dry eye is a recognized side effect after refractive surgery. LASIK and PRK, for instance, often trigger symptoms that bring much misery to patients, including itchy, fatigued, and stinging eyes. I make it a priority to pretreat all refractive surgery patients, especially those who have an increased preoperative risk for dry eye.

**BUT MY EYES DO NOT FEEL DRY**

Refractive surgery patients often find my interest in their tear film composition odd. Their main priority for visiting my clinic is restoring clear vision, and therefore performing dry eye tests and recommending dry eye treatment before surgery often appears unnecessary. However, I believe that dry eye syndrome (DES) is a condition for which the old adage, “prevention is better than cure,” applies, and I am always eager to convey this message to my refractive surgery patients.

Bailey and Zadnik have shown that virtually all laser eye surgery patients experience some degree of DES in the first 6 months after surgery, with symptoms persisting beyond 6 months in nearly 20% of patients. Others have demonstrated that refractive surgery patients with preexisting, albeit subclinical, dry eyes have the highest risk of experiencing long-term postoperative dry eye symptoms, thus illustrating the importance of identifying and pretreating DES before the patient undergoes any type of refractive surgery.

**BEST COURSE OF ACTION**

1. **Identify the problem.** Tear film composition and osmolarity usually deviate from normal in patients with DES. Tear hyperosmolarity, defined as a tear concentration of 308 mOsm/L or greater, is a highly accurate marker of DES. The TearLab Osmolarity Test (TearLab Corp., San Diego), takes less than 1 minute and can be used in the clinical setting to identify DES and quantify its severity. A test strip mounted on a small handheld device is placed on the lower eyelid to collect a tear sample. This test does not require dyes, local anesthetics, or other traditional ocular diagnostic aids. Mild dry eye is diagnosed when the osmolarity reading falls between 308 and 316 mOsm/L; osmolarity values above 316 mOsm/L are indicative of moderate to severe dry eye (Figure 1).

   The LipiView Ocular Surface Interferometer (TearScience Inc., Morrisville, North Carolina) is another tool that I use to detect dry eye preoperatively in my refractive surgery patients. It uses advanced interferometry to visualize the tear film. When a good quality tear film is exposed to a light source, it is visualized as an array of colors. The LipiView interferometer uses this mechanism to determine the quality of the tear film. Like the TearLab Osmolarity Test, it is a noninvasive, office-based test, and it takes less than 3 minutes to obtain a result.

   The final tool that plays an important role in the diagno-
sis of DES is the Meibomian Gland Evaluator (TearScience Inc.), a handheld device that identifies meibomian gland dysfunction (MGD) by assessing the number and the level of function of lipid secreting-meibomian glands. Because MGD is a leading cause of DES, it is important to detect it to ensure that dry eye treatment specifically targeting the meibomian glands is implemented. Pressure is applied to the lid margin with the device, and the lid margin is then examined at the slit lamp.

Step No. 2: Alleviate the problem. Pretreating dry eye is an important step in the prevention of dry-eye–related patient discomfort, but it is especially crucial in refractive surgery patients because postoperative DES can greatly compromise visual acuity and ruin an otherwise near-perfect visual outcome. In my practice, I usually perform LASIK, Supraco or Intraco with the Victus femtosecond laser (Technolas Perfect Vision GmbH, Munich, Germany), PRK, or corneal inlay implantation to correct refractive error. However, I have found that the final visual result after some of these procedures, especially corneal inlay implantation, is strongly affected by the presence of dry eye. The Kamra corneal inlay (AcuFocus, Inc., Irvine, California), for instance, allows only central light rays to reach the retina through a 1.6-mm diameter hole. As a result, the presence of dryness on the central aspect of the cornea can distort the final image achieved from the transmitted light rays.

To reduce the risk of compromised visual acuity after corneal inlay implantation or other refractive surgery procedures, I implement an aggressive dry eye pretreatment plan. I always recommend a regimen consisting of twice-daily lid hygiene scrubs and warm compresses, as well as lubricating eye drops (preservative-free hyaluronic acid artificial tears) used at regular intervals throughout the day. Punctal plugs are also extremely useful for the treatment of DES and can be placed before any surgery is performed.

Because DES is an inflammatory condition, reduction of inflammation is necessary to minimize symptoms. Cyclosporine is extremely useful for reducing postoperative dry eye in patients with marked preoperative hyperosmolarity or tear film abnormality.

For patients with MGD, which often leads to blepharitis and eyelid infection, I also prescribe preservative-free topical antibiotics to treat preexisting lid margin infection, and I use the LipiFlow Thermal Pulsation System (TearScience Inc.) to unblock the meibomian glands via heat and pulsatile pressure. Within 2 weeks after this treatment, meibomian gland lipid secretion increases and any infection in the lid margin clears.

Nutritional therapy also has an important role in pretreatment for DES. I advise patients to take high-dose capsules containing omega-3 and omega-6 fatty acids on a daily basis starting 1 month before surgery to help maintain the tear film’s normal lipid composition. For more information on nutritional therapies, see Jeffrey R. Anshel, OD, FAAO’s article, Nutritional Therapies to Improve Surgical Outcomes, on page 52.

THE END OF THE BEGINNING, NOT THE BEGINNING OF THE END

With highly accurate and convenient diagnostic tools such as the TearLab Osmolarity Test and LipiView systems, I can easily retest patients after they have implemented a recommended routine for 1 to 2 months. At this time interval, it is usual to see an improvement in dry eye measurements. When I know that a patient’s ocular environment is stable and dry eye is no longer a problem, I feel confident that postoperative DES will not compromise his or her surgical results. This of course is not the end, as the risk of dry eye remains in any refractive surgery patient—even after successful pretreatment. It is therefore crucial to continue with aggressive dry eye therapy and monitoring postoperatively. We must always convey the importance of treatment adherence to all patients.

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