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Focus on Eyelid Margin Health

A Consensus Statement on *Demodex* Blepharitis and Meibomian Gland Dysfunction with the Intrepid Eye Society

This supplement was developed by The Fundingsland Group (TFG) with the Intrepid Eye Society as part of a continuing education activity for optometrists.

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Activity Description

This supplement provides an in-depth summary of an expert panel discussion on the management of eyelid margin health. It focuses on achieving consensus among specialists on the diagnosis, treatment and patient communication strategies for *Demodex* blepharitis and meibomian gland dysfunction.

Target Audience

This certified CE activity is designed for optometrists.

Learning Objectives

- Describe the definition, prevalence and impact on visual outcomes and quality of life brought on by Demodex blepharitis and meibomian gland dysfunction (MGD) within the landscape of routine optometric practice.
- Elucidate the current best practices for diagnosis, including effective patient screening parameters (symptomatic and asymptomatic) to detect early-stage Demodex blepharitis and MGD.
- Construct a diagnostic-based decision tree for the treatment of Demodex blepharitis and MGD, facilitating streamlined and effective therapeutic choices.
- Evaluate innovative treatments for Demodex blepharitis and MGD, their real-world outcomes, decision timings and integration into contemporary optometric practice.
- Discuss strategies to handle frequent patient inquiries, objections, and concerns about Demodex blepharitis and MGD, and analyze the effect of these communication practices on patient satisfaction and referral rates.

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Introduction

In May 2024, the Intrepid Eye Society (https://intrepidsociety.com/) engaged in an online consensus meeting to discuss the need to optimize diagnosis and treatment of *Demodex* blepharitis (Db) and meibomian gland dysfunction (MGD).

The Expert Panel set five objectives for the meeting:

- Describe the definition, prevalence and impact on quality of life of Db and MGD within the landscape of routine optometric practice.
- Elucidate the current best practices for diagnosis, including effective patient screening parameters to detect early-stage Db and MGD.
- Evaluate treatments for Db and MGD and their integration into contemporary optometric practice.
- Construct a diagnostic-based decision tree for the treatment of Db and MGD, facilitating streamlined and effective therapeutic choices.
- Discuss strategies to handle frequent patient inquiries, objections and concerns about Db and MGD, and analyze the effect of these communication practices on patient satisfaction and referral rates.

The merits of combining Db and MGD under the composite term 'eyelid margin health' were also discussed, with this approach deemed potentially beneficial in encouraging greater awareness of the conditions, more frequent screening, and, ideally, better outcomes for patients.

Eyelid Margin Health: Understanding Demodex Blepharitis and Meibomian Gland Dysfunction

Blepharitis and meibomian gland dysfunction (MGD) are relatively common ocular surface conditions that can meaningfully impact patient satisfaction and visual outcomes.

Blepharitis is associated with ocular surface inflammation, conjunctivitis, tear film deficiency and keratitis, and can exacerbate other ocular surface issues such as allergy or dry eye disease (DED).[1] *Demodex* blepharitis (Db) is a very common sub-type of blepharitis (representing up to two-thirds of cases), and is caused by *Demodex* mites **(Box 1)** that infest the eyelash follicles and oil (sebaceous) glands on the eyelid.[1-5] The presence of collarettes, a deposit of cylindrical dandruff at the base of the eyelashes, is a pathognomonic sign of Db. Collarettes comprise *Demodex* mite waste, epithelial cells, keratin and mite eggs, and can cause irritation via the secretion of proteases and lipases.[2] If unmanaged, Db can lead to chronic discomfort and reduced quality of life. Db can exacerbate other ocular surface diseases – mite waste can block terminal ducts and contribute to meibum secretory changes.[2]

MGD is characterized by the obstruction or inflammation of the meibomian glands, which are responsible for secreting oils that stabilize the tear film and prevent tear evaporation **(Box 2)**. Obstructed glands can lead to an unstable tear film, causing symptoms such as dryness, irritation, fluctuating vision and contact lens intolerance. In severe cases, MGD can progress to cause chronic pain and significant visual impairment. Non-obvious MGD, where there are no apparent symptoms or signs without gland expression, often goes undiagnosed, which delays treatment initiation and allows the condition to worsen.

Patients with Db and MGD may report blurry vision that improves with blinking, which indicates tear film instability. This can affect daily activities and overall quality of life. For contact lens wearers, these conditions can result in reduced lens tolerance and increased discomfort,[6] leading to frustration and frequent switching of lens brands without addressing the root cause.

Dr. Selina McGee described the need to define a new category of overall 'eyelid margin health' that considers Db and MGD together, to help encourage assessment of both conditions in all patients who visit the clinic.

> "Eyelid margin health needs to be considered in all patients not just those that are presenting with symptoms or complaining of discomfort."
>
> **- Dr. Selina McGee**

BOX 1

Demodex Mites and *Demodex* Blepharitis

Two members of the *Demodex* mite species are found on the human eyelid **(Figure 1)**.

D. folliculorum is translucent and microscopic (0.3–0.4 mm in length) and clusters at the eyelash root and follicle, where it feeds on sebum and epithelial cells.[2,3]

D. folliculorum is typically associated with anterior blepharitis as regurgitated waste deposits around the eyelash follicles, forming collarettes and driving local inflammation.

D. brevis is smaller and localizes in the sebaceous glands, where it can impair or block gland secretion and contribute to MGD and posterior blepharitis.[2,4]

Both *D. folliculorum* and *D. brevis* are found on the eyelids of healthy eyes–everyone has a mite population – but overpopulation can lead to Db through several key mechanisms:[3]

- **Mechanical:** lash distension can be caused by mite attachment and egg-laying at the follicles. The mites also cause micro-abrasions as they feed on the epithelial cells. Enzyme secretions from mites and collarettes contribute to inflammation.
- **Bacterial:** mites may transport bacteria to the follicles; typically, these are *Streptococcus* spp. And *Staphylococcus* spp. and *Bacillus oleronius*. The risk of bacterial infection may also be increased where patients rub their eyes to try and relieve itching sensation.
- **Hypersensitivity:** Mite waste can trigger inflammatory cascades, and infestation is associated with up-regulation of pro-inflammatory cytokines. *Demodex* mites may also play a role in compromising the epithelial barrier; the resulting inflammation can contribute to damage of the conjunctival tissue.[7]

A B

Figure 1. *Demodex folliculorum* (A) *and D. brevis* (B) are found on all eyelids but can cause blepharitis when they overpopulate. *Images obtained under Creative Commons License Agreement.*

BOX 2

MGD and Eyelid Margin Health

MGD is a leading cause of DED, with a significant impact on the quality of life of affected individuals. The prevalence of MGD increases with age and is higher in populations with greater screen use and contact lens wearers. MGD symptoms include dryness, irritation, blurred vision and discomfort.

The pathogenesis of MGD involves both glandular obstruction and inflammation. Hyperkeratinization of the gland ducts and increased viscosity of the meibum contribute to gland blockage **(Figure 2)**. This leads to stasis of the meibum, creating an environment conducive to bacterial growth and inflammation. Inflammatory mediators exacerbate gland dysfunction and further contribute to tear film instability.

A B

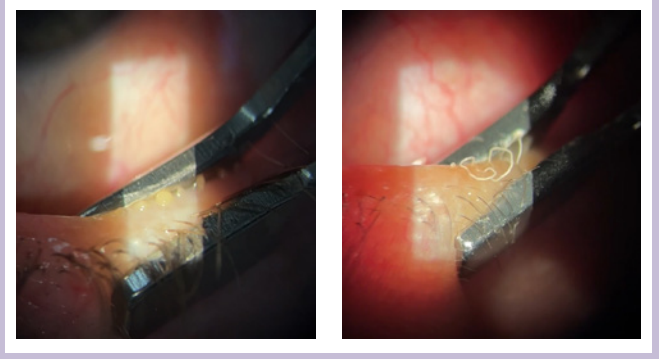


Figure 2. Clinical presentation of meibomian gland dysfunction demonstrating (A) blocked glands and (B) toothpaste-like secretions. *Images courtesy of Jaclyn Garlich, OD, FAAO, Envision Optometry.*

The Impact of Db and MGD: How Eyelid Margin Health Affects Patient Satisfaction

The Expert Panel all reported a notable impact of Db and MGD on their patients – with 83% considering this to be a 'very significant' effect **(Figure 3)**.

