



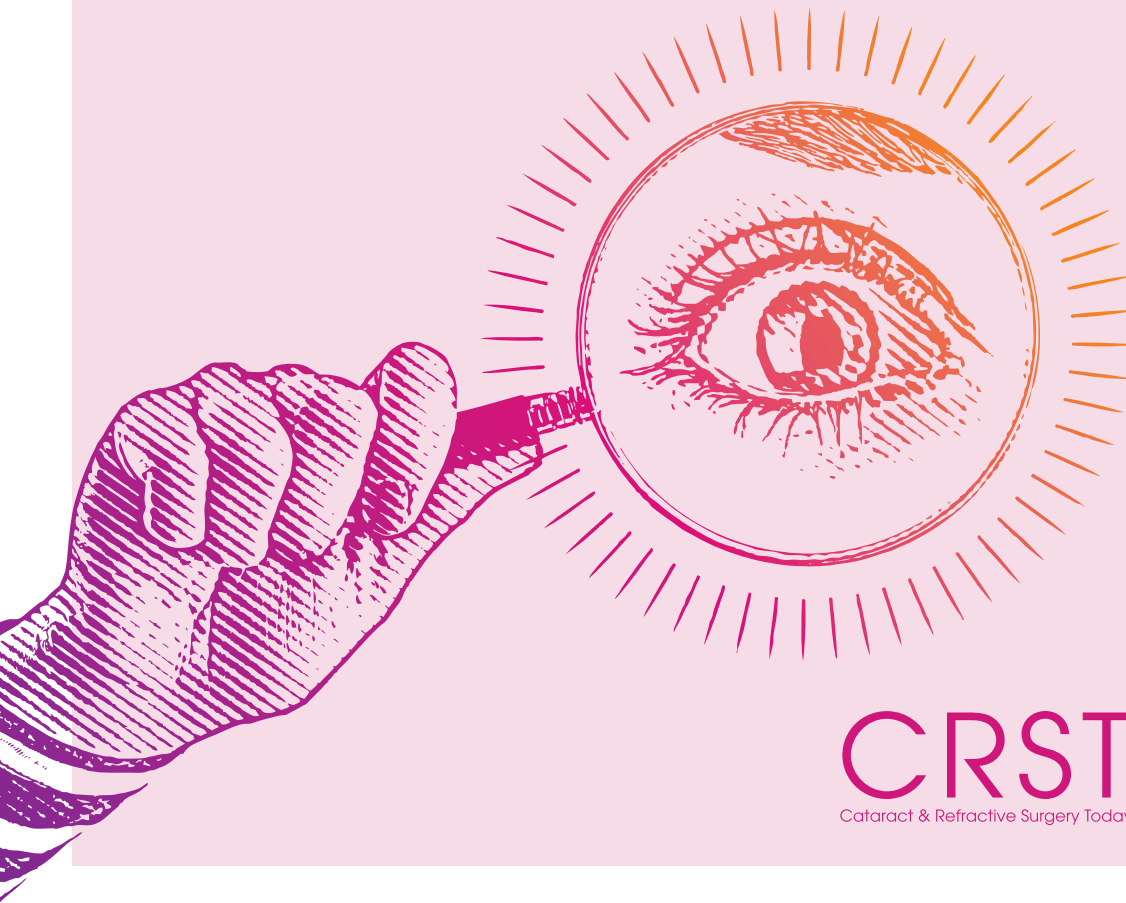
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The Interventional MGD Consensus Statement: Detecting, Diagnosing, and Dealing With MGD



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Content Source

This continuing education (CE/CME) activity captures content from a roundtable discussion.

Activity Description

This supplement discusses meibomian gland disease, including prevalence, tools for diagnosing, and the array of treatment options, from traditional to interventional.

Target Audience

This certified CE/CME activity is designed for optometrists and ophthalmologists.

Learning Objectives

Upon completion of this activity, the participant should be able to:

- **Review** the definition, prevalence, and impact of various meibomian gland diseases (MGD)
- **Understand** how to best assess meibomian gland structure and function, and why to integrate these diagnostics as a part of the initial point of care workup
- **Understand** the different types of mechanical MGD treatments and how these differ from other types of MGD treatments
- **Review** how to correctly perform mechanical MGD procedures and best integrate these into an OSD practice
- **Identify** the types of MGD patients that would benefit from mechanical MGD treatments, how to communicate with these patients, and the type of outcomes to expect

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Course: 81594-TD

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PRETEST QUESTIONS

Please complete prior to accessing the material and submit with Posttest/Activity Evaluation/Satisfaction Measures for credit.

