Optimizing the Ocular Surface for Laser Corneal Refractive and Refractive Cataract Surgery

Tips on screening and treatment.

BY KENNETH A. BECKMAN, MD

Thanks to rapid advances in the techniques and technologies for laser cornea refractive and refractive cataract surgery, the precision of today's surgical outcomes is unprecedented. This success has led to soaring, often unrealistic expectations and demands on the part of patients.

In response, ophthalmologists and industry have directed their attention to the ocular surface, the good health of which is essential to achieving the highest level of surgical success. Clinicians have long understood that an intact ocular surface decreases the perioperative risk of infection. Today, they also recognize it as essential to the accuracy of preoperative keratometry, topography, and wavefront aberrometry and, therefore, to IOL selection and refractive outcomes. Optimizing the health of the ocular surface, moreover, may speed its postsurgical recovery and decrease the risk of visual aberrations that can compromise postoperative visual acuity.

This article shares my strategies for optimizing the ocular surface to promote the best possible results with laser cornea refractive and refractive cataract surgery.

PREOPERATIVE SCREENING AND TREATMENT

The preoperative assessment always begins with a detailed history. The practitioner identifies the patient's visual complaints in order to determine how they affect the activities of daily living. Clinicians can identify the symptoms of ocular surface disease (OSD) even before beginning the examination. Warning signs include fluctuating vision, fatigue after prolonged reading or computer use, and contact lens intolerance. Although patients often do not associate these symptoms with dry eye disease, they may require aggressive treatment.

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Physicians must closely examine the lid margins, tear film, and cornea. Lid margin disease is often the source of poor surgical outcomes. Common signs include thickened meibomian gland secretions and lash debris. Pushing on the lid margins to assess the quality of meibomian secretions may reveal lid margin disease in patients who, at first glance, do not appear to have the problem. I instruct patients with lid margin disease to use warm compresses and lid hygiene. My initial approach to medical therapy is topical azithromycin (AzaSite; Merck & Co., Inc.) b.i.d. for 2 days, followed by q.h.s. for up to 4 weeks. Topical azithromycin with warm compresses was found to be superior to warm compresses alone for the treatment of the signs and symptoms of posterior blepharitis.[1] I often instruct patients to begin oral omega-3 supplements as well.

Tear film dysfunction frequently coexists with lid margin disease and may lead to suboptimal surgical outcomes. I therefore typically measure the tear break-

up time and assess conjunctival and corneal staining with lissamine green and fluorescein dyes. Although it can certainly yield useful information, I tend not to perform Schirmer testing, because I find other options easy and more reliable. Tear osmolarity testing is now available, and matrix metalloproteinase-9 testing will soon be as well. I find these tests to be particularly useful for assessing the quality of the tear film.

To improve the tear film, I typically begin by prescribing preservative-free artificial tears but often add topical cyclosporine ophthalmic emulsion 0.05% (Restasis; Allergan, Inc.) b.i.d. Patients may need counseling to understand that 6 weeks or more may elapse before this regimen produces improvement; they are often eager to proceed with surgery and perceive treatment as a major setback. For particularly inflamed eyes, I may add a short course of topical steroids such as lotoprednol etabonate ophthalmic gel 0.5% (Lotemax 0.5% Gel Drop; Bausch & Lomb) b.i.d. I rarely use punctal plugs at this stage, particularly if the eyes appear inflamed, but this modality can be quite helpful to many patients. I find that plugs may be of use during the postoperative phase if the epithelium is slow to heal.

Additional testing that can reveal OSD includes topography and keratometry. I try to obtain multiple keratometry readings. If the readings are not consistent, if there is a dropout of information, or if the mires are irregular, I initiate OSD treatment and bring the patient back at a later date to repeat the testing. Again, the delay can frustrate patients, so I thoroughly explain that a healthy surface is essential to a successful outcome.

Much can be learned from corneal topography photographs, so I carefully look for irregularities that may affect outcomes. If the patient whose topography is shown in Figures 1 and 2 had received a toric IOL or undergone refractive surgery, for example, the results would have been poor.[2]

The position, contour, and function of a patient's eyelids can also greatly alter the ocular surface and affect surgical outcomes. Significant ptosis, lesions, and chalazia can alter corneal measurements and compromise vision. A poor blink reflex or poor lid closure may put the patient at high risk of suboptimal outcomes as well. Although these findings are not necessarily contraindications for surgery, they may need to be addressed