The symptoms of Db and MGD overlap considerably **(Table 1)** and are associated with a reduced quality of life. Patients with Db and MGD are also at risk of fatigue in the morning and evenings, and are less able to carry out day-to-day activities, especially where screen use is required.[8]

Dr. Mark Schaeffer noted that satisfaction with refractive 'outcomes', whether glasses or contact lenses or more complex interventions, assumes an intact ocular surface: "Everything assumes a healthy ocular surface, assumes a healthy tear breakup time. When we have a breakdown in this, which we see in patients who have MGD and Db, we see the patients that can't make it through a refraction without having fluctuating vision. So even when we're doing our testing to get their best vision, our numbers can be 'off' based on the presence of these conditions."

Dr. Jaclyn Garlich agreed and expanded that any examination that doesn't look at eyelid margin health is at risk of making suboptimal choices in contact lens selection: "For our patients they say they find a particular lens uncomfortable, a first thought can be to switch to a different brand, and then another brand if discomfort continues. This approach won't improve things for the patient if the issues are with the tear film and the quality of the tears. At this point, we're wasting time treating the complaint rather than the underlying cause."

The Expert Panel suggested that ocular surface health and tear film integrity are re-investigated where patients:

- **Present with blurry vision–** assess the health of the ocular surface and the eyelid margins before adjusting the refractive prescription.

> "It makes sense to have a workflow in practice that assesses eyelid margin health and ocular surface health, before calculating refractive adjustments."
>
> **- Dr. Cecelia Koetting**

Question: How significant do you find the impact of *Demodex* blepharitis and meibomian gland dysfunction on patient satisfaction and visual outcomes in your practice?

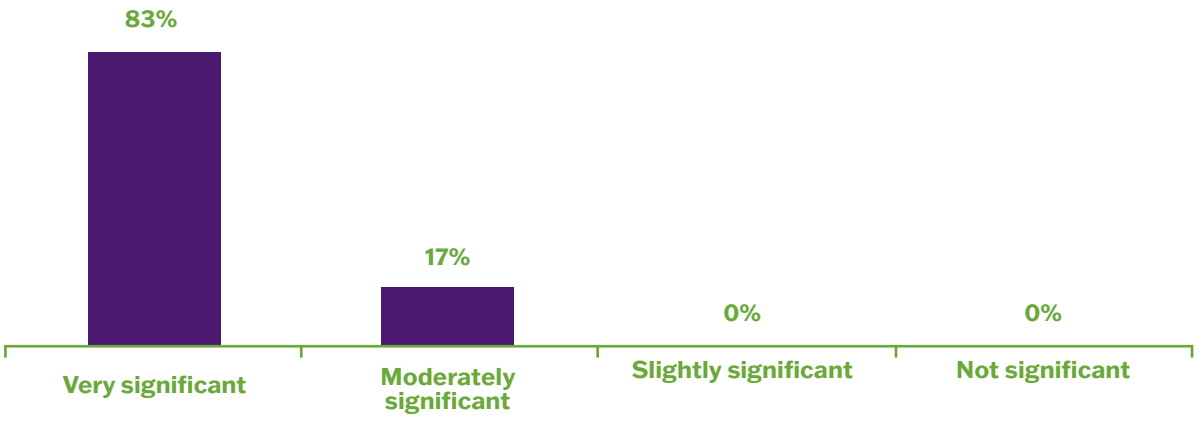


Figure 3. There was unanimous agreement that patients with *Demodex* blepharitis and meibomian gland dysfunction experience significant impact on their visual outcomes and treatment satisfaction.

- **Have a fluctuating prescription–** suspect that the tear film is impaired and is affective refraction.
- **Struggle to sit through a refraction assessment–** DED should be strongly suspected, and an examination for MGD and Db performed before continuing with testing
- **Report discomfort with their contact lenses–** this could be a sign of ocular inflammation and irritation, of DED and of foreign body sensation, all of which could be rooted in Db and MGD.

Dr. Koetting explained that in her practice, she now examines the margins and ocular surface, including slit lamp investigation for any signs of Db or MGD before conducting a refraction: 'This made more sense, and I was catching OSD in patients which explained why their refractive outcomes weren't as expected, rather than spending time recalculating lens powers without knowing the cause of the change.'

Dr. McGee reiterated that all these factors affect a patient's quality of life, but that the responsibility for thorough investigation lies with the physician, rather than patient prompts: "Patients often will reset their expectation of 'normal' – they think this is just how life is 'supposed to be'. I think a key takeaway is that the phoropter absolutely is a tool for reaching a clinical endpoint of refraction change but can also be utilized as a diagnostic tool for eyelid margin health and ocular surface disease."

> "We need to be proactive and not reactive with eyelid margin health and the ocular surface."
>
> **- Dr. Jacob Lang**

> "We need to start examinations with the eyelids and work inwards to help our patients have the best visual outcomes possible."
>
> **- Dr. Selina McGee**

Patient satisfaction can be affected by how valued they feel their feedback is, and by how many physicians they feel are seeing them for the 'same problems'.

Dr. Jacob Lang noted that for many patients, DED or ocular surface issues are a diagnosis of exclusion after other clinical situations have been discounted: "Now we can do more to help the patient – realizing that this lacrimal functional unit is the primary refractive element on surface of our eye and knowing that that is a unit that's composed of multiple dynamic parts and components and activities is so important. Bringing investigation of eyelid margin health and the ocular surface earlier in the consultation can help avoid situations where all seen a patient that's had cataract surgery and then realized that the cataract wasn't the primary culprit, or where the patient that was unhappy with their contact lenses, because their ocular surface was not addressed."

Dr. Nathan Lighthizer concluded the discussions around patient satisfaction by noting the role that the health of the ocular surface plays in the success of most interventions: "While satisfaction with contact lenses and glasses reflects the vast majority of day-to-day practice, let's not forget outcomes with refractive surgery, cataract surgery and premium multifocal intraocular lens replacements– patient satisfaction with these outcomes is very important."

The Prevalence of Db and MGD: A Practical Insight

Prevalence of estimates for blepharitis and MGD across the medical literature varies widely. This is largely driven by inconsistent definitions and populations with multiple, overlapping causes of eyelid health complaints. A commonly cited study found that blepharitis was seen frequently in clinical practice (47% of patients seen by optometrists) and that MGD was 'considered to be the most common cause of evaporative dry eye disease.[9,10]

Two recent studies have examined the prevalence of Db in the USA.

- A multicenter retrospective chart review reported that 58% of 1,032 consecutive presented with collarettes, which is a pathognomonic signature of Db. Collarettes were observed in 69% of patients with a blepharitis diagnosis, 60% of those with a prescription for the treatment of DED and 51% of patients who were contact lens users.[5]
- A study in 199 patients at two outpatient clinics observed *Demodex* spp. on the eyelids or eyelashes in 55% of all patients, 62% of patients with a blepharitis diagnosis and 68% of patients with DED.[11]

Overall, the documented MGD prevalence is not consistent. Although reported as common (approximately 40%),[12] estimates vary from <20% in Caucasians to approximately 60% in Asian populations – and these data are now over a decade old.[13,14] A recent meta-analysis calculated a prevalence of 21% in the USA,[15] and a separate meta-analysis calculated a global prevalence of 36%, with a significant preponderance in males.[16]

It has been estimated that between 50% and 75% of patients seeking eye care – across a range of different reasons – will have either MGD or Db, or both conditions.[8]

The Intrepid Eye Society panel reported that collarettes were observed on an average of 47% of their patients **(Figure 4)**, and that an average of 73% of patients in their care had MGD; half the panel managed MGD in over 80% of their patients **(Figure 5)**.

Question: What percentage of your patients has collarettes on their lids or lashes?

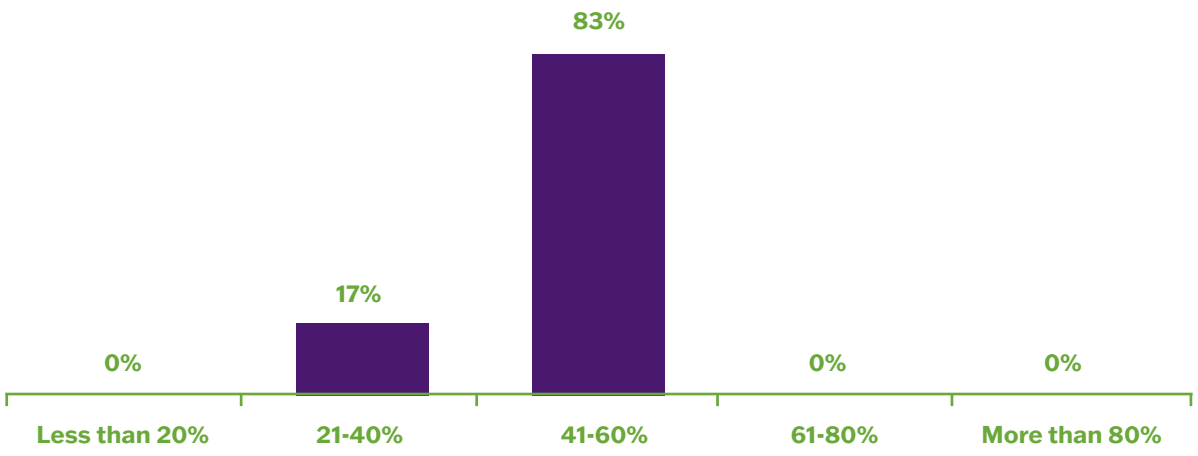


Figure 4. The Expert Panel reported that collarettes were present on the eyelids and eyelashes of an average of 47% of their patients.

