

Untangling the Causes and Effects of **DEMODEX BLEPHARITIS**

By Milton M. Hom, OD, FAAO; Paul M. Karpecki, OD, FAAO;
and Ian Ben Gaddie, OD, FAAO

First, there was dry eye, then it was meibomian gland dysfunction (MGD); now, more and more we are talking about blepharitis in the clinical realm.

Blepharitis affects up to 47% of patients seen in the clinical setting, making it one of the most common ocular pathologies that optometrists encounter.^{1,2,3} This chronic inflammatory condition affects individuals of all ages and causes ocular irritation and redness⁴ that, in most patients, tends to ebb and flow in an ongoing cycle of exacerbation and remission.¹ Severity varies on a scale that ranges from mild to severe, with some cases resulting in permanent eyelid deformity and vision loss due to keratopathy.¹

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The classification of blepharitis generally is based on location and/or etiology. For example, blepharitis can cause anterior or posterior inflammation. In some cases, both anterior or posterior disease occurs simultaneously. This is termed marginal blepharitis. Blepharitis can be further subclassified as *Staphylococcal*, *seborrheic*, or *meibomian gland dysfunction (MGD)*, any of which can occur alongside *Demodex* infestation.



Milton M. Hom, OD, FAAO
Canyon City Eyecare



Paul M. Karpecki, OD, FAAO
Kentucky Eye Institute



Ian Ben Gaddie, OD, FAAO
Gaddie Eye Centers

DEMODEX BLEPHARITIS

Demodex is the most common ectoparasite in human beings, and there is a close connection between infestation and blepharitis.⁵ In fact, *Demodex folliculorum* and *Demodex brevis* have been implicated in both anterior and posterior blepharitis.⁶

D. folliculorum cluster at the root of the eyelashes, infesting both the lashes and the follicles.⁷ These mites consume epithelial cells, which leads to follicular distention and the formation of loose or misdirected lashes.⁷ Meanwhile, the mite's claws cause microabrasions, inducing epithelial hyperplasia and reactive hyperkeratinization. Cylindrical dandruff is a tell-tale sign.^{7,8,9} *D. brevis* infest the meibomian glands and mechanically block them,⁷ leading to a cascade of MGD-related consequences.

Demodex mites also cause blepharitis because they are bacterial vectors for *Streptococci* and *Staphylococci*.⁷ Finally, *Demodex* causes hypersensitivity reactions due to proteins inside of the mite as well as to their waste.^{7,9}



Demodex blepharitis

PRIMARY CLASSIFICATION

From an anatomical perspective, blepharitis is typically categorized as anterior or posterior,¹⁰ but in reality, it is often marginal, meaning both anterior and posterior blepharitis coexist.^{1,2,11}

Anterior blepharitis. Anterior blepharitis affects the skin of the eyelids, the base of the lashes and the lash follicles.^{4,1} *Staphylococcus* infection and seborrheic dermatitis are commonly associated with anterior blepharitis.¹ Squamous debris or collarettes are also often present.^{1,2,11}

Posterior blepharitis. Blepharitis can be classified as posterior when the meibomian glands are affected.⁴ As such, meibomian gland dysfunction (MGD) can be conceptualized as a complication of posterior blepharitis wherein hyperkeratinization occurs, triggering inflammation and an alteration in glandular secretions that leads to tear film instability and dry eye.^{10,12} Viewed in this way, MGD is a *result* of blepharitis; however, MGD can also *cause* blepharitis.^{1,2,11} The important thing to remember is that MGD and blepharitis

are not interchangeable terms, since both conditions have alternative causes.^{1,13}

Marginal blepharitis. As most clinicians have witnessed, anterior and posterior blepharitis commonly coexist because the etiologies of blepharitis cause insult both anteriorly and posteriorly.¹ For example, *Demodex* mites¹⁴ and, less commonly, *Phthirus pubis* (crab lice)¹⁵ are both parasitic causes of marginal blepharitis.¹

Understanding the intersections between MGD and dry eye, and blepharitis and *Demodex*, are fundamental to successfully managing patients. When one condition is present, always look for the others.

SUBCLASSIFICATION

Staphylococcal, seborrheic, and MGD are the three most common subcategories of blepharitis, but as with primary categories any of these can coexist.^{4,16}

Staphylococcal blepharitis. Relative to other forms of blepharitis, *Staphylococcal* blepharitis is most common in younger female patients.^{4,16,17} Clinically, it presents with lid margin scaling, crusting, and erythema alongside collarette formation.⁴ Severe presentations include ulcerative blepharitis and corneal involvement.⁴ Eyelid cultures have shown both coagu-

lase-negative *Staphylococcus* and *Staphylococcus aureus*,^{4,16} but less than half of patients diagnosed with *Staph.* blepharitis have positive cultures.^{1,18}

Seborrheic blepharitis. In patients with seborrheic blepharitis, there is significant crossover between anterior blepharitis and MGD.¹ These patients commonly present with greasy scaling anterior lids and seborrheic dermatitis of the brows and scalp.⁴ In fact, 95% of seborrheic blepharitis patients have seborrheic dermatitis.^{1,16}

Meibomian gland dysfunction. As discussed above, MGD can be both a cause or an effect of blepharitis. MGD also can be particularly insidious because of its close association with evaporative dry eye disease^{4,3} and *Demodex brevis*, which mechanically blocks meibomian gland orifices, giving rise to lipid tear deficiency.^{7,8} *D. brevis* also burrows deep into the glands, leaving behind a chitinous exoskeleton that can cause a granulomatous reaction.⁷ *Demodex folliculorum* is likewise implicated in MGD, and can be clinically discerned by the presence of collarettes or cylindrical dandruff at the base of the lashes.^{4,8}

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