1. Please rate your confidence in your ability to detect, diagnose, and treat meibomian gland disease (MGD; based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - E. 5
2. Lemp et al identified MGD in ____ of patients with dry eyes.
 - a. 25%
 - b. 42%
 - c. 52%
 - d. 86%
3. Effective MGD treatments improve _____.
 - a. Intraocular lens selection
 - b. Corneal crosslinking
 - c. Intraocular pressure
 - d. A & C
4. MGD treatment is likely to _____.
 - a. Improve contact lens tolerance
 - b. Improve cataract surgical results
 - c. Improve prescriptions for glasses
 - d. All of the above
5. Gupta and Brooks published a study showing that ____ of patients in the 21 to 62 age range who are undergoing refractive surgery evaluations had meibomian gland atrophy.
 - a. 23.5%
 - b. 54.5%
 - c. 72.5%
 - d. 39.5%
6. Which of the following are obvious signs of MGD?
 - a. Lid inflammation
 - b. Gland inspissation
 - c. Gland dropout on meibography
 - d. All of the above
7. During the exam, the _____ test may indicate whether the patient has an incomplete lid seal.
 - a. Fluorescein staining
 - b. Korb-Blackie test
 - c. MMP-9
 - d. Tear osmolarity
8. The _____ test is used to examine the eyelids.
 - a. SPEED
 - b. LLPP (look, lift, pull, push)
 - c. MMP-9
 - d. LNEP
9. What do panelists often use to express the meibomian glands?
 - a. Microblepharoexfoliation
 - b. Fingertip or thumb
 - c. Cotton swab tip
 - d. B & C
10. Meibography helps the clinician _____.
 - a. Educate patients
 - b. Evaluate the function of the meibomian glands
 - c. Assess the meibum quality
 - d. Assess the quantity of the meibum
11. Research by Hura et al demonstrated that _____ stabilized or improved gland structure in most patients studied.
 - a. Thermal masks
 - b. Steroids
 - c. Vectored thermal pulsation
 - d. Blepharoexfoliation
12. One value of traditional topical treatments was said to be _____.
 - a. Reversal of MGD
 - b. Maintenance
 - c. Relieving gland obstruction
 - d. None of the above
13. _____ was stated to help remove biofilm from the lids.
 - a. Omega-6 supplements
 - b. Microblepharoexfoliation
 - c. Intelligent heat
 - d. Thermal pulsation
14. _____ is often used to treat rosacea.
 - a. Intense pulsed light
 - b. Intelligent heat
 - c. Thermal mask
 - d. Thermal pulsation
15. When patients pay out of pocket for procedures, they often expect _____.
 - a. Medicare reimbursement
 - b. A discounted fee schedule
 - c. A cure of MGD
 - d. None of the above
16. Which of the following may be recommended as part of a posttreatment regimen in a patient with severe MGD?
 - a. 20/20/20 rule
 - b. Nutraceuticals
 - c. Blinking exercises
 - d. All of the above



Prevalence of Meibomian Gland Disease

MGD is increasing in older and younger patient populations.

Although awareness of meibomian gland disease (MGD) is increasing, many cases may still be escaping detection.

According to the 2019 *Modern Optometry* Clinical Survey, optometrist respondents believe 70% of patients with ocular surface disease (OSD) have MGD.¹

Ophthalmologists responding to the 2019 ASCRS Clinical Survey believe 54% of patients with dry eye have MGD and 37% of patients with cataracts have MGD.²

Cochener et al diagnosed MGD in 52% of patients with cataracts, and 56% of patients had meibomian gland atrophy of at least Arita grade 1.³ Half of patients with MGD had no symptoms. There was a significant correlation between meibomian gland function and gland atrophy score, lipid layer thickness, symptoms, and age.

A DEEPER LOOK

Some Interventional MGD Consensus Statement Panel members believe these numbers are low, acknowledging that their opinions may indicate their own screening or referral bias. MGD also is more common with aging.

Courtesy of Jacob Lang, OD, FAAO

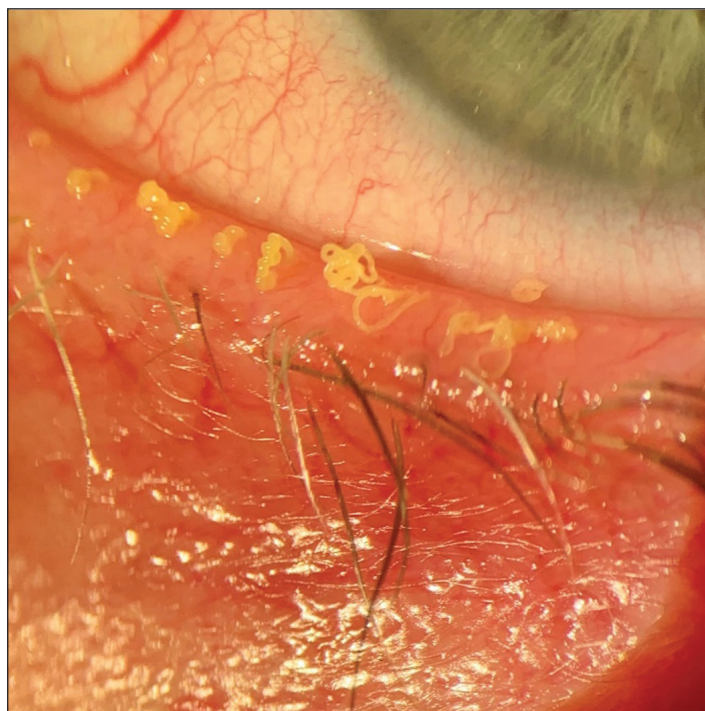


Figure 1. MGD demonstrated by thick meibum after expression.

"If you're always on the lookout for MGD, I think you find it much more frequently than if you just look past the eyelids," said Jacob Lang, OD, FAAO (Figure 1).

"To me, those numbers may reflect only obvious MGD—and not nonobvious MGD. Nonobvious MGD is when the lids look normal and when there is not meibography and doctors are not pressing on lids to observe the meibum," said Douglas K. Devries, OD. In some cases, clinicians may rely on patients reporting symptoms and view the overt structure without examining the functional quality of the meibum, he continued.

