Blepharitis is a common type of ocular surface disease (OSD). It can be a source of frustration for both practitioners and patients, affecting spectacle and surgical refractive accuracy, infection risk, and both visual and physical comfort.

The American Optometric Association defines blepharitis as an inflammatory condition of the eyelid causing redness, itching, and dandruff-like scales on the lashes. According to the American Society of Cataract and Refractive Surgery’s Preoperative OSD Algorithm, blepharitis is a common cause of cataract surgery cancellation and a major risk factor for postoperative endophthalmitis.\(^1\)

This article evaluates current treatment algorithms and research aimed at managing this condition.

**BLEPHARITIS: THE BREAKDOWN**

*Anterior blepharitis* affects the external lids, lashes, and external glands, whereas *posterior blepharitis* affects the meibomian glands and the posterior lid margin. The workup is typically the same for all types of OSD, including blepharitis and meibomian gland disease (MGD), with investigations including a detailed history, patient questionnaire (Standard Patient Evaluation of Eye Dryness [SPEED]), Ocular Surface Disease Index [OSDI]), topography, noninvasive tear meniscus height and tear breakup time, meibography, testing for tear osmolarity and levels of matrix metalloproteinase 9 (MMP-9), and detailed slit-lamp examination.

**Anterior Blepharitis**

Anterior blepharitis can be further subdivided. Conditions with bacterial origins, including staphylococcal, are characterized by signs including scurf, collarettes, missing lashes, lid margin
erythema, and edema. For seborrheic conditions, signs include greasy flakes and mild redness; these may become ulcerative (ie, debris removal leaves ulceration and/or bleeding).

Parasitic *Demodex* mites are also a common source for anterior blepharitis. Collarette sleeves on upper lashes are pathognomonic for this source. Other signs include chronic lid margin inflammation and resilience to standard lid scrubs.

**Posterior Blepharitis**

The International Workshop on Meibomian Gland Dysfunction described posterior blepharitis as an inflammatory condition of the posterior lid margin, of which MGD is one possible cause. MGD can originate from anterior blepharitis and underlying systemic inflammatory conditions such as rosacea. Chronic lid inflammation leads to terminal duct obstruction and changes or reduction in meibomian secretion.

Noninflammatory MGD cases exist; these can still exhibit signs of minimal or turbid gland expression with symptoms of an inadequate tear film. For this reason, I recommend both observation and digital expression of meibomian glands in an OSD workup. MGD leads to OSD by causing tear hyperosmolarity, increased evaporation of tear film, and inflammation.

**TREATMENT TALK**

For all types of blepharitis, the goal is to eliminate lid and lash buildup, reduce organism biofilm, and reduce inflammation.

Antibiotics, both topical and oral, have their place in blepharitis management by reducing bacterial load. A recent study found that 20% of blepharitis cultures were resistant to macrolides, erythromycin specifically, and that 3.6% were tetracycline-resistant.

A Combination Approach

My approach to managing blepharitis is a combination of in-office and at-home treatment. For anterior blepharitis, I begin with blepharexfoliation (Figure 1), which thoroughly and safely removes lid and lash debris, bacterial biofilm, and keratinization of the lid margin and meibomian gland orifices. Next, I add a daily hypochlorous acid spray (now available over the counter and by prescription). Romanowski et al demonstrated that bacteria in biofilms were killed by hypochlorous acid 0.01% solution alone; however, bacterial biofilms formed by blepharitis isolates destroying host tissue, which can cause escalating levels of inflammation not only of the lid margin, but also of the ocular surface.

For anterior blepharitis of bacterial origin, the classic first line of treatment includes the at-home use of hot compresses to loosen debris and lid scrubs. There are many over-the-counter lid scrub options available, but, whether it’s due to poor compliance, patients not scrubbing hard enough, or wrong product selection, I am often underwhelmed by the outcomes, as lid debris and symptoms persist.

Based on the Tear Film & Ocular Surface Society Dry Eye Workshop II (TFOS DEWS II) report, I recommend against using baby shampoo due to the risk of reducing goblet cell function. A dedicated lid cleaner has the ability to reduce MMP-9 and improve lipid layer quality with better tolerance. Even with the appropriate lid cleaner, according to one report in DEWS II, only 55% of patients were compliant with at-home lid hygiene after 6 weeks.

AT A GLANCE

- Blepharitis is an inflammatory condition of the eyelid that can cause redness, itching, and dandruff-like scales on the lashes.
- Anterior blepharitis affects the external lids, lashes, and external glands; posterior blepharitis affects the meibomian glands and the posterior lid margin.
- For all types of blepharitis, the goal is to eliminate lid and lash buildup, reduce organism biofilm, and reduce inflammation.
remained structurally intact. This confirms that lid cleaners alone may not remove biofilm, but a combination of blepharocyclization and lid cleaners are needed to clear the lids and lashes. For stubborn recurrent lid debris, an at-home blepharocyclization device called NuLids (NuSight Medical) can be used daily.

When inflammation is present on examination, I prescribe at least 1 month of doxycycline, 100 mg to 200 mg per day, and/or a topical antibiotic or combination antibiotic and steroid. I believe inflammation will persist until debris and biofilm are eliminated.

