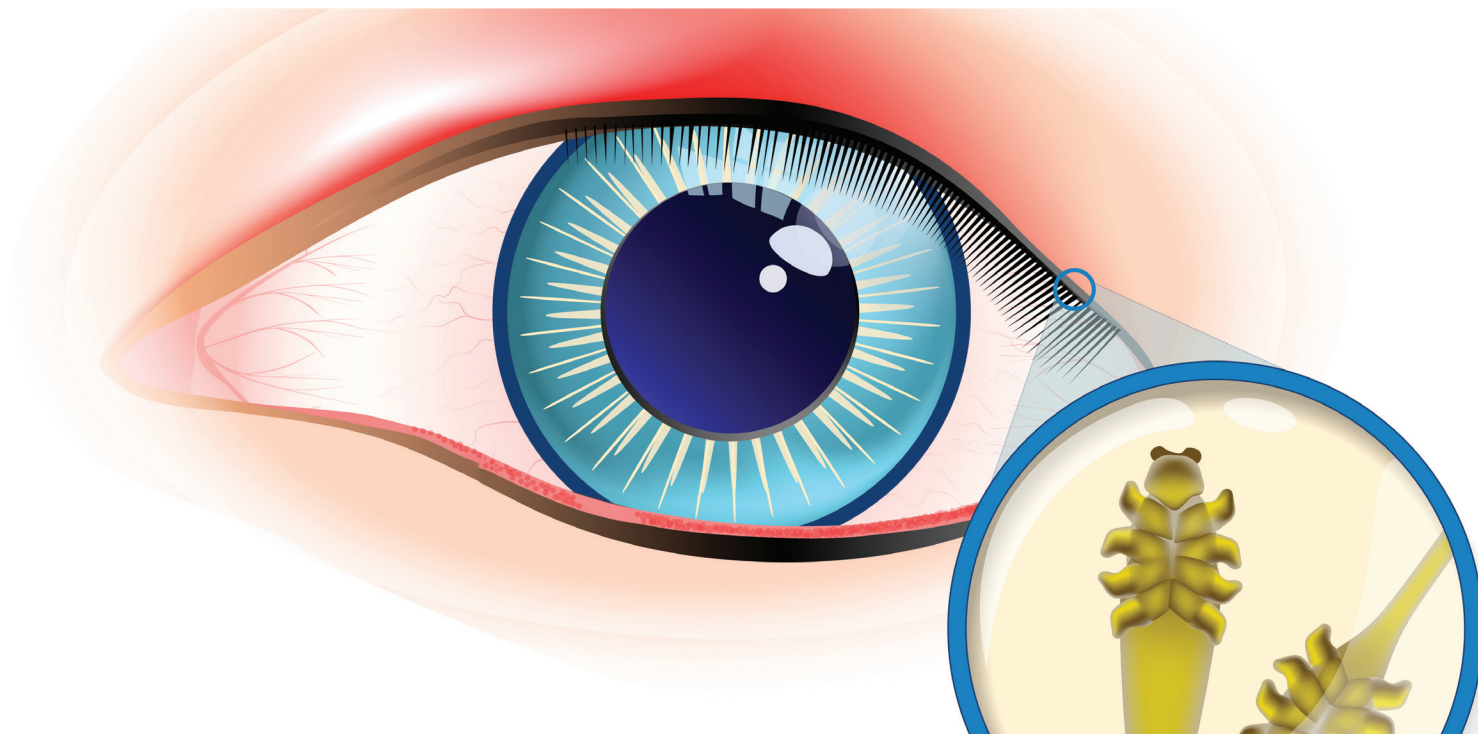




DEMODEX: FRIEND OR FOE?



How infestation strikes—and what to do when it does.

