TOOLS AND TECHNIQUES FOR MANAGING MGD

What's available—and what's coming.

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Meibomian gland dysfunction (MGD) is a leading cause of dry eye disease (DED) that was once primarily managed with warm compresses. Treatment of this condition has evolved significantly with the development of in-office technologies and pharmaceutical options. This article explores the latest innovations reshaping how we manage MGD.

TODAY'S TREATMENT OPTIONS

MGD is closely linked with ocular rosacea, a chronic inflammatory skin condition.[1] One of the most effective treatments for rosacea is intense pulsed light (IPL) therapy, which is FDA-approved for treating ocular rosacea and associated DED. IPL therapy uses broad-spectrum light filtered to target specific chromophores in the skin. It can help reduce eyelid telangiectasia and inflammation and improve meibomian gland expressibility.[2]

Low-level light therapy is a light-based modality that may be used alone or in conjunction with IPL therapy. It emits red and near-infrared light to support tissue repair and reduce inflammation.[3]

When inflammation or telangiectasia is not present, thermal treatments such as the LipiFlow Thermal Pulsation System (Johnson & Johnson Vision), MiBo Thermoflo (MiBo Medical Group), TearCare (Sight Sciences), Systane iLux MGD Thermal Pulsation System (Alcon), MGrx (OcuSci), and radiofrequency can be effective for liquefying and clearing meibomian secretions. In cases of long-standing MGD, intraductal probing may be necessary to relieve periductal fibrosis caused by chronic inflammation and gland obstruction (Figure 1).[4]

NEW AND EMERGING THERAPIES

Powered by proprietary Thermo-Mechanical Action, Tixel i (Novoxel) uses a heated matrix of pyramid-shaped pins to transfer brief, controlled thermal energy to the skin. This nonablative, contact-based technique has been used in dermatology to treat conditions such as actinic keratosis, acne, and wrinkles (Figure 2). Recent studies show that periocular application of Tixel may improve meibomian gland function, reduce inflammation, and enhance tear film stability to help manage evaporative DED.[5,6]

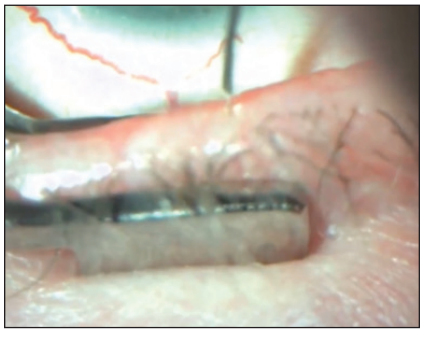

Figure 1. Intraductal probing with a 2-mm probe.

Photo courtesy of Lauren Bailey, OD

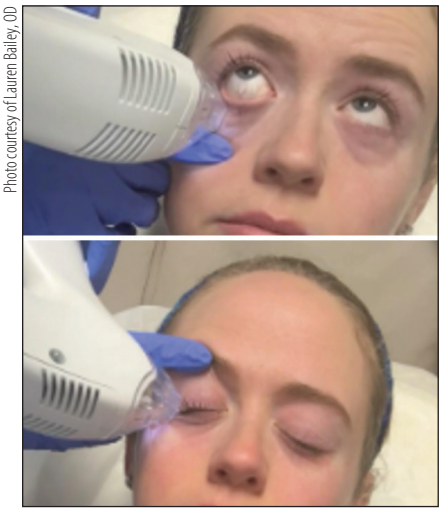

Figure 2. Treatment of the lower and upper eyelids with Tixel i.

Photo courtesy of Kambiz Silani, OD

Figure 3. Insertion of the OptiVize applicator.

Dynamic Muscle Stimulation Technology by Lumenis, used in the OptiLift and TriLift devices (Lumenis), is a noninvasive therapy that uses electrical impulses to stimulate the periorbital muscles and soft tissue. Applied to the lower eyelid area, it is intended to improve eyelid tone and blink dynamics. A study found that it significantly improved lower lid laxity, blink rate, blink quality, and patient-reported DED symptoms in patients with moderate to severe MGD. The mechanism is believed to involve fibroblast stimulation, promoting collagen production and skin elasticity.[7]

Biofilm at the eyelid margin has long been recognized as a contributing factor to MGD and chronic blepharitis.[8] It serves as a reservoir for bacterial exotoxins that may trigger an immune response, leading to inflammation and surface findings such as erythema and folliculitis. At-home and in-office blepharoexfoliation with devices such as BlephEx (BlephEx) and Zocular Eyelid System Technology (Zocular) are often combined with other MGD treatments to address this.

