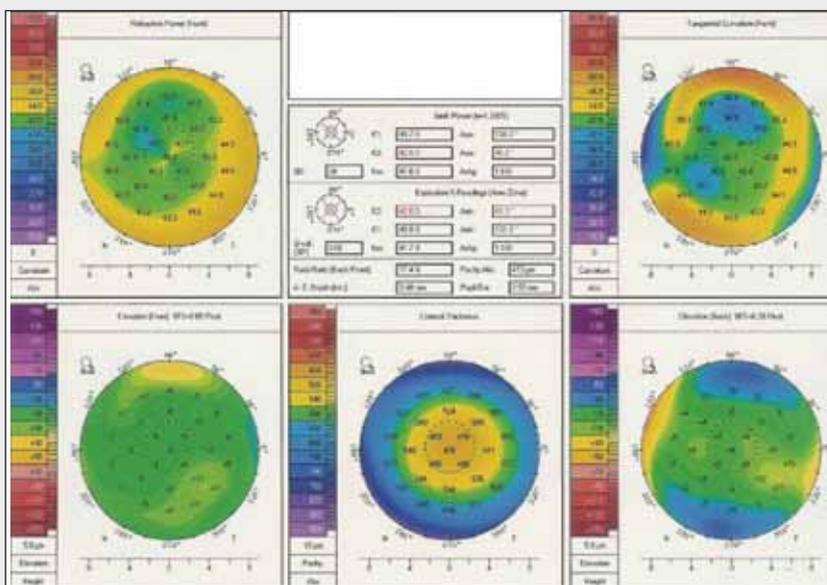


Figure 3. Irregular topographic changes were confirmed OS but also reveal an overall central pachymetry measurement of 476 μ m.

ALAN R. FAULKNER, MD

The examination and scans suggest that the visual complaints in the patient's left eye are most likely due to the topographic abnormalities caused by the flap macrostriae. Her dry eye condition and residual refractive error are contributory but appear to be minor factors as evidenced by the good UCVA in the right eye.

The first step would be to address the macrostriae. Given the length of time the striae have been present, a flap lift with suturing or phototherapeutic keratectomy most likely would be the best choices. Aggressive treatment of the ocular surface should be continued. Once the flap and refractive error are stable, I would consider a wavefront-guided PRK enhancement if indicated, and reliable aberrometry could be obtained.

The lesson to be learned in this case is the prevention of flap complications and aggressive early intervention when they occur. In more than 3 1/2 years of using the Intralase femtosecond laser (Intralase Corp., Irvine, CA), I have not experienced a significant epithelial slip or defect. To me, this is one of the most underrated advantages of laser-created flaps. When visually significant striae or a flap slip occurs, it needs to be treated aggressively as early as possible with flap lift and stretching. If the result is not satisfactory the following day, the lift and

stretch should be repeated. Although many methods of treating striae have been described (eg, epithelial removal, hypotonic saline, etc.), I have always been successful with lifting, removal of epithelium in the bed, and Weck cell smoothing and stretching.

STEPHEN BRINT, MD

I believe that the major issue that must be solved before a next step may or may not be necessary is the macrostriae. The dry eye situation must continue to be managed but seems to be able to be controlled by virtue of the fact that the right eye's acuity and comfort are successful. At this point, I think it will be necessary to lift the left flap, again clean out epithelial ingrowth if there is any, and suture the flap. I prefer the original 8-bite anti-torque 10—0 nylon suture that was taught by José Barraquer. It takes 1 month or so for the visual acuity to recover to the point that you can assess the patient's progress. I would leave the suture in place for 3 to 4 months. Striae typically induce hyperopia with cylinder as she currently has, which may be improved with the suture alone. This ultimate refraction is somewhat in question, however, because of the initial enhancement for apparent residual myopia. No additional laser refractive procedure should be done at this time. When the suture is out and the

refraction is stable, careful custom enhancement should be considered based on the refractive error and symptoms. Now there are high higher-order aberrations (especially coma), but this is impossible to judge with the macrostriae. The dry eye therapy needs to be continued, with perhaps a 2-week waiting period to resume the Restasis following the suturing, which will require a bandage soft contact lens for 3 to 5 days.