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Demodex mites are often-overlooked members of the human skin microbiome, typically regarded as harmless commensals that feed on sebum without harming their host. They are known to play a role in the natural cleaning system of the skin. By consuming excess sebum and dead skin cells, *Demodex* help regulate bacterial overgrowth. Beyond microbial regulation, *Demodex* may influence immune homeostasis, potentially offering protective effects against inflammatory skin conditions.¹

In some cases, however, these microscopic organisms escalate from harmless residents to problematic invaders, triggering ocular and dermatologic disorders.²

Understanding *Demodex* epidemiology, its clinical effects, and ocular comorbidities is essential for making informed decisions. By using

evidence-based treatment strategies, clinicians can effectively manage infestations while preserving ocular surface stability.

AT A GLANCE

- ▶ *Demodex* mites can escalate from harmless to problematic, triggering ocular and dermatologic disorders.
- ▶ Topical therapies, in-office treatments, oral medications, and lifestyle modifications can help reduce mite load and control inflammation, both of which are essential to preserving ocular surface health.
- ▶ Complete eradication of *Demodex* mites is not the goal, but restoring and maintaining a healthy symbiotic relationship between host and mite is.



Figure 1. Extensive collarettes are visible at the lash base, indicative of *Demodex* infestation.

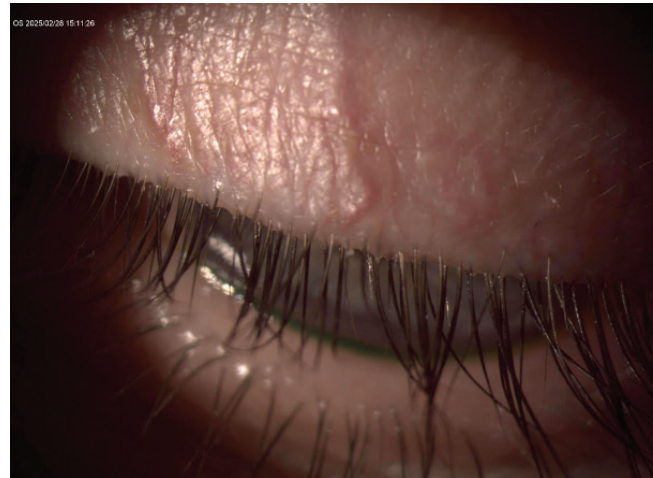


Figure 2. Anterior blepharitis and eyelid inflammation are visible upon downgaze.

WHEN GOOD MITES GO BAD

It remains unclear whether ocular surface inflammation facilitates *Demodex* overgrowth or if *Demodex* proliferation is the primary trigger that initiates the inflammatory cascade. While older age is a key risk factor, immune system status and skin conditions also play a significant role. Individuals who are immunosuppressed have larger mite populations, and patients with rosacea have increased facial pH, reduced hydration, and altered lipid composition, all of which promote mite proliferation.¹

Demodex Infestation

Cylindrical collarettes at the lash base are a classic sign of *Demodex* infestation (Figures 1 and 2). Trichiasis, madarosis, and lid inflammation can also signal a *Demodex* infestation (Figure 3).³ As *Demodex* mites feed on epithelial cells, their claws cause microabrasions, leading to hyperplasia, follicular dilation, and inflammation.³ Additionally, clustering and egg-laying at the lash base can distort follicles, contributing to conjunctivitis, keratitis, lash misdirection, and lash loss (Figure 4).³ Meibomian gland dysfunction (MGD) and chalazion are also signs of *Demodex brevis* overgrowth.⁴ Beyond eyelid

inflammation, emerging evidence implicates *Demodex* infestation in pterygium progression.⁵

Ocular itching is the hallmark symptom of *Demodex* blepharitis, peaking at night or early morning. Other common symptoms, often overlapping with dry eye disease, include redness, burning, tearing, foreign body sensation, puffy eyelids, and eyelid margin distortion. Patients may also report periocular skin changes such as roughness, scaling, or small inflamed papules and whiteheads resembling acne around the eyes and nose.³

MANAGEMENT APPROACHES

Chronic blepharitis can significantly affect a patient's quality of life and, if left untreated, may lead to serious corneal complications and vision loss.