For patients with *Demodex*, I recommend use of a daily tea tree oil–based lid cleaner, and for recurrent cases I also consider recommending tea tree oil–based shampoo for hair application, as *Demodex* infestation is typically not limited to the lids and lashes. Hypochlorous acid has also been found effective at reducing *Demodex* mites.

For patients with unilateral unresponsive chronic blepharitis with lid ulceration and lash loss, lid carcinomas, including squamous cell, basal cell, and sebaceous cell, should always be considered. A prompt oculoplastic consultation is recommended in these cases.

**MGD Medical Treatment Options**

The first-line treatment to improve MGD is heat. The application of warm compresses, creating a consistent temperature of 40°C to 45°C to the palpebral conjunctiva for 5 minutes, has been shown to melt meibum. However, compliance is often poor.

Another natural remedy for improving MGD is the use of blinking exercises. Kim et al studied a group of individuals who performed a 10-second cycle of blinking exercises every 20 minutes during waking hours for 4 weeks. The result was a 47% reduction in OSDI score with improvement of noninvasive tear breakup time by an average of 1.6 seconds.

Thermal pulsation therapy has become my primary office-based treatment of choice for patients with MGD. With the price of dry eye drugs increasing and insurance coverage decreasing, thermal pulsation, now with affordable options available for both doctor and patient, can make more financial and practical sense for MGD, the most common cause of dry eye.

Three popular heat-based MGD treatment devices are the iLux (Alcon), TearCare System (Sight Sciences), and LipiFlow Thermal Pulsation System (Johnson & Johnson).

- **iLux** is a handheld device with disposable compression pads that uses LED light at lime-green (568 nm) and near-infrared (850 nm) wavelengths to heat the external lids and reach internal temperature of 40°C to 42°C, while simultaneous pad compression is applied to evacuate meibomian glands (Figure 2).

- **The TearCare System** uses wearable adhesive pads applied to the outer lids to deliver adjustable electric thermal heat for 15 minutes while the patient’s eyes are opened or closed, followed by manual expression with paddle forceps.

- **LipiFlow** uses a lens-like activator to deliver heat to the palpebral conjunctiva with simultaneous lid compression using a computerized algorithm. A study found that a single LipiFlow treatment improved SPEED scores for 3 years.

Off-label use of intense pulsed light (IPL) therapy is gaining popularity as an adjunctive treatment for MGD. IPL was initially used to treat telangiectasia from rosacea, skin hyperpigmentation, fine lines, and wrinkles. With wavelengths ranging from 500 nm to 1,200 nm, IPL uses thermal photobiomodulation to improve skin texture.
and reduce telangiectasia. IPL can promote the secretion of meibum, destroy telangiectasia in the eyelid margins, and reduce bacteria on the eyelid skin surface. A recent study found that corneal nerve fiber length increased after IPL treatments.

For IPL therapy, a cooling gel is applied to the inferior periorbital rim. Attention must be paid to skin type (recommend only Fitzpatrick type IV and below), patients who take certain medications, and those with skin lesions or active infections. After IPL therapy, the meibomian glands are expressed.

A new IPL option is the Eye-Light (Topcon), which combines 600 nm IPL and athermal stimulation of meibomian glands using low-level light therapy with an LED light mask. The Eye-Light allows a broader patient base with all Fitzpatrick skin types, no cooling gel is needed, and it can be applied to upper and lower lids.

Blepharitis that is undertreated or untreated can lead to permanent disfigurement of the lids, conjunctiva, and corneas. Lid disfigurement from chronic inflammation can include lid notching, chronic trichiasis, ectropion, entropion, chalazion, and has been associated with lagophthalmos (Figure 3) and floppy eyelid syndrome (Figure 4). Thus, it is important to properly identify and treat blepharitis as early as possible.

**Surgical Treatment Options**

My preferred treatment for chronic trichiasis is radiofrequency ablation with the Surgitron (Ellman). With targeted lash selection, this treatment typically involves minimal inflammation. For entropion, ectropion, and floppy eyelid syndrome, a lateral tarsal strip procedure to tighten the affected lid is the typical treatment of choice (Figure 5). For chalazion, surgical intervention includes steroid injection or excision. As lid involvement increases, the conjunctiva can also be affected. Effects can include chronic conjunctivitis, which can be associated with keratinization and conjunctivochalasis.

Surgical management of symptomatic conjunctivochalasis unresponsive to medical management includes cauternization or resection. Corneal involvement includes exposure keratitis from lagophthalmos; staphylococcal marginal keratitis that can be chronic or recurrent, even after improving the lid surface; or mechanical keratitis from trichiasis, all of which can lead to corneal dellen and scarring. The treatment algorithm for keratitis with corneal dellen includes aggressive lubrication (tears, ointment, plugs), bandage contact lens, lid taping for lagophthalmos, amniotic membrane, and temporary tarsorrhaphy. Exposure keratitis from blepharitis-associated lagophthalmos may also benefit from gold weight implant (adhesive or surgically placed) for better corneal coverage (Figure 3).

**AN OPPORTUNITY TO MAKE A DIFFERENCE**

Once a diagnosis is made, I recommend having a thorough discussion with patients regarding the chronicity of the disease and the treatment options available. I believe that good communication leads to better patient performance regarding therapy initiation and compliance. With blepharitis potentially affecting 37% to 47% of the population, and 70% of those affected being older than 60 years, optometrists are well positioned to provide early and robust care to patients to prevent surgical involvement.


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