Laura M. Periman, MD, explained that the Prospective Health Assessment of Cataract Patients' Ocular Surface (PHACO) study showed that 76.8% of eyes examined for cataract surgery had positive corneal staining, but 58.8% of patients did not have foreign body sensation, a symptom traditionally associated with dry eye.⁴ A study by Lemp et al identified MGD signs in 86% of patients with dry eye.⁵

In a prospective case series, Gupta et al found that patients evaluated for cataract surgery frequently had signs of OSD, but in many cases it had not been diagnosed when they presented.⁶

"These discrepancies suggest that we are still learning how to look for MGD, identify it, and address it appropriately," Dr. Periman said.

According to the Interventional Meibomian Gland Disease Consensus Finding #1, panelists believe the average percentage of dry eye patients who have MGD is 85% (Figure 2).

"Some of the modern risk factors may explain the increased prevalence of MGD—the prolonged time at the computer, the average American is consuming more omega-6 and less omega-3," said Alice Epitropoulos, MD.

"Of course, MGD is more prevalent in our older patients presenting for cataract surgery, but it is also not to be overlooked in the younger patients interested in refractive surgery," said Jade Coats, OD.

Doctors are also seeing MGD with meibomian gland dropout and atrophy in pediatric patients.⁷ "The fact that we are seeing it in our kids at such a young age stresses the importance of looking for this disease and minimizing any progression or development of damage to the glands," Dr. Epitropoulos said.

What percentage of dry eye patients do you believe have MGD?

The average percentage of dry eye patients that respondents believe have MGD = 85%

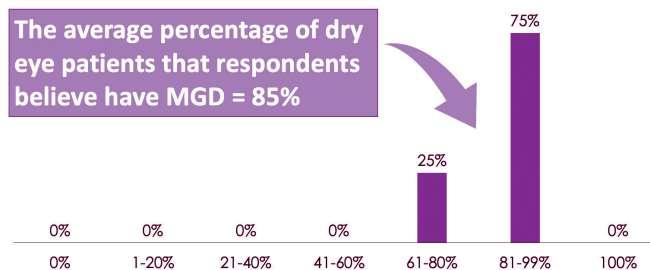


Figure 2. Consensus Finding #1.



The report by Cochener et al underscores that screening based on symptoms alone may not be sufficient in patients having cataract surgery, said Brandon Baartman, MD. "If 50% are asymptomatic, if you are not looking carefully, you may miss the signs too, and it can go undertreated."

EDUCATING COLLEAGUES

Clinicians can help their referring colleagues recognize the prevalence of MGD and the availability of effective treatment.

"We have to demonstrate to them that diagnosing and treating MGD will have a positive impact on their surgical results," said Marguerite B. McDonald, MD, FACS. "I think that is how you get to the heart of eye surgeons. There are papers in the literature that could be used to prove that."⁸⁻¹¹

"We need to educate our referral sources, whether it is ophthalmologists or optometrists, that now we have good treatments for MGD that are beneficial for patients," said Brandon D. Ayres, MD. With effective MGD treatments, he said, clinicians will not need to remake glasses as often, patients will have better contact lens tolerance, intraocular lens selections will be more on target, and patients will be happier after surgery.

During continuing education events for his local primary eye care network, Dr. Baartman emphasizes the value of dry eye screening, which has increased the number of patients who are already being treated when they arrive in his practice for a surgical consult. "The fact that treatment starts before the patient comes to a surgical referral center is critical," Dr. Baartman said. "If I am seeing a patient in surgical referral who is ready for surgery and I am finding MGD for the first time, we are behind the eight ball because I know that the impact of our management is going to potentially change the power or type of lens that we use."

Clinicians should investigate the tools they can bring into their clinic to diagnose dry eye or refer patients to a colleague who can diagnose MGD, said Hardeep Kataria, OD, FAAO. "I think the biggest thing is, do we understand what normal is? From there, what are we using as our standard to discuss what disease means?" Dr. Kataria said.

However, doctors do not need to make a large investment to get started. "I encourage doctors to evaluate for nonobvious MGD by either gently pushing on the lid or with a meibomian gland evaluator," said Melissa Barnett, OD, FAAO, FSLs, FBCLA.



"There have been enough data and enough talk that if doctors are not considering MGD when they are diagnosing patients with dry eye, they are missing the boat."

— Jacob Lang, OD, FAAO

"Unfortunately, I think most of our colleagues are just doing fluorescein staining, which has some value, but we know it is not that sensitive and specific," said Josh Johnston, OD, FAAO. "They will look at staining and tear breakup time, but we know tear breakup time is not very valuable. You have to dig deeper, looking at the quantity and quality of the meibum that you can express. I think this is a starting point to change behaviors and then see how prevalent this is. Then look at that and tie it to outcomes."

"There have been enough data and enough talk that if doctors are not considering MGD when they are diagnosing patients with dry eye, they are missing the boat," Dr. Lang said. "If we are not addressing the underlying cause of the disease, we are not really addressing the disease at all." ■

1. 2019 Modern Optometry Clinical Survey, developed in partnership with the Fundingsland Group.
2. 2019 ASCRS Clinical Survey, developed in partnership with the Fundingsland Group.
3. Cochener B, Cassan A, Omiel L. Prevalence of meibomian gland dysfunction at the time of cataract surgery. *J Cataract Refract Surg*. 2018;44:144-148.
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Diagnosing Meibomian Gland Disease

Clinicians rely on a range of criteria to identify MGD.

Given its prevalence, clinicians need to be alert for meibomian gland disease (MGD) in their patients. There are many available tools for diagnosis.