A newer device, OptiVize (OptiVize), is designed to address biofilm within the meibomian glands themselves (Figure 3). It delivers a harmonically tuned electric current that vaporizes internal biofilm and liquefies hardened meibum. This is followed by heated ultrasonic forceps to express the glands and remove residual debris. This approach helps set the stage for the Recognize, Exfoliate, Vaporize, Vibrate, Express (REVVE) protocol, which targets both surface and intraglandular components of disease using a stepwise treatment model. Early clinical use of the REVVE protocol shows improvement in gland expressibility and patient symptoms.

Demodex blepharitis is common in patients with MGD.[9] Lotilaner ophthalmic solution 0.25% (Xdemvy, Tarsus Pharmaceuticals) is an FDA-approved treatment for this condition. In a randomized, vehicle-controlled phase 3 trial, lotilaner achieved collarette cure in 56% of patients, marked collarette reduction in 89%, and complete mite eradication in more than 50% by week 6.[10] All primary and secondary endpoints were met with high statistical significance. The treatment was well-tolerated, with compliance and no major safety concerns. In addition to improving blepharitis symptoms, emerging data suggest a 6-week course of lotilaner may enhance meibomian gland expressibility and function.[10,11]

Another emerging therapy is AZR-MD-001 (Azura Ophthalmics), a topical keratolytic and lipogenic agent containing selenium sulfide. In a recent double-masked, controlled trial, the 0.5% formulation significantly improved key factors, including meibomian gland yield, meibum quality, tear film stability, and patient-reported symptoms.[12] These findings suggest AZR-MD-001 may be a valuable addition to the therapeutic arsenal—either as an adjunct to device-based treatment or as a standalone option for patients seeking a noninvasive solution.

LOOKING AHEAD

With advances in light-based therapy, thermal expression, pharmaceutical innovation, and novel techniques targeting biofilm and muscle function, MGD management has entered a new era. As clinicians, we now have more tools than ever to personalize care, target the root causes of dysfunction, and improve quality of life for patients struggling with DED. These developments not only represent significant progress, but also raise the bar for what we consider effective, evidence-based MGD care. ■

1. Dell SJ. Intense pulsed light for evaporative dry eye disease. *Clin Ophthalmol*. 2017;11:1167-1173.
2. Lei Y, Peng J, Liu J, Zhong J. Intense pulsed light (IPL) therapy for meibomian gland dysfunction (MGD)-related dry eye disease (DED): a systematic review and meta-analysis. *Lasers Med Sci*. 2022;38(1):1.
3. Markoulli M, Chandramohan N, Papas EB. Photobiomodulation (low-level light therapy) and dry eye disease. *Clin Exp Optom*. 2021;104(5):561-566.
4. Magno M, Moschowits E, Arita R, Vehof J, Utheim TP. Intraductal meibomian gland probing and its efficacy in the treatment of meibomian gland dysfunction. *Surv Ophthalmol*. 2021;66(4):612-622.
5. Shah S, Dutta D, Barua A, Hanneken L, Naroo SA. The effect of non-ablative thermomechanical skin treatment (Tixel) on dry eye disease: a prospective two centre open-label trial. *Cont Lens Anterior Eye*. 2023;46(2):101811.
6. Sadri E, Verachtert A, Parkhurst GD, et al. Effectiveness and safety of a thermo-mechanical action device versus thermal pulsation device in the treatment of meibomian gland dysfunction. *J Cataract Refract Surg*. 2024;51(4):274-281.
7. Chelnis JG, Chelnis A. Dynamic muscle stimulation of the periorbital area for improvement of blinking in dry eye patients. *Clin Ophthalmol*. 2025;19:1057-1071.
8. Rynerson JM, Perry HD. DEBS – a unification theory for dry eye and blepharitis. *Clin Ophthalmol*. 2016;10:2455-2467.
9. Bhandari V, Reddy JK. Blepharitis: always remember *Demodex*. *Middle East Afr J Ophthalmol*. 2014;21:317-320.
10. Gaddie IB, Donnenfeld ED, Karpecki P, et al. Lotilaner ophthalmic solution 0.25% for *Demodex* blepharitis: randomized, vehicle-controlled, multicenter, phase 3 trial (Saturn-2). *Ophthalmology*. 2023;130(10):1015-1023.
11. Syed YY. Lotilaner ophthalmic solution 0.25%: first approval. *Drugs*. 2023;83(16):1537-1541.
12. Watson SL, Jones LW, Stapleton F, et al. Efficacy and safety of AZR-MD-001 selenium sulfide ophthalmic ointment in adults with meibomian gland dysfunction: a vehicle-controlled, randomized clinical trial. *Ocul Surf*. 2023;29:537-546.

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