Question: What percentage of all your patients has meibomian gland dysfunction?

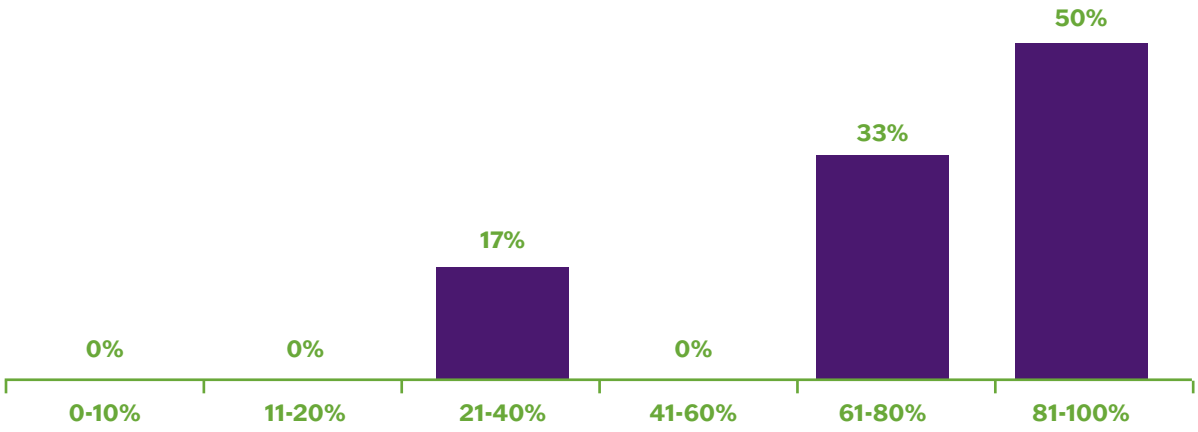


Figure 5. The majority of patients seen by the expert panel (average 73%) had meibomian gland dysfunction.

The Intrepid Eye Society Guide to Improving Observation and Monitoring of Eyelid Margin Health

The Expert Panel was unanimous in their position that all patients visiting the clinic should undergo eyelid margin health screening **(Figure 6)**. Dr. Lighthizer observed that this will require a change in habit for many practitioners: "Ten or 15 years ago, we were all trained to start with examining the cornea and the ocular surface. So, I remind myself, occasionally, remember to start with the eyelids… because they really matter."

Dr. McGee expanded on the need for evolution in practice: "Ten years ago, we would also not be differentiating between the types of blepharitis that we're seeing on a patient's lids, and we'd just treat all blepharitis the same, because we didn't have targeted treatment options. Now, with the advent of new therapeutic option, we're realizing that the physician has to accurately determine the nature of the deposits on the on the eyelashes – are they related to Staphylococcus infection or to Demodex mites?"

The Expert Panel recognized that the need to routinely assess eyelid margin health may not be apparent to all physicians **(Box 4)**, and that there remains a need for education. As physicians work towards eyelid examinations in all patients, it remains beneficial to be aware of patients that are at an elevated risk of developing Db **(Box 5)**.

"We agree that 100% of our patients should have their meibomian glands and their eyelid and eyelash health checked: that is the **new standard of care**, and essential to comprehensive eye care."

- Dr. Selina McGee

BOX 3

Rosacea and Eyelid Margin Health

Rosacea is a chronic inflammatory skin condition that often affects the face and can significantly complicate eyelid health.

The *Demodex* mite over-population (*Demodex* mite count on eyelash samples has been shown to be significantly higher in patients with facial rosacea than those without) can lead to either ocular rosacea, Db or, frequently, both.[3,17] Consequently, rosacea has a strong association with existing Db, and has been identified as a risk factor for developing Db. Rosacea has been reported as the most common systemic condition concomitant with Db.[1]

Ocular rosacea is characterized by telangiectasia, lid margin irregularity and meibomian gland dysfunction; facial rosacea is characterized by transient or persistent erythema, (primarily on the face and around the eyes) telangiectasia, papules, pustules and phymatous changes (thickening of the pores). Patients can experience episodic flushing and burning and stinging sensation.[17]

Ocular rosacea can complicate eyelid margin healthcare, and affects the:[17]

- **Eyelids:** lid margin is typically erythematous with telangiectasia, and both MGD and posterior blepharitis are the common comorbidities.[18]
- **Conjunctiva:** inflammation, driven by rosacea, can lead to non-specific but chronic conjunctivitis and potentially to scarring.
- **Cornea:** Around a third of ocular rosacea cases have corneal involvement, which starts in the inferior cornea and progresses centrally. Common pathologies include marginal keratitis, corneal vascularization, scarring and peripheral thinning.

Treatment of ocular rosacea includes several approaches:[17]

- Patient education
- Avoidance of triggers (UV exposure, hot showers, spicy foods, alcohol and caffeine).
- Lid hygiene
- Topical treatments:
  - Artificial tears: preservative-free for dry eyes and inflammation
  - Topical steroids: for acute inflammation (short-term use)
  - Cyclosporin: for ocular surface inflammation
  - Lifitegrast: for inflammatory MGD
  - Tacrolimus: for refractory posterior blepharitis
  - Azithromycin: for MGD and blepharitis
- Systemic treatments:
  - Doxycycline: low dose for chronic management
  - Azithromycin: for 3-4 weeks
  - Erythromycin: alternative to tetracyclines in children and pregnant women
  - Omega-3 fatty acids: as food supplements for meibomian gland function
- Interventional treatments:
  - Thermal pulsation: mechanical and thermal stimulation for meibomian gland clearance
  - Intense pulsed light (IPL): can reduce inflammation and improve meibomian gland function
  - Intraductal meibomian gland probing: relieves gland obstructions
- Management of skin disease:
  - Appropriate topical agents and oral medication to manage concomitant skin disease
  - Laser and IPL: for persistent erythema and telangiectasias

BOX 4

Why is eyelid margin health not assessed in all cases?

Dr. Selina McGee challenged the Intrepid Eye Society to consider factors that might contribute to physicians not always including eyelid margin health in their routine examinations.

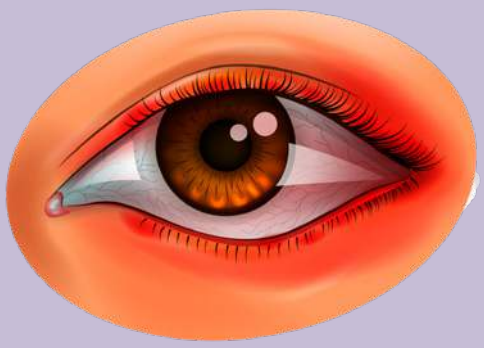
The reasons for skipping a full eyelid assessment might include:

- A lack of awareness around eyelid margin health.
- Conversations that may be perceived as intimidating.
- The considerable overlap between the signs and symptoms of poor eyelid margin health and other, more common conditions like DED or allergies – and the physician may choose to focus on managing these issues.
- A significant lack of adherence to the use of over-the-counter treatments for MGD and Db, which can lead to unsatisfactory outcomes combined with additional treatment burden for the patient.
- Physicians need to find extra time to provide education. Patients often do not fully understand the conditions – for example, thinking they can't have DED because their eyes are watering.
- Db and MGD may not be considered 'serious' in the eye clinic compared with macular degeneration or glaucoma, and eyelid margin health may be deprioritized where these conditions are being managed or ignored as a 'healthy eye' where a more serious disease is not manifested.
- A lack of interventions for managing Db may have lowered interest in diagnosing the condition.

Dr. Jacob Lang concluded there remains an unmet need in physician education, and that addressing this is essential to improving patient understanding: "I think if we are all more comprehensive in our evaluation of the patient's ocular health, we can deliver better value by educating our patients on the potential damage associated with untreated Db and MGD."