ASKING QUESTIONS

The first step in the process is often to administer a dry eye questionnaire or informally asking the patient about ocular symptoms to determine how dry eye and MGD are affecting the patient's quality of life.

In addition to asking patients about their eyes, Jade Coats, OD, also questions them about their eyelids, which has yielded useful information.

Laura M. Periman, MD, begins with the SPEED score, assessing risk factors, age, contact lens wear, dermatologic symptoms consistent with rosacea, and medications. She has found jotform.com to be helpful to convert intake forms into QR codes, so patients can complete this information on a smartphone.

"Many times, patients are complaining of watery eyes, blurry vision, or visual function," said Jacob Lang, OD, FAAO. "If we ask the right questions, I think we find a lot more symptoms than we realize, and the patient finds more correlation to what they are experiencing visually than they may have thought."

"It's not uncommon to see an MGD patient that is compensating with increased tear output," Dr. Periman said. "When you perform your examination, there is clear evidence of MGD, but the osmolarity may be within the normal range because the lacrimal gland is picking up the slack from inadequate meibum delivery. That can be a clue to understanding the asymptomatic patients."

"I believe that patient symptoms are important, and they do not always correlate perfectly with signs. It is important to ask all patients about their symptoms. I find questionnaires are helpful to monitor for progression over time," said Melissa Barnett, OD, FAAO, FSLs, FBCLA.

Josh Johnston, OD, FAAO, emphasizes to patients that regardless of what is causing their discomfort, his goal is to make them feel better. "I key in on that to be more empathetic and to help them on that journey of starting to feel better," he said.

SEARCHING FOR MGD

Regardless of whether symptoms are present, doctors should evaluate for MGD. "If we are not looking for this condition, we are going to miss a lot of patients," said Alice Epitropoulos, MD. "Missing the diagnosis can result in patient dissatisfaction after refractive cataract surgery and adversely affect our surgical outcomes."

Rate your level of agreement with the following statement: Routine eyelid evaluation, including a meibomian gland evaluation, should be a standard part of all OSD exams.

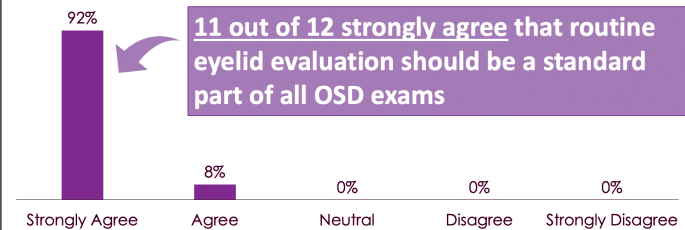


Figure 1. Consensus Finding #2.

In the Prospective Health Assessment of Cataract Patients' Ocular Surface (PHACO) study, Trattler et al reported that 76.8% of eyes being examined for cataract surgery had positive corneal staining, 62.9% had a tear breakup time of 5 seconds or less, and half exhibited positive staining of the central cornea; however, nearly 60% of patients did not describe a foreign body sensation.¹

Preeya K. Gupta, MD, and Cassandra Brooks, MD, published a study showing that 72.5% of patients (age range: 21 to 62 years) undergoing refractive surgery evaluations had meibomian gland atrophy.² "These are young patients who are going to be upset with you if you worsen their ocular surface disease (OSD)," Dr. Gupta said.

"In practice, I do not wait for symptoms. I think it is important to assess the health of every eyelid," Dr. Coats said, explaining that a comprehensive examination includes investigating the meibomian glands and eyelid function. "It is part of my preoperative process and postoperative process," Dr. Coats said. "I am constantly educating patients on the function of their eyelids."

Panelists highlighted the need for early diagnosis and treatment. "I'd rather treat a patient with early disease when there's a chance for improvement rather than a patient with late-state disease because the treatments may not be as effective," Dr. Lang said.



Figure 2. Blepharitis and MGD.

Courtesy of Brandon D. Ayres, MD.



EYELID EVALUATION

In Consensus Finding #2, 11 of 12 panelists strongly agreed that routine eyelid evaluation should be a standard part of all OSD examinations (Figure 1).

During the examination, panelists look for blepharitis, telangiectasia and ocular rosacea, signs of *Demodex* and biofilm, lid laxity, conjunctival chalasis, filamentary keratitis, trichiasis, tylosis, and other findings (Figure 2). They may perform the Korb-Blackie test to determine whether the patient has an incomplete lid seal.³

Some panelists follow the ASCRS preoperative OSD algorithm, which includes the SPEED questionnaire, tear osmolarity, MMP-9, and the LLPP (look, lift, pull, push) clinical examination to examine the eyelids, as well as other tests.⁴

"My whole team knows what numbers I'm looking for on the SPEED score—the red score, we call it—when to initiate the initial dry eye testing, which includes meibography," said Brandon Baartman, MD, who uses it as part of the ASCRS algorithm.⁴ "But all my new refractive patients get meibography as a screening tool, and I am amazed. We are collecting data on the number of asymptomatic new refractive patients who come in with some degree of structural change to their glands."

"It is important to really look at the lids, the lid margins, along with the quality and quantity of the meibum," Dr. Epitropoulos said. "Obvious signs of MGD include gland inspissation, gland dropout as seen on meibography, and inflammation of the lid, all of which are very easily discerned with a quick slit lamp examination. Evidence of very subtle signs such as an abnormal quality and quantity of meibum requires gland expression."

Courtesy of Jacob Lang, OD, FAO



Figure 3. MGD.