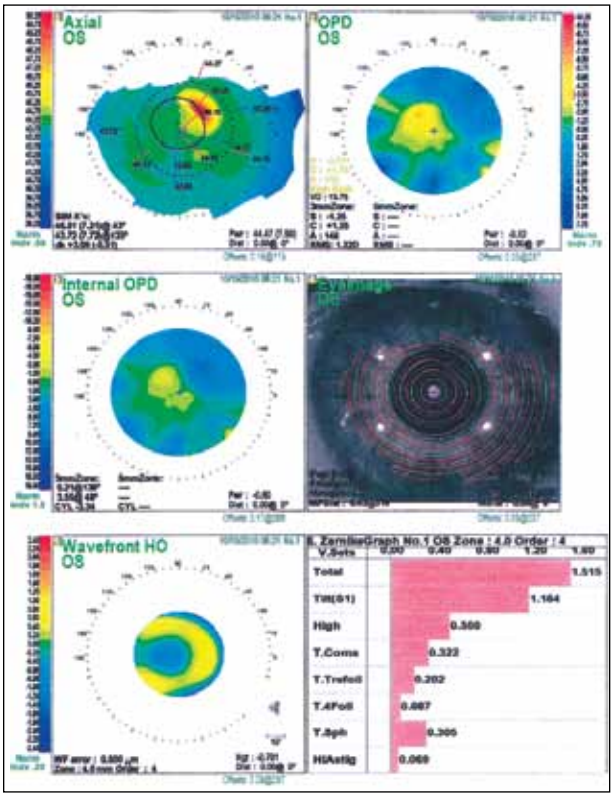

Figure 1. Corneal topography for a patient with blepharitis and dry eye disease. Note the irregular mires and 3.00 D of irregular astigmatism.

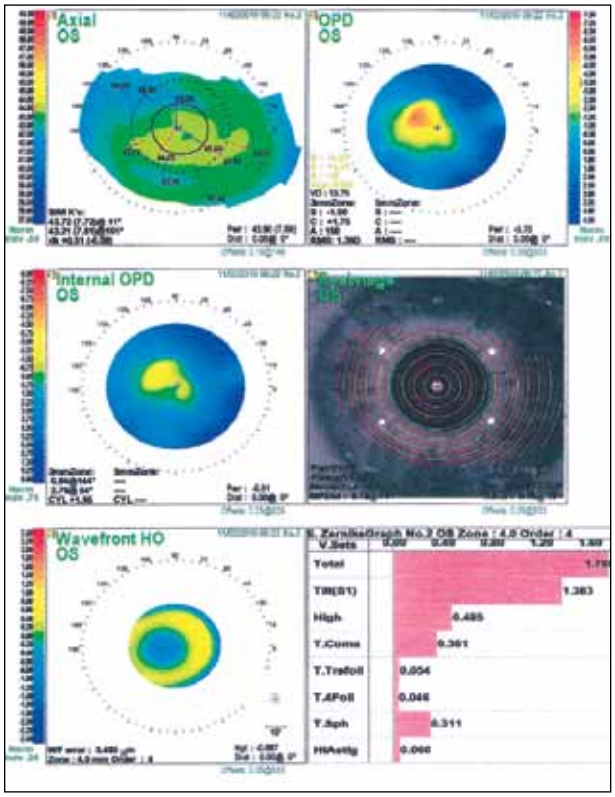

Figure 2. Corneal topography for the same patient after 2 weeks of treatment. Note the regular mires and dramatic decrease in corneal astigmatism.

before refractive cataract or laser cornea refractive procedures can be performed.

Finally, contact lens wear may warp the cornea and cause measurements to be inaccurate. I require patients to discontinue wearing rigid contact lenses for at least 2 weeks and soft contact lenses for at least 1 week before preoperative testing. If I am still not satisfied with the appearance of the keratometry or topography results, then I may have them spend additional time out of their contacts before repeating the testing.

POSTOPERATIVE CARE

After surgery, careful monitoring of the ocular surface should continue, because problems here can become a major source of frustration for the patient. LASIK patients, in particular, may suffer from dry eyes for months to years. They may require the previously described therapies indefinitely. When the epithelium is healing poorly, other etiologies may need to be considered. Bandage contact lenses work well, but if the defect persists for more than 1 week, then I often add an oral antiviral agent if I suspect herpes simplex virus. Punctal plugs can be helpful in this setting. I also occasionally add compounded serum tears, which work well for these patients in my experience.

CONCLUSION

The ocular surface profoundly influences the outcome of laser refractive and refractive cataract surgery as far as perioperative infection, preoperative surgical calculations, and postoperative visual aberrations. Optimizing the ocular surface is therefore critical. Through its meticulous evaluation and treatment, surgeons can attain the highest-quality postoperative visual acuity for their patients. ■

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