BOX 5

Patients at elevated risk of developing Db



Cataract patients: Patients undergoing cataract surgery often experience tear film homeostasis impairment, which can exacerbate symptoms of DED and lead to increased susceptibility to *Demodex* mite infestation. Patients with more severe ocular disease are at a higher risk of postoperative complications.

Patients with DED: There is a significant overlap between DED and Db, as both conditions involve tear film instability and ocular surface inflammation. A high percentage of DED patients present with collarettes.

Contact lens users: Contact lens wearers are prone to mechanical irritation, which can be exacerbated by the presence of *Demodex* mites. It is recognized that a substantial number of individuals experiencing contact lens intolerance also have Db.

Glaucoma patients: People with glaucoma, especially those on long-term topical medications like prostaglandin analogs, are at risk of blepharitis due to the potential for these medications to exacerbate ocular surface diseases. Approximately two-thirds of glaucoma patients also have Db.

Herpetic keratitis patients: Individuals with herpetic keratitis, a leading cause of infectious visual loss, are also at higher risk for *Demodex* infestation. The presence of *Demodex* can worsen lid margin inflammation and complicate the management of herpetic keratitis, making it important to check for mites in patients who do not respond to antiviral treatments.

Assessment of MGD

For examination of the margins to assess MGD, manipulation of the eyelid was considered key. There was a mixture of preference for using the digits to press on the glands or alternatively the use of cotton-tip applicators or forceps to apply a more consistent pressure. Dr. Lang noted that in clinics with very limited resources, "direct illumination on the inside of the lid can reveal a lot about functional or form loss in the meibomian glands."

Dr. Schaeffer provided more detail on the process of examination: "I push on the inner third of the lid, then the central third and observe. I won't typically push hard or on more of the lid than this unless I start to see anything being expressed from the gland. At this point, I'm at the consistency of the secretion. I'm also paying attention to what the margins look like before I push on them, and after I've pushed on them – do they look different?"

The clinical signs of MGD include:[13,14,19]

- Gland orifice abnormalities:
  - **Capping:** The presence of keratinized debris blocking the gland orifices.
  - **Notching:** Irregular or scalloped lid margins due to meibomian gland atrophy.
- Meibomian gland secretion:
  - **Turbid or Opaque Secretions:** Healthy meibum is clear, while dysfunctional glands may produce turbid, toothpaste-like secretions.
  - **Reduced Secretion:** Reduced or absent expression of meibum upon digital pressure.
- Lid margin changes:
  - **Telangiectasia:** Dilated blood vessels along the lid margin, indicating chronic inflammation.
  - **Inflammation:** Redness and swelling of the eyelid margins.

A thorough meibomian gland examination is required even if there is no obvious issue. This is especially important in clinics that are primarily focused on spectacle and contact lens prescription, where the patient will be there for refractive evaluation and may not be complaining of any issues that would bring the margins under suspicion.

There was Expert-Panel-wide agreement that physical manipulation of the eyelid margins is the minimum level of investigation, and that it should offer clear insight into the health of the meibomian glands. Dr. Jaclyn Garlich also advocated for meibomian imaging, if the technology is available to a clinic. Imaging may help detect meibomian gland dropout or atrophy. In addition to signs of MGD on the margins, fluorescein staining can reveal epithelial erosions on the cornea or conjunctiva visible under blue light.

> "Many patients are visiting without a primary complaint of obstruction – they have an appointment for a routine, comprehensive exam. Therefore, most of my patients don't look like they have MGD until I start pressing on their eyelids."
>
> **- Dr. Mark Schaeffer**

Question: What type of patients should you be performing eyelid margin health screening on?

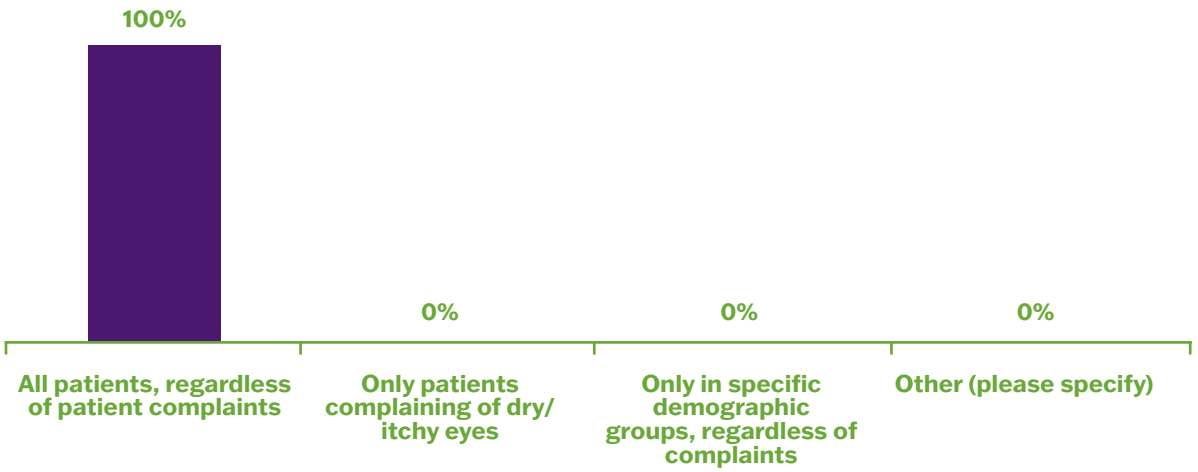


Figure 6. There was unanimous agreement that all patients should have their eyelid margin health screened at routine visits.

Evaluation of Db

The clinical signs of Db include:[3,20]

- Collarettes:
  - The pathognomonic sign of Demodex blepharitis is the presence of collarettes, which are solidified exudative secretions forming cylindrical collars around the base of the eyelash follicles.
  - Also known as cylindrical dandruff, collarettes are composed of accumulated undigested material, keratinized cells, dead or living mites and their eggs. They remain at the base of the lash and can be differentiated from bacterial debris, which typically clings to the shaft of the lash as it grows.
- Lash anomalies:
  - Trichiasis (eyelash misdirection).
  - Madarosis (eyelash loss).
  - Advanced cases may show a change in lash thickness, where the lash abruptly thins and has twisted or split ends, indicative of mite-induced damage to the lash cortex.
- Eyelid margin erythema and telangiectasia:
  - Eyelid margin erythema and telangiectasia are commonly observed in patients with Db. Patients may complain about these symptoms as a negative cosmetic appearance or because of discomfort.
- Corneal involvement:
  - Inflammation at the lid margin may spread to the cornea.
  - *D. brevis* is more frequently associated with corneal manifestation than *D. folliculorum*, although any causative effect is unproven.

The AAO Preferred Practice Pattern checklist for the diagnosis of blepharitis is shown in **Table 2**.[9] However, positive identification of collarettes during slit-lamp examination, along with the manipulation of eyelashes, is a practical method for diagnosing Db in a routine clinical setting.[21] Epilation of eyelashes followed by microscopic examination can also be used to confirm the presence of Demodex mites, but is less practical for most clinicians. Although there is no universally accepted method for sampling and quantifying mite density, the identification of collarettes alone is sufficient for diagnosis.

The Expert Panel advocated strongly that the most important diagnostic step for assessing Db was to have the patient look down during slit-lamp examination **(Figure 7, Figure 8)**. Patients should also be asked to gently close their eyes, which can also help with detection of collarettes. Dr. McGee also suggested talking to patients about their cosmetic habits, such as the use of eyelash extensions, or a preference for 'tight-lining' or 'water-lining' (application of eyeliner to the upper or lower margins), which could increase the risk or severity of blepharitis and MGD.

Question: When you do an eyelid examination, do you have the patient look down or close their lids to evaluate for collarettes?

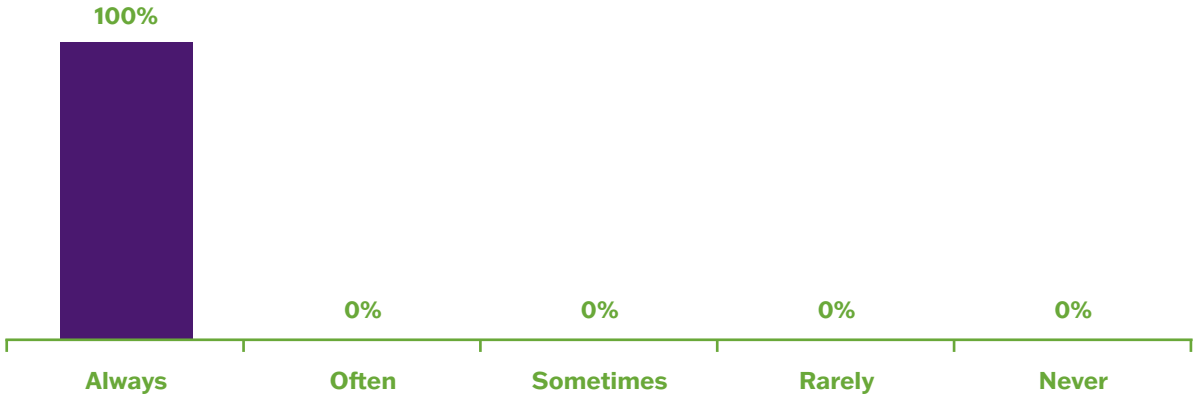


Figure 7. Having a patient look down or close their eyes is an essential step in examining for collarettes.