"Patients can look like they have 'normal' glands; these are patients who are often missed for a long time. Without expression to check the quality of the meibum, I think that we are going to miss diagnosing MGD earlier in its disease state," Dr. Gupta said.

Dr. Epitropoulos uses meibomian paddles to express the glands, often after heating the glands. She also assigns a meibomian gland score, which is based on the quality and quantity of meibum secreting from the glands, as well as the anatomy of the glands on meibography.

After the SPEED questionnaire, Dr. Periman performs osmolarity, MMP-9 testing, meibography, and diagnostic gland expression with a wooden-handle cotton swab to assess the meibum quality and the ease of expressibility. Then she categorizes MGD (hyposecretory, hypersecretory, nonsecretory) and treats the patient. "Those are the four simple steps for identifying OSD, and I think it helps us understand the significant overlaps and contributing factors," she said.

"I assess the tear lake, perform a quick analysis, grade their dry eye, and grade their MGD," said Marguerite B. McDonald, MD, FACS. "It's critical to put your thumb or the tip of a cotton swab in the middle of their lower lid and press. Do you see obstruction? Do you see clear meibum? Do you see cloudy meibum? It only takes a moment. I do that on absolutely every patient."

When expressing the glands, Dr. Lang also notes how much and how long he has to press the glands to release meibum (Figure 3). "It is also important to assess the punctal and nasolacrimal system as well because there needs to be a balance of production and drainage to maintain a healthy ocular surface," Dr. Lang said.

"When you look for lid thickening, abnormal meibum, and meibomian gland expressibility on your exam and you also look for the presence of telangiectasias, you will realize that ocular rosacea is highly prevalent in the MGD patients," Dr. Periman said. "Do not let the skin tone fool you. The richer pigmented skin tones can also have rosacea, so look for telangiectasia."

In addition to the lid tests, Dr. Barnett noted the value of staining. "Oftentimes, when I am evaluating contact lens wearers—whether they have a normal or irregular cornea—many of these patients have MGD," she said.

Should meibography be performed at the point of care with OSD patients?

9 out of 12 believe that meibography should be performed at the point of care for all OSD patients

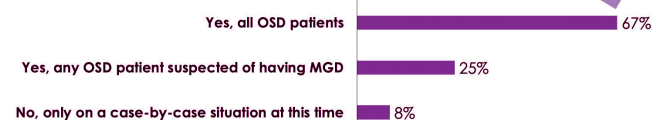


Figure 4. Consensus Finding #3.

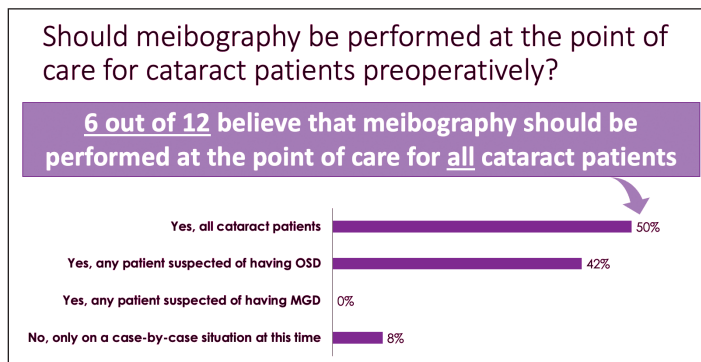


Figure 5. Consensus Finding #4.

MEIBOGRAPHY

Consensus Finding #3 showed that nine of 12 panelists believe meibography should be performed at the point of care for all patients with OSD, and Consensus Finding #4 showed that half of panelists believe meibography should be performed at the point of care for all cataract patients (Figures 4 and 5).

"The most important part of meibography is being able to stage MGD and educate the patient," Dr. Gupta said (Figure 6). "That education piece helps us in the long term not only for patients accepting treatments, but also accepting that this is a chronic disease that is not going to go away."

"Meibography helps me tell the story of MGD to the patient and reinforces the importance of the treatment algorithm that we develop for the patient," said Brandon D. Ayres, MD.

Dr. McDonald agreed. "A picture is worth a thousand words," she said. She shows patients the image, compared with an image of normal glands. "It takes less than 30 seconds to explain the difference," Dr. McDonald said.

"We perform meibography and the SPEED questionnaire on every patient, so we use it as a screening tool," said Hardeep Kataria, OD, FAAO.

Dr. Barnett also believes meibography should be standard of care, especially in contact lens-focused practices. "It would be wonderful if doctors and their staff had meibography done on themselves, so they can visualize and be impressed by the detail of these images to then introduce this technology to their patients," she said.

Some panelists take a targeted approach to meibography. "We screen all of our patients for OSD no matter why they are here, but I do not perform meibography for every one of those



"In my clinic, I consider meibography the Snellen visual acuity of dry eye."

— Douglas K. Devries, OD

patients," Dr. Ayres said. He performs meibography if significant MGD is identified, a patient is referred for ocular surface examination, and for patients for whom surgery is delayed.

"In my clinic, I consider meibography the Snellen visual acuity of dry eye," said Douglas K. Devries, OD. If patients score 6 or greater on the SPEED questionnaire, his practice performs tear osmolarity, assesses for inflammation, and performs meibography.

Dr. Coats regards meibography as a helpful tool to educate patients and document a baseline before cataract and refractive surgery. "We often need to treat MGD postoperatively, so for patient education and being able to show patients that MGD definitely was there prior to surgery it is invaluable," Dr. Coats said.