G. BROCK MAGRUDER, JR, MD

This patient has two problems: (1) significant post-LASIK dry eye disease in both eyes and (2) irregular astigmatism and loss of BCVA associated with significant flap striae in the left eye. She is apparently perimenopausal and perhaps becoming presbyopic.

The first issue to address is her frustration regarding her situation. This problem can be significant, especially if she felt dismissed or that her complaint was trivialized by the original surgeon or center. I recommend actively listening first, then acknowledging the validity of her problem. I would reassure her that she will get better, and that the improvement will likely be gradual and over a long time period. I would aim to keep her informed and be positive.

The next problem to address is the dry eye. I would treat her with Restasis, lubricants, perhaps punctal occlusion, oral supplements, and time. She might benefit from a change in her hormonal supplements. I would not intervene surgically until, at a minimum, her clinical signs were normalized. Some patients will have a significant decrease in symptoms related to her loss of BCVA (blurriness, shadowing) as the dry eye improves. As she is only 2 months out from her last procedure, there is the potential for a gradual improvement in her BCVA. I think there is a fair possibility of avoiding more surgery, and this should be emphasized. Typically, these patients want you to “fix it today.”

Once the dry eye situation was optimized, I would re-evaluate. If her blur symptoms persisted, and there was no change in the striae, I would lift the flap and stretch and suture with five or six interrupted radial 10—0 nylon sutures. Based on the degree of striae, I might debride the epithelium as well. I would be wary of poor flap anatomy (ie, thin, near buttonhole, asymmetrical, narrow hinge) as I lifted. I would place a bandage contact lens and leave the sutures in for 2 to 8 weeks. Vigorous dry eye treatment would be maintained post-operatively.

Any future laser treatments, if needed, would be done on the surface. If she were left with a refractive error and normal BCVA, I would treat her with a wave-front-optimized ablation. If she has persistent irregular

astigmatism and loss of BCVA, and the striae are resolved, I would offer referral for topography-guided treatment. If her symptoms are unimproved, and the striae remain, I would re-treat the striae.

PAUL H. HUGHES, MD

I believe that the patient's problems are related to the grade 4 loose epithelium in her left eye, which is a consequence of the mechanical microkeratome and her ocular dryness. I concur with the surgeon's initial reaction to place a contact lens on the eye but am mystified as to why he left the contact lens in situ for an additional 6 days. My rationale is that the contact lens would have led to flap edema and contributed little once the epithelium was intact. I feel the case also highlights the problems of loose epithelium at the time of flap creation in that it is very difficult to replace the flap and minimize complications such as microstriae. I would not have relifted the LASIK flap in order to treat the microstriae, and I certainly would not have performed a corneal scraping—this, I believe, is the basis of her poor vision.

I note that the dryness is an ongoing problem, but it affects both eyes, has been treated, and although a complicating factor, it is not a causative aspect of her problems. The residual refractive error that the surgeon elected to treat was astigmatism, and taking into account dry eyes, I admit that I would not have performed an enhancement at that stage.

This patient has three problems: (1) irregular astigmatism, which is confirmed with a Nidek OPD scan and also prevents capturing good Visx CustomVue images; (2) macrostriae that runs through the visual axis; and (3) dry eyes.

What to do now? First, I would counsel the patient regarding the existing problems and the longevity of treatment to attain a successful outcome. I would tell her that my first goal would be to try and improve her dry eye signs and symptoms. The next point is the significant macrostriae from which the patient suffers, and I feel strongly that as her uncorrected vision is 20/25, I would be in no hurry to address this in light of her astigmatism and dry eye problems.

I believe the patient's most significant problem is irregular astigmatism as a consequence of the flap lift and epithelial debridement early in her management. This is the reason that it is difficult to obtain good Visx CustomVue images and rules out further laser treatment at this stage. I would point out to the patient that the result in her right eye is outstanding with her vision is better than 20/20. The vision in her left eye is only one line down. I would wait at least 12 months before performing any further treatment apart from dry eye man-

agement. If at that time she still wished something to be done, I would perform a transepithelial PTK and then reassess her visual symptoms. Finally, I have not recommended treatment for the macrostriae through the visual axis considering her existing problems and the fact that her vision is satisfactory.

I believe that watchful waiting is the treatment of choice followed by addressing the patient's dry eye symptoms and then attempting to treat her irregular astigmatism. As mentioned, this management would all be associated with counseling and patience by both the patient and the physician. ■

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