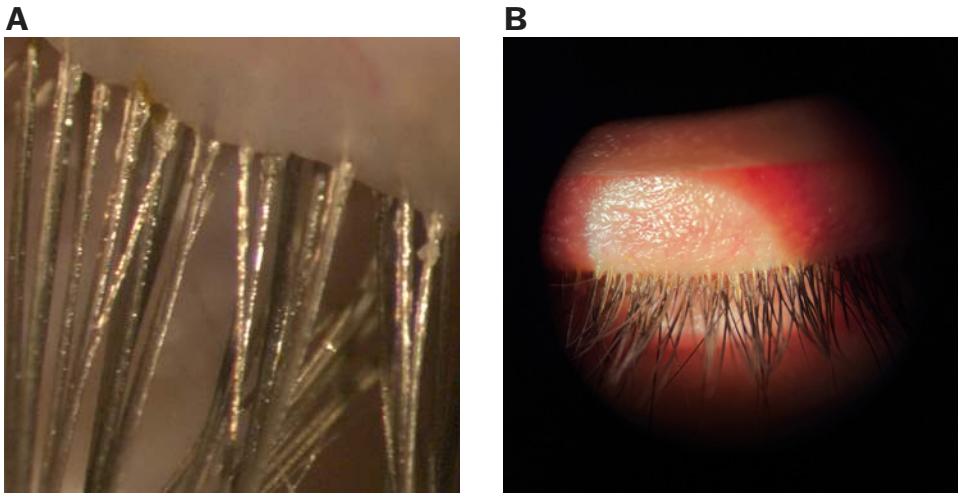


Figure 8. During slit lamp examination, (A) collarettes are easier to detect if (B) the patient looks down. *Images courtesy of (A) Nathan Lighthizer, OD, FAAO, Oklahoma College of Optometry at Northeastern State University and (B) Jaclyn Garlich, OD, FAAO, Envision Optometry.*

The importance of appropriate magnification in accurate examination

Physicians need to assess the eyelid as a whole, and then investigate the base of the lashes for the presence of collarettes; consequently, appropriate magnification is key to accurate examination. Several members of the Expert Panel remarked that they had been using increasing degrees of magnification in his recent practice **(Figure 9)**. There was broad agreement that:

- 10x magnification is suited to examination of the eyelid and overall assessment
- 16x magnification is useful for closer investigation of the eyelashes and the cornea
- 25x is best reserved for photography of the ocular adnexa.

Question: What magnification do you use during an eyelid examination?

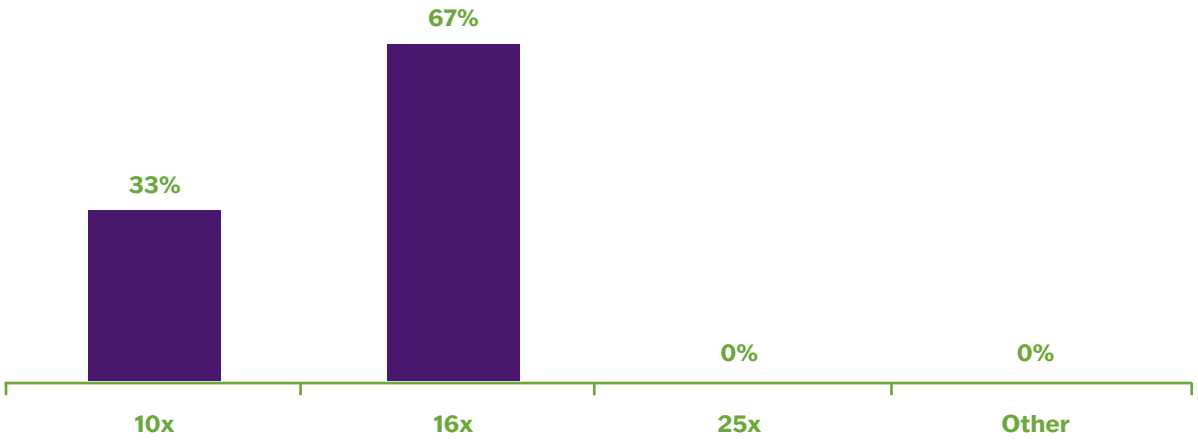


Figure 9. A combination of 10x magnification for overall eyelid examination, and 16x for eyelash and eyelid investigation, is most appropriate.

Finding time for eyelid margin health assessment and education

The Expert Panel considered, in their clinical experience, that the additional steps needed to effectively screen the eyelid margin health of a patient do not require significant extra time in the examination chair **(Figure 10)**.

The key to optimizing time in the examination chair is the conversation with the patient during the assessment. Dr. Lang suggests this becomes easier with experience: "I think it's an evolution of practice. When we first got out of school and we described a floater or vitreous detachment, we probably used a very different approach to how we explain it now. Just having the eyelid health conversation multiple times with patients will evolve how you present things, and how to respond to patient reactions."

Dr. Koetting agreed noting that she updated the patient throughout the examination. For example, when expressing the meibomian glands: "I start the conversation with my patients as I'm giving the exam. As I'm pushing on the glands, I'm explaining that these oil glands that line your eyelid are really important. They help provide oil that comes out that helps keep your tears from evaporating too quickly as well as providing nutrients to the front surface of your eye. And then I'd explain that I was pushing hard on your glands, and what was expressed looked like toothpaste, rather than the oil we'd see come out of a healthy gland with a light squeeze, I'd explain this was an issue and lead into how we were going to work to improve it."

> "Have conversation with the patient during the examination. That's the real tool of patient education."
>
> **- Dr. Jacob Lang**

Dr. Schaeffer suggested reconsidering the perception of 'chair time' as something that is best minimized: "I think it's important for us to create connections with the patient, and I think that starts with being curious. So, as you're screening, and you see MGD or Db, you can probe with questions that are very targeted, like, do your eyelids itch?, do you feel like you have to rub your eyes?, do you feel like you have to blink to make things clearer? or do you feel like your eyes get tired at the end of the day? These are simple, easy, 'yes or no' questions that link your observations to feedback from the patient that they might not have considered to this point. And now a connection is created by being curious and triggering 'light bulb' moments for the patient. I think that's a positive investment in time, rather than a resource that we have to minimize." Dr. Garlich agreed: "The more you can normalize that conversation with the patient, you can simplify your workflow with diagnosis and with explaining treatment – showing patients images of their glands or eyelids can further help with understanding."

Developing a connection with the patient was identified as a key need by the Expert Panel, who unanimously agreed that a lack of awareness about MGD and Db, and their day-to-day symptoms was a driver for under-diagnosis **(Figure 11)**.

Question: How much additional chair time does eyelid margin health screening take in your daily practice?

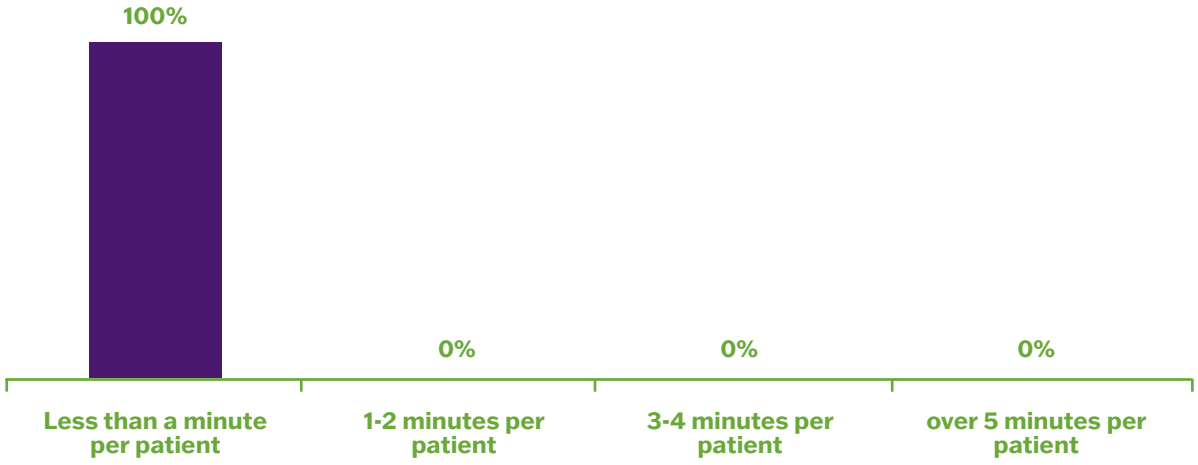


Figure 10. No significant extra chair time is required to screen a patient's eyelid margin health.