"When we present meibography to our patients, we teach the terminology of the morphological changes," Dr. Kataria said. "A lot of patients want to know the numbers because they are used to them from tear film osmolarity, for example, or an intraocular pressure for glaucoma."

Meibography is also useful in tracking progression. "Sometimes you will make the diagnosis and develop a treatment plan, but there might be challenges with adherence to the recommended treatment plan or interventions," Dr. Periman said. Meibography is helpful to show the patient how the condition has progressed without treatments or has improved with certain interventions, she explained.

Hura et al evaluated meibomian gland structure in patients with MGD with a morphometric analysis, demonstrating that vectored thermal pulsation stabilized or improved gland structure in most patients studied.⁵ "The results from this study also raised the possibility that absence of visible gland structure may not necessarily indicate absolute atrophy or loss of function, but may suggest loss of activity that improves with treatment, indicating possible gland reactivation," said Dr. Epitropoulos, a coauthor in the study. "Of course, additional or prospective studies need to be done to further validate these findings, but I think if you're seeing atrophy, there is some hope that you can potentially regenerate the glands."

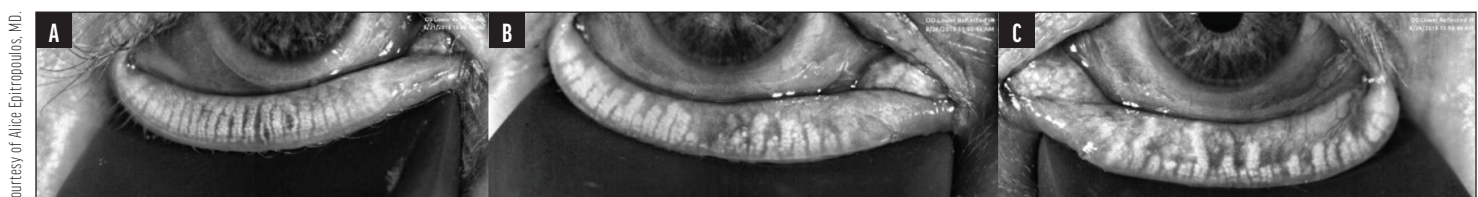


Figure 6. Mild (A), moderate (B), and severe (C) MGD.

Courtesy of Alice Epitropoulos, MD.



Courtesy of Hardeep Kataria, OD, FAAO.

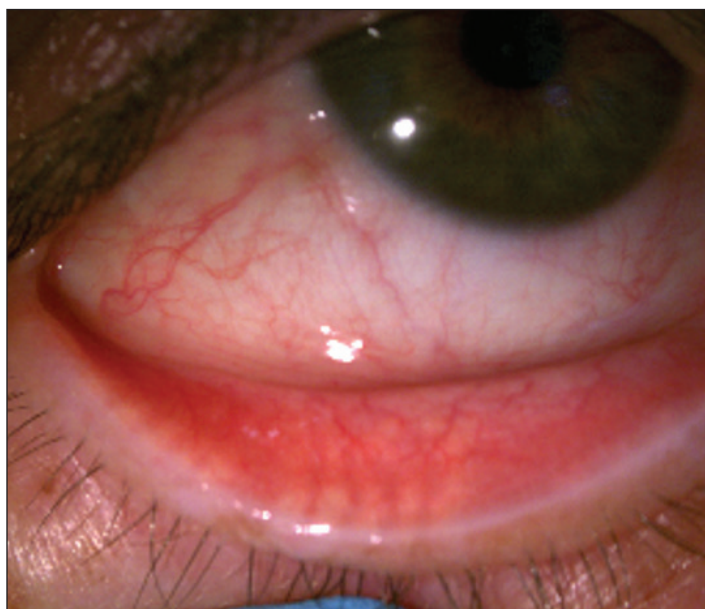


Figure 7. Slit lamp imaging to evaluate meibomian gland structure, which is an alternative to meibography to evaluate for gross morphologic changes.

INCREASING AWARENESS

Doctors may be hesitant to adopt meibography because of cost, staff utilization, and space, Dr. Lang said. “I think those obstacles are dwindling with advancements in this technology,” he said. “We are getting quicker, better images, and electronic health records continue to improve.”

“Now we know more about this with good research, the prevalence and understanding of MGD, and how it is so important to treat it,” Dr. Johnston said. “I think its use will continue to grow, and I am very optimistic about seeing more of our colleagues incorporate this into their practices.”

“In the past decade we have seen a significant uptick in clinicians who are willing to talk about their experience when it comes to implementing their protocols, which is very helpful when it comes to doctor education,” Dr. Kataria said.

Dr. Coats believes slit lamp photography is one way clinicians can begin imaging MGD (Figure 7). “A smartphone or another digital device could be something to get you started to take these photos or to become invested and start treating dry eye,” she said (Figure 8).

“A good pearl, if you do not have access to meibography, is using a penlight at the slit lamp with no illumination on the slit lamp,” Dr. Johnston said. “You can still see some of the gland morphology.”

TAKING ACTION

Dr. Devries believes that function (quality of the meibum) is more important than structure in choosing to treat. “If I see the

Courtesy of Jade Coats, OD.