Early identification of at-risk patients allows prompt initiation of targeted therapies aimed at reducing mite load and controlling inflammation, both of which are essential to preserving ocular surface health. Below are several common options used in the treatment and management of *Demodex* blepharitis.

At-Home Therapies

Tea tree oil is a frontline treatment used to break down collarettes, kill surface mites, and draw mites that are deeper in tissues to the surface. A less-is-more approach is recommended when using tea tree oil, as higher concentrations can increase ocular surface irritation, while lower strengths (2% to 5%) used consistently over 10 to 12 weeks are safer and often equally effective.⁶



Figure 3. Telangiectatic vessels are apparent along the eyelid margin.

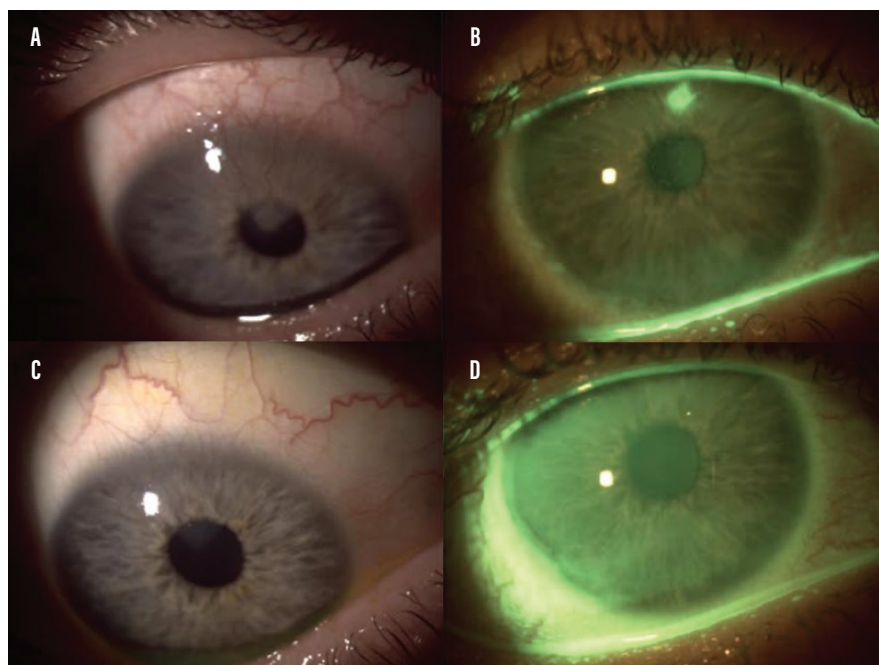


Figure 4. Persistent keratitis and a corneal ulcer (A, B) showed marked resolution following blepharitis management (C, D).

Hypochlorous acid is a non-toxic, non-irritating compound that targets *Staphylococcus aureus* and *Bacillus oleronius* bacteria commonly found in the gut of *Demodex*. It helps neutralize inflammatory toxins released by both mites and microbes, and although hypochlorous acid doesn't kill mites directly, it still plays a key role in creating a less favorable environment for *Demodex* to live in.⁷

Topical Therapies

Topical ivermectin 1%, an antiparasitic agent with antiinflammatory properties, is more effective than metronidazole 0.75%, an antibiotic and antiprotozoal medication, particularly in rosacea-associated *Demodex* infestations, as it directly targets mites while also reducing inflammation.⁸ Topical ivermectin 1% is used off-label and is applied to the eyelids twice daily for 1 to 2 months.⁹

Topical corticosteroids can provide short-term relief from inflammation, but studies suggest they may increase *Demodex* density and potentially worsen conditions such as dermatitis

and rosacea.^{10,11} When prescribed, they should be paired with anti-*Demodex* therapy to minimize mite proliferation and prevent flareups.