Question: How significantly does the lack of awareness about eyelid margin health among the general population contribute to the under-diagnosis of *Demodex* blepharitis and meibomian gland dysfunction?

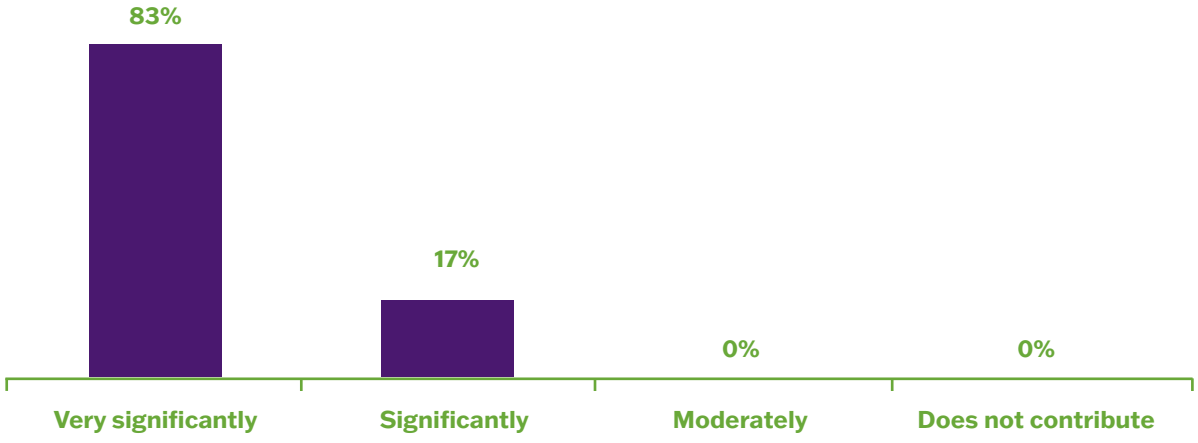


Figure 11. The Expert Panel felt that a lack of awareness about eyelid margin health contributes significantly to under-diagnosis.

Navigating Treatment Options for MGD and Db

When to consider treatment initiation for MGD or Db

The first decision in disease management is usually whether to intervene or to wait. The Expert Panel was in full agreement that when signs of Db or MGD have been recorded, treatment should be initiated – even when the patient is asymptomatic. This is because, left unmanaged, MGD and Db will progress and become more difficult to treat at a later stage.

In asymptomatic patients, Dr. Lighthizer suggests using a succinct statement to grab a patient's attention, but to also reassure them – for example: "I'm seeing something here that concerns me. Now, the good news is I think this is at a very early stage and we can address this if we start now."

Dr. Schaeffer added that this approach may also require a shift in mindset for some physicians, who may feel less confident with initiating treatments at a very mild disease stage, compared with managing a more severe patient where the necessary treatment steps are more obvious, and may be supported by guidelines.

Treatment approaches for Db

Management of Db has typically aimed to manage symptoms and improve eyelid health, using a range of non-specific options:

- At-home treatments:
  - **Lid wipes and foams:** Pre-moistened wipes containing ingredients such as tea tree oil or okra derivatives, are designed to remove debris from the eyelid margins.
  - **Cleansers containing hypochlorous acid:** Used to sanitize the eyelid area, killing bacteria and reducing inflammation, but do not work on Demodex.
  - **Nutraceuticals** are commonly used in MGD treatment, and can play a role in overall eyelid margin health; however, there are no data supporting their benefit specifically in Db.
- Pharmacological therapy: Topical or oral antibiotics can be used to treat bacterial infection and inflammation associated with general blepharitis.
  - Lotilaner ophthalmic solution 0.25% (lotilaner; Tarsus Pharmaceuticals, Inc.) is the first approved pharmacological treatment specifically for Db.
- In-office procedures:
  - **IPL therapy:** Uses light pulses to reduce inflammation, target blood vessels and improve meibomian gland function. This can reduce Demodex mite populations.
  - **Microblepharoexfoliation:** Exfoliates the eyelid margins to remove debris, bacteria and mites, improving overall eyelid hygiene.

Until recently (July 2023), there was no FDA-approved treatment for Db. Lotilaner became the first approved treatment, supported by evidence that it can reduce collarettes, help eradicate mites and reduce erythema **(Box 6)**.[22]

Dr. Koetting reinforced the need for communication with the patient and to make the treatment process a 'shared journey': "At the first appointment I'm going to talk about lid hygiene, and I'm going to discuss it at every visit, to try and develop good habits. It's important to not get frustrated with non-adherent patients, and to accept that no-one is going to be 100% compliant – but we need to set our patients up for success."

Dr. Lighthizer agreed that physicians can then progress into discussions about other treatments: "Build on the early diagnosis, then plan for lid hygiene, and then discuss all the treatment options… leading to your recommendation."

The Expert Panel recommends prioritizing collarette reduction in the management of Db, alongside strategies to improve eyelid health and hygiene. Dr. McGee suggested: "Start the patient on lotilaner for six weeks and make sure the patient has an education package on how to care and clean for their eyelids moving forward." Dr. Koetting added that if a patient has ocular rosacea with Db, IPL should be initiated alongside other treatments.

Treatment approaches for MGD

Management of MGD focuses on relieving symptoms and restoring normal gland function. Treatment options include:

- At-home treatments:
  - **Lid hygiene:** Regular cleaning of the eyelid margins to remove debris and reduce bacterial load.
  - **Warm compresses:** Application of heat to the eyelids to loosen the obstructed meibum, followed by gland expression.
  - **Nutraceuticals:** Omega fatty acids, found in nutritional supplements, have anti-inflammatory properties. Antioxidants help protect the eye tissues from oxidative stress and inflammation.
- Pharmacological therapy: Use of medications like antibiotics and corticosteroids when indicated.
- In-office procedures:
  - **Thermal pulsation:** Utilizes controlled heat and pressure to liquefy and express meibum from obstructed meibomian glands.
  - **IPL therapy:** Uses bursts of intense light to reduce

inflammation and improve meibomian gland function by targeting abnormal blood vessels.
- **Manual gland expression:** Involves applying pressure to the eyelids to manually express the meibum from the meibomian glands.
- **Microblepharoexfoliation:** Exfoliate the eyelid margins and remove debris and bacteria that can obstruct the meibomian glands.
- **Meibomian gland probing:** Involves inserting a small probe into the meibomian gland orifices to break through hyperkeratinzation blockages.

The Expert Panel noted that a preferred approach for MGD is harder to define and depends on the severity of the patient. Dr. Garlich suggested that grading patients by the degree of meibomian gland obstruction is essential to determine which type of at-home and in-office treatments might be most suited to the patient.

Dr. Schaeffer added that dietary supplements are also important in improving eye health: "I start every single patient on nutraceuticals –Gamma linolenic acid combined with Omega-3 fatty acid is my personal preference. Doing this in patients with mild MGD or who are 'asymptomatic' can also help impress on them that they have a condition that needs managing before it progresses."

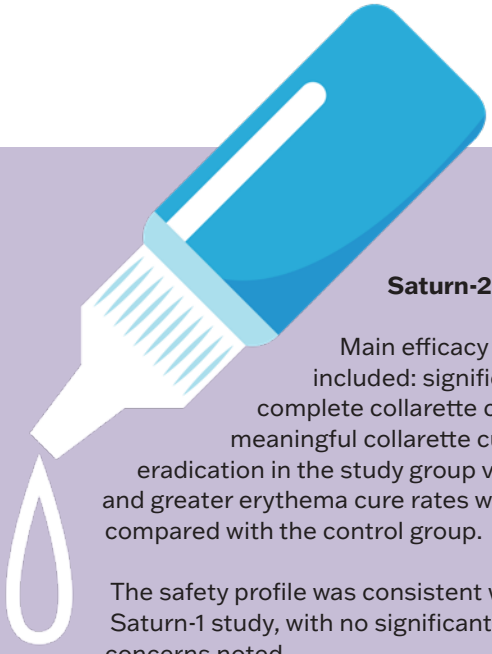
Dr. Lang recommended that in most cases: "Nutraceuticals, heat application, expression and lid cleaning, followed by artificial tears are the core treatments. For some patients, gland probing to relieve obstruction may be required; for patients with inflammation but no obstruction, a course of in-office thermal treatment could be most appropriate."