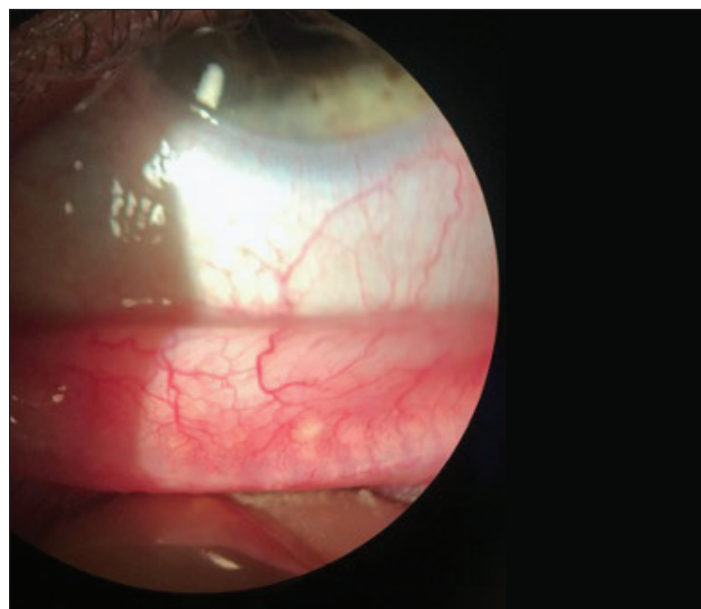


Figure 8. MGD and meibomian gland dropout documented with smartphone imaging at slit lamp.

meibum is starting to get cloudy and turbid, my feeling is I can have good results if I intervene with a mechanical procedure before we have gland dropout,” he said.

Dr. Baartman explained when determining whether treatment is necessary, he relies on functional tests like tear breakup time; however, like many panelists, he believes meibography is an invaluable educational tool and to evaluate refractive surgery and dry eye patients.

“If we are bathing the globe and the eye in turbid meibum, we know we are going to have problems,” Dr. Lang said. “If those meibomian glands are not functioning properly, we are going to have structural changes downstream because of the consequences of that obstruction.”

CONCLUSION

“Our colleagues sometimes worry that they have to have every single test and do everything to diagnose MGD,” Dr. Gupta said. “There are many different ways in which you can diagnose MGD and OSD. My best advice is to pick one tool or test and become comfortable with it. Once you become confident in changing your routine process or adding a test, go to the next level and add in different tools.” ■

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3. Korb D, Blackie C. The Korb-Blackie lid light test. *Invest Ophthalmol Vis Sci*. 2013;54 (suppl):942.
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5. Hura AS, Epitropoulos AT, Czyn CN, Rosenberg ED. Visible meibomian gland structure increases after vectored thermal pulsation treatment in dry eye disease patients with meibomian gland dysfunction. *Clin Ophthalmol*. 2020;14:4287-4296.



MGD Treatment Options

Part 1: Weighing Conventional Treatments

Experts assess the role of traditional MGD treatments.

Early treatment of meibomian gland disease (MGD) is critical. Clinicians turn to a wide array of conventional palliative and prescription treatments for MGD, which are often the first step in treatment.

"The cataract patient is a dry eye patient typically just by their age. We pump the brakes if we see surgical patients who have ocular surface disease (OSD), whether that is signs or symptoms," said Josh Johnston, OD, FAAO. He does not want OSD to impact surgical outcomes, which may lead to residual refractive error or increased dry eye symptoms. He may use hypochlorous acid on the lids to treat biofilm, prescription medications, neurostimulation, and immunosuppressants to decrease inflammation and increase tear production, and addresses the obstruction with an in-office procedure.

"We know it is going to get worse," Dr. Johnston said. "We need to intervene as fast as we can, especially in our symptomatic patients."

Melissa Barnett, OD, FAAO, FSLS, FBCLA, is even more concerned to see gland atrophy in children, which is occurring more often because they increasingly use digital devices.¹ She speaks with all of her patients about the impact of digital devices on MGD and the importance of the 20-20-20 rule, taking a 20-second break to view something 20 feet away every 20 minutes.

CONVENTIONAL TREATMENTS

"Conventional therapy is to recommend treatments like artificial tears to replace tear volume, warm compresses to help encourage flow of the meibum, nutraceuticals like omega-3s, and lid cleansers," said Preeya K. Gupta, MD (Table). "From a pharmaceutical perspective, topical steroids help with inflammation and there are even anti-inflammatory properties of antibiotics like azithromycin or doxycycline."

TABLE. SEVERAL TYPICAL CONVENTIONAL MGD TREATMENTS.

- Artificial tears/lubricants
- Warm compresses
- Nutraceuticals
- Lid cleansers
- Topical steroid
- Azithromycin



"We are trying to provide the best care possible, and I do not want to waste time."

— Brandon D. Ayres, MD

By the time patients with dry eye symptoms see their eye doctor, they have often begun treatment with over-the-counter ocular lubricants.

"Our patients are more and better educated," Jacob Lang, OD, FAAO, said. "They have already tried three or four tears before they bring it up to their eye doctor. They have searched the internet and asked their friends how to take care of these symptoms. I think patients have already tried and failed with most of these things." However, he believes conventional treatments can be useful for maintenance.

Marguerite B. McDonald, MD, FACS, prescribes preservative-free lubricant drops and nutritional supplements for patients with very mild MGD but recommends interventional treatment for those in the next stage. Dr. McDonald explained that she takes an aggressive approach early.

Douglas K. Devries, OD, added, "I start patients on a warm compress, and I talk to them about how the compress will not only be therapeutic now, but it will also be good maintenance after a thermal expression procedure."

Jade Coats, OD, believes conventional and pharmaceutical agents are good for maintenance, but after a certain point, the patient may also need to be referred for interventional treatments.