Lotilaner ophthalmic solution 0.25% (Xdemvy, Tarsus Pharmaceuticals) has demonstrated up to a 66% reduction in *Demodex* mite burden and a 44% decrease in collarettes within 6 weeks, with efficacy sustained over 1 year and minimal ocular irritation.¹²

In-Office Therapies

Microblepharoexfoliation is a valuable in-office treatment for *Demodex* blepharitis. It removes biofilms and collarettes, restoring lid hygiene and reducing ocular inflammation. This deep clean primes the lid margin for better efficacy of topical treatments. Devices such as BlephEx (BlephEx) and ZEST (Zest Optical) offer efficient options, with short, painless treatments that often provide immediate symptomatic relief.⁷

Intense pulsed light (IPL) therapy is a promising approach for MGD, rosacea, and *Demodex* blepharitis, targeting telangiectasia, bacterial biofilms, and inflammatory mediators

(Figure 5). A recent study showed that IPL therapy can achieve up to a 75% improvement in Ocular Surface Disease Index score, tear breakup time, meibum quality, and mite eradication rate versus tea tree oil alone, with even better results when IPL therapy is combined with ivermectin 1%.^{13,14} Another study showed that IPL therapy delivers a 77.8% clearance of rosacea lesions with minimal side effects and sustained results for up to 52 months.¹⁵

Oral Medications

Oral medications such as tetracyclines are effective in managing *Demodex* blepharitis, particularly when MGD or rosacea is present.¹⁶ Common dosing for doxycycline ranges from 40 mg to 100 mg once or twice daily. While effective, doxycycline has two notable drawbacks: It often causes gastrointestinal upset—hence the recommendation to take it with food—and it increases photosensitivity, which may be problematic for fair-skinned patients or those who live in sunny places.

Oral azithromycin, a macrolide antibiotic with lipid-regulating properties, has also been used in the treatment of MGD and blepharitis. A randomized clinical trial found that a 3-week course of oral azithromycin was as effective as a 6-week course of oral doxycycline for moderate to severe MGD. Azithromycin offers the advantages of shorter treatment duration, fewer gastrointestinal side effects, and improved overall tolerability.¹⁷

In severe or persistent cases of *Demodex*, oral ivermectin can also be used, particularly when topical therapies fall short. A typical dose is 200 µg/kg of body weight. It reaches deep follicular areas where mites reside; however, because it does not debride cylindrical dandruff, it should be combined with lid hygiene or a topical agent to effectively clean the lash margins.^{9,18} Repeat doses every 1 to 2 weeks for two to



Figure 5. In this case of *Demodex* blepharitis (A), IPL therapy reduced inflammation, vascularity, and collarette quantity (B).

five cycles are often necessary to achieve full eradication and prevent reinfestation.¹⁸ Gastrointestinal side effects may occur and should be considered in patient selection.

Lifestyle Factors

Evidence supports lifestyle and dietary modification in *Demodex* management, particularly for inflammation control. The link between gut microbiota and *Demodex*-related issues is clearer now. Gut dysbiosis, *Helicobacter pylori* infection, and increased intestinal permeability can fuel systemic inflammation, giving way to an environment supporting mite overgrowth. Low water intake has been associated with a threefold increase in *Demodex*-related skin issues. High-glycemic processed diets also promote inflammation and mite proliferation, whereas

diets rich in probiotics, omega-3s, and antioxidants help reduce inflammation, regulate sebum production, and strengthen the skin barrier.¹⁹

Hygiene also plays a role in prevention; avoiding oil-based cosmetics and eyelash extensions, replacing mascara and eyeliner every 3 to 6 months, and not sharing eye makeup can help reduce mite transfer and recurrence.²⁰

THE BALANCE

Demodex mites are a normal part of the skin's microbiome, but an imbalance or overgrowth can disrupt this delicate relationship and lead to significant ocular and skin disease. Complete mite eradication is not the goal, but careful evaluation, early intervention, and targeted treatment can help restore and maintain a healthy symbiotic relationship between host and mite. ■

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