Intrepid Eye Society algorithm for eyelid margin health assessment and treatment

The Expert Panel developed a practical algorithm to support physicians with a Db and MGD workflow for routine appointments **(Figure 12)**. This algorithm collates the diagnostic signs and preferred treatment approaches and aims to support the improvement of eyelid margin health.

BOX 6

An FDA-approved treatment for Db is now available



Lotilaner ophthalmic solution, 0.25%, has been evaluated in a Phase 2b/3 and a Phase 3 trial, each over 43 days, in a randomized vehicle-controlled setting.

Saturn-1 study:[23]

Main efficacy outcomes included: significantly greater clinically meaningful collarette cure (grade 0 or 1), complete collarette cure (grade 0); mite eradication (0 mites/lash); erythema cure (grade 0) and composite cure (grade 0 for both collarettes and erythema) in the study group versus the control group.

The most common adverse event was instillation site pain, which was mild in nature.

Saturn-2 study:[24]

Main efficacy outcomes included: significantly greater complete collarette cure, clinically meaningful collarette cure, mite eradication in the study group versus control and greater erythema cure rates with lotilaner compared with the control group.

The safety profile was consistent with the Saturn-1 study, with no significant safety concerns noted.

Lotilaner is the first FDA-approved treatment for Db.

Intrepid Eye Society practical algorithm for improving eyelid margin health

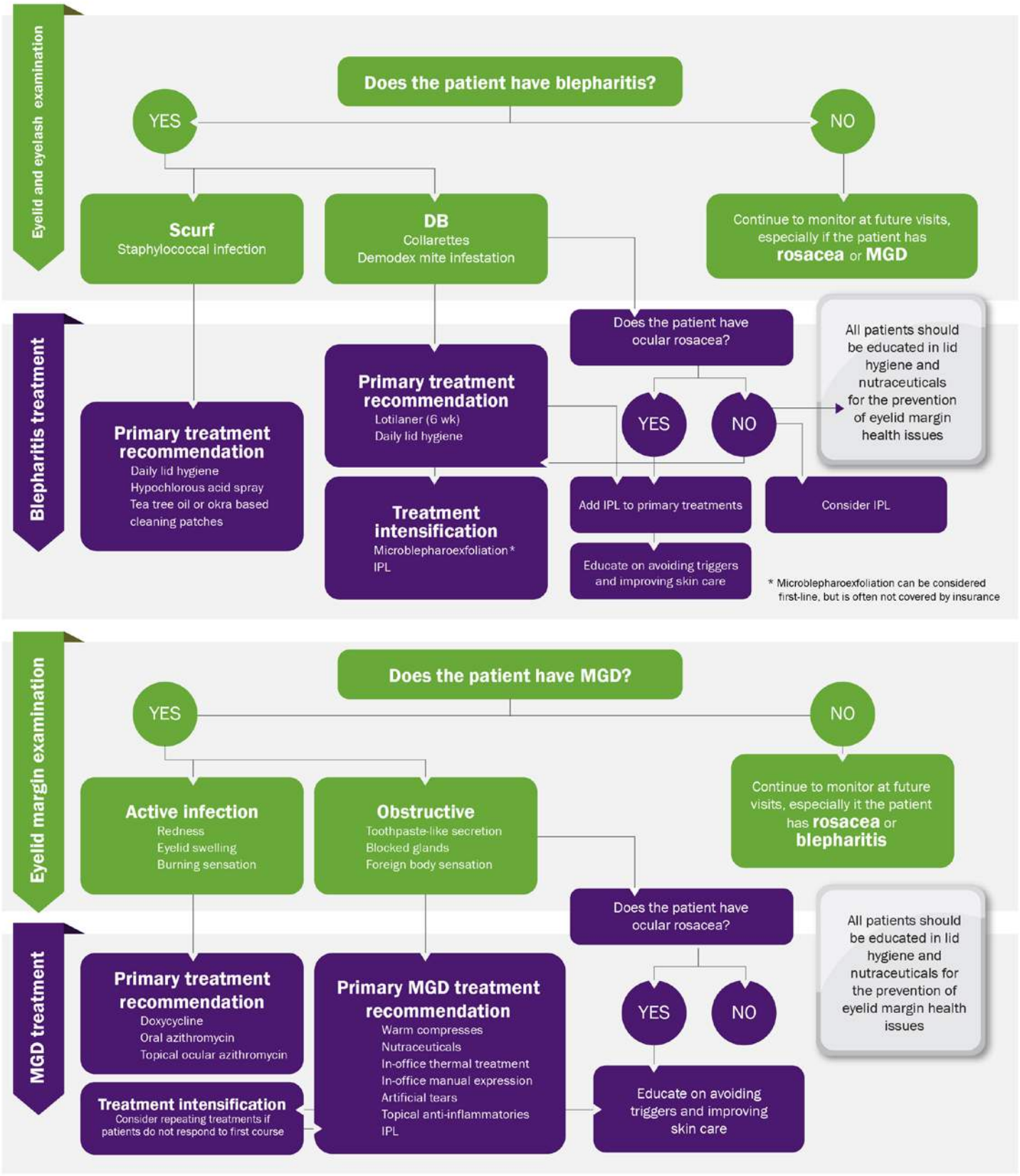


Figure 12. The Intrepid Eye Society practical algorithm for eyelid margin health work flow.

Best Practice for Communication About Eyelid Margin Health

The Expert Panel devised a 6-step guide to effective communication about eyelid margin health. This approach can help improve patients adherence to with treatment and follow-up **(Figure 13)** and is positively perceived by patients **(Figure 14)**.

1. Discuss regular eyelid hygiene:

- **Daily routine:** Emphasize the importance of maintaining daily eyelid hygiene similar to dental hygiene. Patients should be encouraged to clean their eyelids twice daily, using appropriate cleansers, to manage and prevent flare-ups of *Demodex* blepharitis.
- **Analogy:** Use the analogy of brushing teeth to explain the necessity of regular eyelid cleaning. "Just like you brush your teeth every day to prevent dental issues, you need to clean your eyelids regularly to manage blepharitis."

> "Use the dentist analogy to explain how you and the patient are going to work together. When you go to the dentist you get a deeper cleaning than you do at home. So, you're going to need to do some work at home and I'm going to do some work on you here."
>
> **- Dr. Jacob Lang**

> "There are natural organisms that live on our face and skin. What I'm seeing on your eyelids is an overgrowth of one of these organisms. It's called *Demodex*. It's a mite that can live in your eyelash follicles and we're going to treat them."
>
> **- Dr. Mark Schaeffer**

2. Normalize the condition:

- **Commonality:** Inform patients that *Demodex* mites are common and natural inhabitants of human skin. Explain that almost everyone has them, but problems arise when there is an overgrowth.
- **Non-infectious:** Assure patients that *Demodex* blepharitis is not due to poor hygiene, it is not an infection and it cannot be transmitted to others. This helps in reducing the stigma and anxiety associated with the condition.

3. Explain the symptoms and causes:

- **Overgrowth and symptoms:** Explain that the overgrowth of *Demodex* mites leads to inflammation and symptoms such as itching, redness and discomfort. Use relatable terms and avoid medical jargon when possible.

- **Triggers:** Discuss potential triggers such as stress, skin conditions and hormonal changes that might exacerbate the condition.

4. Agree on the management strategies:

- **Home care:** Educate on effective home care routines including the use of prescribed lid scrubs and warm compresses. Reinforce that consistent home care is crucial for managing symptoms.
- **In-office treatments:** Explain the role of in-office treatments such as lid exfoliation or intense pulsed light (IPL) therapy. Clarify that these treatments complement home care practices.
- **Medications:** If applicable, discuss the use of medications like ivermectin or topical metronidazole and explain their role in reducing mite populations and inflammation.

5. Emphasize the importance of follow-up visits:

- **Regular check-ups**: Highlight the importance of regular follow-ups to monitor the condition and adjust treatment plans as necessary. Emphasize that blepharitis is a chronic condition that requires ongoing management.
- **Patient involvement:** Encourage patients to communicate any changes in symptoms or concerns they might have, ensuring a collaborative approach to treatment.

