Dry eye disease (DED), a common condition that occurs when the eyes are insufficiently moisturized, leads to itching, redness, and pain from dry spots on the surface of the eye. The eyes may become dry and irritated because the tear glands do not produce enough tears or because of a chemical imbalance causing evaporation of the tears. Meibomian gland disease (MGD) is a primary cause of the evaporative form of DED. When these glands in the eyelids malfunction, the lipid component of the tear film can be reduced, allowing rapid evaporation of aqueous from the tear complex. Furthermore, if the glands’ secretions become trapped inside the glands, inflammation and bacteria can follow, worsening the problem.

Patients with DED often experience irritating symptoms that may result in more serious damage to vision if the condition is left untreated.

TREATING DED

The treatment for DED depends on the cause and severity of the condition, as well as the patient’s overall health and personal preference. Nonprocedural treatments are often effective; these may include artificial tears or moisturizing ointments, punctal plugs, cyclosporine ophthalmic emulsion 0.05% (Restasis; Allergan), warm compresses and good lid hygiene, and attention to diet and nutrition, including the use of oral omega-3 fatty acid supplementation.

When traditional therapy fails or does not provide adequate relief, other methods may bring comfort. One modality gaining attention is the use of broadband light (BBL), or intense pulsed light (IPL). BBL therapy for DED is provided by a targeted wavelength of light (typically 560 nm) that specifically focuses on blood vessels near the surface of the skin. The light also has an impact on bacterial flora on the skin and the eyelid, as well as increasing the skin temperature, all of which can have a beneficial effect on the meibomian glands and their function.

At Vance Thompson Vision, we have been employing BBL therapy in the treatment of evaporative DED and our patients are experiencing successful results. We use the Joule phototherapy system (Sciton), originally developed for use in dermatology, to safely and effectively heat affected blood vessels of the lower eyelids. The theory behind how it works is that as the blood vessels shrink, thereby diminishing inflammation that was brought to the skin and the meibomian glands through the vessels, allowing the glands to function more normally and ultimately decrease the symptoms and signs of DED.

LESSON FROM AESTHETICS CLINIC

The idea of using light therapy to treat patients with DED was anecdotally discovered during the use of the light-emitting device for treatment of a common dermatologic condition: rosacea. The use of BBL or IPL is FDA approved for the treatment of rosacea, acne, hyperpigmentation, and helping diminish the appearance of fine lines and wrinkles. At a certain wavelength, the light emitted by the BBL device is absorbed by oxyhemoglobin in the blood vessels on the skin surface. The absorption generates heat that coagulates cells, leading to thrombosis of the blood vessels, thus minimizing redness and improving the appearance of the skin.

This treatment came into ophthalmology after anecdotal reports of clients who were being treated for rosacea (who also had DED) stating that not only did their skin look better, but their eyes felt better, too. Clinical examinations confirmed these reports, even though the treatment was not...
applied directly to the eyelid or meibomian glands.

After we opened our skin and laser center in 2013 (Artisan 57, in association with Vance Thompson Vision) we began investigating this phenomenon further using the Joule BBL instrument. We were looking for a treatment device that could help improve the appearance of patients’ skin and that could also be used in the DED clinic. Although the device is not designed to treat DED or MGD, we found that after BBL treatment, patients’ MGD and signs and symptoms of DED improved. These patients’ eyelids looked less inflamed with fewer blood vessels, the meibomian glands were less plugged, the secretions were thinner, and, most important, many of the correctly selected patients had reduced symptoms, both objectively and subjectively.

“WORLD’S BEST WARM COMPRESS”

BBL treatments for MGD can provide better results than constantly performing at-home warm compresses and lid massage. We believe that when the light is absorbed by the blood vessels, it generates heat in the dermal layer that liquefies inspissated meibomian gland secretions and opens the glands. In our clinic, we express the glands right after treatment, which offers patients some immediate relief before the light treatment begins to work.

Research in the field of dermatology has uncovered several other relevant effects of BBL treatment. By closing off blood vessels near the surface of the skin, the treatment decreases the levels of inflammatory cytokines, which contribute to MGD.1 In addition, BBL decreases the bacterial load on the skin, which is one of the reasons it helps with acne. There is also evidence that BBL decreases parasites on the eyelash margin that can cause meibomian gland problems.

When patients come to our clinic, we perform a complete DED diagnostic assessment including the use of a DED questionnaire, TearLab Osmolarity System (TearLab), InflammaDry (Rapid Pathogen Screening), HD Analyzer (Visiometrics), Schimer testing, vital dye assessment with sodium fluorescein and lissamine green, tear meniscus evaluation, and meibomian gland expression with a consistency evaluation.

Patients with evaporative DED are instructed to begin using warm compresses and massage, and we prescribe doxycycline, AzaSite (azithromycin ophthalmic solution; Akorn), and/or Lotemax gel (loteprednol 0.5%; Bausch + Lomb) to address the inflammatory components. For nonresponsive patients or those with more progressive/chronic conditions, we recommend BBL therapy. BBL treatment should be used only for patients with Fitzpatrick skin type 4 or below to avoid causing unwanted lightening of the skin color or chance of blistering. For appropriate patients, we begin by placing a scleral shield over the eyes, and then we treat the entire lower eyelid and periorbital region, extending out toward the ears. We do not directly treat the glands on the upper lid for several reasons. First, when the side of the lid is treated, blood vessels that feed into the upper glands are closed off. Second, once the lower glands are working better, the lids are better apposed, which makes the pumping mechanism that accompanies blinking more effective in the upper glands. Third, some of the heat is transferred from the treatment, so the “warm compress effect” is achieved indirectly on the upper glands. We have found, therefore, that the upper glands open up and allow expression without direct treatment.

CONCLUSION

We typically recommend a minimum of four treatments, spaced 1 month apart, depending on the severity of the patient’s MGD. It can take this amount of time to see changes in secretions and improve the function of the glands. We recommend maintenance treatments every 6 to 12 months.

One patient told us that, for the past 20 years, his life revolved around thinking about his DED every single day. After having the BBL treatment, he can now go days without thinking about his eyes, and he stated that his life is more enjoyable. This is what we hope for all DED sufferers, and we look forward to future advancements in both medical and procedural care for this disease.

Alison Tendler, MD, specializes in cataract and lens implant surgery and refractive surgery at Vance Thompson Vision and is medical director of Artisan 57, the laser and medical skin care clinic within Vance Thompson Vision, in Sioux Falls, South Dakota. She has a financial interest in Allergan. Dr. Tendler may be reached at alison.tendler@vancethompsonvision.com.

Jason Schmit, OD, specializes in oculoplastic, aesthetic, cataract, and refractive clinical care at Vance Thompson Vision in Sioux Falls, South Dakota. He is instrumental in leading the practice’s Dry Eye Center of Excellence. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Schmit may be reached at jason.schmit@vancethompsonvision.com.