> "There is normal 'stuff' that lives on our body, normal bacteria, normal mites. There's just an overpopulation of that.'
>
> **- Dr. Jaclyn Garlich**

> "It's important to follow-up with patients and see them again and again to develop that relationship and provide more education, which will build compliance and communication."
>
> **- Dr. Nathan Lighthizer**

6. Address patient concerns:

- **Affordability:** Discuss the cost of treatments and medications upfront and offer assistance in navigating insurance coverage, if applicable. Reassure patients that cost-effective solutions are available and don't let 'cost of treatment' concerns impact on patient engagement with a management plan.
- **Cosmetic Considerations:** For patients who use make-up, provide guidance on safe cosmetic practices and recommend products that are less likely to aggravate blepharitis.

By incorporating these points into patient education, physicians can help patients better understand and manage Db, driving adherence to treatment plans and improving outcomes.

Question: How effective do you find clear communication strategies in maximizing patient compliance for *Demodex* blepharitis and meibomian gland dysfunction treatment?

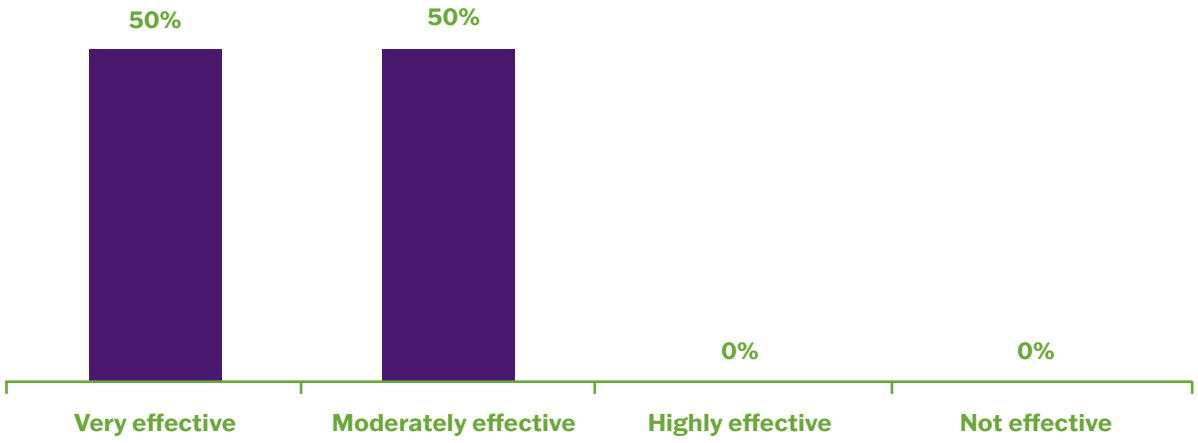


Figure 13. The Expert Panel recommended a clear communication strategy for effectively engaging with patients and encouraging adherence to treatment.

Question: What percentage of your patients with *Demodex* blepharitis and meibomian gland dysfunction is satisfied with their outcomes with your communication approach?

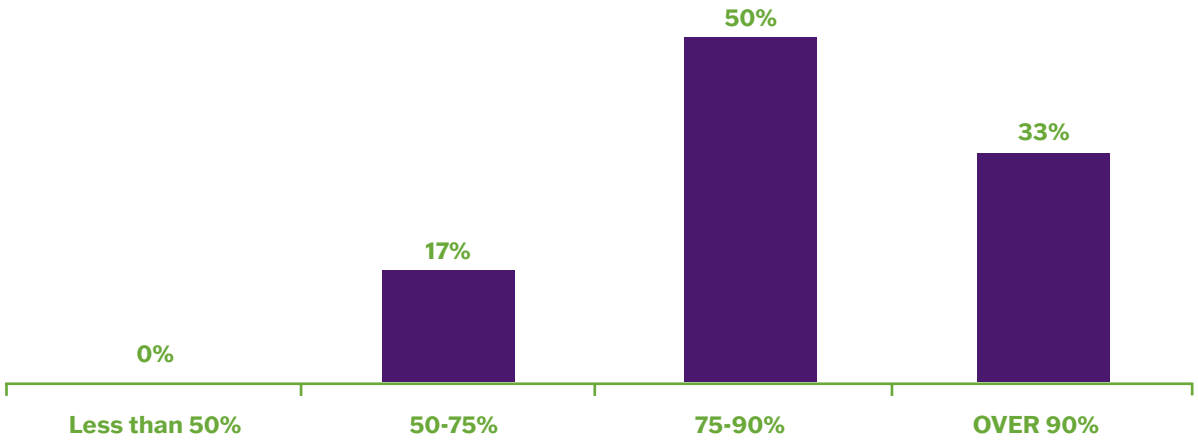


Figure 14. An effective communication strategy is appreciated by patients; the Expert Panel reported that around 83% of their patients are satisfied with this type of approach.

Table 1. The common symptoms of MGD and Db that can impact a patient's quality of life[3,6,13,14,19,25]

Symptoms	*Demodex* Blepharitis (Db)	Meibomian Gland Dysfunction (MGD)
Itching	Persistent itching of the eyelids, particularly at the base of the eyelashes	
Sensations	Watery or crusty eyes	Persistent burning sensations, often exacerbated by environmental factors
Grittiness	Sensation of grittiness or having a foreign body in the eye	Feeling of grittiness, or a foreign body in the eye, particularly upon waking
Blurred Vision	Fluctuating vision that improves with blinking	Fluctuating vision that improves with blinking
Photophobia		Sensitivity to light, which may increase with age
Tearing and Dryness	Both can be present	Both can be present
Paradoxical Tearing	Reflex tearing due to irritation	Reflex response to dryness
Dryness	Chronic dry eye symptoms due to the instability of the tear film associated with MGD	Chronic dry eye symptoms due to the instability of the tear film
Contact Lens Intolerance	Reduced tolerance to contact lens use, particularly for long periods	Reduced tolerance to contact lens use, particularly for long periods
Redness	Chronic redness of the eyes and eyelid margin	Chronic redness of the eyes and eyelid margin

Table 2. The AAO Blepharitis Preferred Practice Pattern diagnosis checklist[9]

Examination	Checklist of Signs and Symptoms
External Examination	
Skin	• Changes consistent with rosacea such as rhinophyma, erythema, telangiectasia, papules, pustules and hypertrophic sebaceous glands in malar areas
Eyelids	• Abnormal eyelid position (i.e., ectropion and entropion), incomplete eyelid closure (i.e., lagophthalmos), blink response and/or eyelid laxity • Loss, breakage or misdirection of eyelashes • Vascularization or hyperemia of eyelid margins • Abnormal deposits at the base of the eyelashes • Ulceration • Vesicles • Scaling, hyperkeratosis • Chalazion/hordeolum • Scarring

Slit-lamp Biomicroscopy	
Tear film	• Tear meniscus • Tear film break-up time and pattern • Foamy discharge • Debris in the tear film
Anterior eyelid margin	• Hyperemia • Telangiectasia • Scarring • Pigmentary changes • Keratinization • Ulceration • Vesicles • Blood-tinged debris • Pediculosis palpebrarum (Pthirus pubis) • Presence of lesion
Eyelashes	• Malposition or misdirection • Loss or breakage • Pediculosis palpebrarum (P. pubis) or nits • Cylindrical sleeves (demodicosis or seborrhea) • Cosmetic deposits and collarettes
Posterior eyelid margin	• Abnormalities of meibomian orifices such as capping, pouting, retroplacement, metaplasia and obliteration • Character of meibomian secretions such as expressibility, thickness, turbidity and color • Vascularization, keratinization, nodularity • Thickening • Scarring/fibrosis
Tarsal conjunctiva (everting eyelids)	• Appearance of meibomian glands and ducts such as dilation and inflammation • Chalazia • Erythema • Scarring • Keratinization • Papillary/follicular reaction • Lipidexudation/inspissation/concretions • Cicatricial changes: subepithelial fibrosis, fornix foreshortening, symblepharon formation
Bulbar conjunctiva	• Hyperemia • Phlyctenules, follicles • Conjunctivochalasis • Punctate staining with fluorescein, rose bengal, or lissamine green (generally fluorescein is used for cornea and lissamine green for conjunctiva) • Cicatricial changes: subepithelial fibrosis, fornix foreshortening, symblepharon formation
Cornea	• Epithelial defect, punctate staining with fluorescein, rose Bengal or lissamine green (generally, fluorescein is used for cornea and lissamine for conjunctiva) • Edema, infiltrates, ulcers, and/or scars (small subepithelial or superficial stromal, circumferential, in midperipheral cornea, usually without overlying fluorescein staining) • Vascularization, scarring, including pannus • Phlyctenules
Measurement of IOP	

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