Dr. Johnston explained that although artificial tears provide temporary relief, a thermal mask is a path toward an in-office MGD treatment. He also believes nutraceuticals have value, as well as lid cleansers to treat any biofilm. "A steroid will treat inflammation, and it may make the patient feel better, but it is not really addressing the root cause, which is obstruction," Dr. Johnston said.

Dr. Barnett also reminds patients that certain ingredients in cosmetics, sunscreen, lotions, and other products may adversely affect their meibomian glands.

Hardeep Kataria, OD, FAAO, reaches for some palliative treatments in children. "It is going to be more for habit forming to try to prevent some of these problems from getting worse in the future and to educate their parents that this is something we need to watch for," she said.

SEEKING RAPID RESPONSE

Brandon Baartman, MD, begins treating MGD aggressively and peels back if needed. "Oftentimes, particularly with symptomatic patients, they are looking for a result and relief," he said. He tends to use multiple at-home prescription treatments for early stages in conjunction with interventional treatments.



Brandon D. Ayres, MD, takes a similar approach, prescribing multiple treatments, including topical or systemic antibiotics and steroids, to relieve patients' symptoms. "We are trying to prepare patients for surgery. We are trying to provide the best care possible, and I do not want to waste time," Dr. Ayres said. "We will even recommend a procedure right away if we think they need it because so many of our patients have already tried tears, warm compresses, and lid scrubs. I think topical steroids are great. It is not a good long-term fix, but sometimes they need to be pulsed in severe disease."

Dr. Ayres also uses systemic antibiotics, but he cautions that doxycycline can cause sun sensitivity and says topical azithromycin tends to work well.

TREATING REFERRED PATIENTS

"I think it is important to remind other practitioners who do not work in a referral or refractive center that it is in the best interest of the patients to start some sort of dry eye/MGD treatment upon referral for cataract or refractive surgery," Dr. Coats said. "When the patients get to the preoperative appointment, the process may be expedited if steps have already been taken to pretreat their ocular surface. It also helps us have an idea of what they have already tried and where to go from there." ■

1. Gupta PK, Stevens MN, Kashyap N, et al. Prevalence of meibomian gland atrophy in a pediatric population. *Cornea*. 2018;37:426-430.

MGD Treatment Options Part 2: Interventional Technologies

Interventional technologies have taken an increasingly prominent role in MGD treatment.

Clinicians often use conventional therapies in conjunction with an expanding array of interventional treatments to treat meibomian gland disease (MGD) (Table).

MICROBLEPHAROEXFOLIATION AND LID MARGIN DEBRIDEMENT

"Microblepharoexfoliation and lid margin debridement can be a beneficial treatment for patients with MGD who also have chronic biofilm that leads to inflammation and physical obstruction of the meibomian gland openings," said Preeya K. Gupta, MD. Tools include a microblepharoexfoliation handpiece or Maloney spatula to remove keratinized material along the eyelid, and clinicians may combine this therapy with other interventional treatments.

"Keratin can grow over the gland openings and ultimately start to obstruct the output of the glands, which can lead to atrophy," said Josh Johnston, OD, FAAO. "Cleaning up the lids with an in-office procedure can be very efficacious."¹



"Keratin can grow over the gland openings and ultimately start to obstruct the output of the glands, which can lead to atrophy."

— Josh Johnston, OD, FAAO

"We need to treat the lid from front to back and we have to treat the entire lid," said Jacob Lang, OD, FAAO. "We are treating the front of the lid and the lashes because they can harbor pathogens and biofilm. With lid debridement, we remove or clean up the buildup that might cap or inhibit our meibomian expression. Then we need to treat the meibomian glands mechanically to remove any obstruction inside them."

When patients have hyperkeratinization (Figure 1) 3 or 4 months after an in-office treatment, Hardeep Kataria, OD, FAAO, debrides



Courtesy of Hardeep Kataria, OD, FAAO

Figure 1. Capping and hyperkeratinization over meibomian glands and eyelid telangiectasias.

TABLE. INTERVENTIONAL MGD TREATMENTS.

- Microblepharoexfoliation
- Lid debridement
- Semi-automated thermal pulsation
- Automated vectored thermal pulsation
- Intelligent heat and manual expression
- Intense pulsed light



the lid margins even if patients are not having an in-office thermal pulsation that day.

Douglas K. Devries, OD, compares microblepharoexfoliation to dental cleanings when speaking with patients. “When the biofilm began to be removed between the teeth and gums, it was a tremendous advancement in dentistry,” Dr. Devries said.

SEMI-AUTOMATED THERMAL PULSATION

During the 8- to 12-minute treatment with semi-automated thermal pulsation, an LED light warms the upper and lower eyelids and melts blockages. Research has shown that meibomian gland function increased by 300% 4 weeks after treatment with this device compared with baseline (Figure 2).²

The blocked meibomian gland orifices are viewed through a magnifying lens and video imaging. Panelists like the small footprint of the device.

“It measures the temperature in real-time, so we can see the internal temperature on the back of the eyelid to know the level of temperature we are raising the meibomian glands to. Then we can use mechanical force to express the oil from the glands,” Dr. Lang said.

“This device allows you to do focused gland treatments, so you can treat sections. Sometimes you can go back to a section and treat it again if that is where you really felt the disease was more prevalent,” Dr. Lang said.

Dr. Devries uses meibography to plan where he would like to focus these treatments to customize care. “As I start to express, I can really see the results,” he said. Dr. Devries also has found it useful in patients with small lid openings.

Courtesy of Laura M. Periman, MD

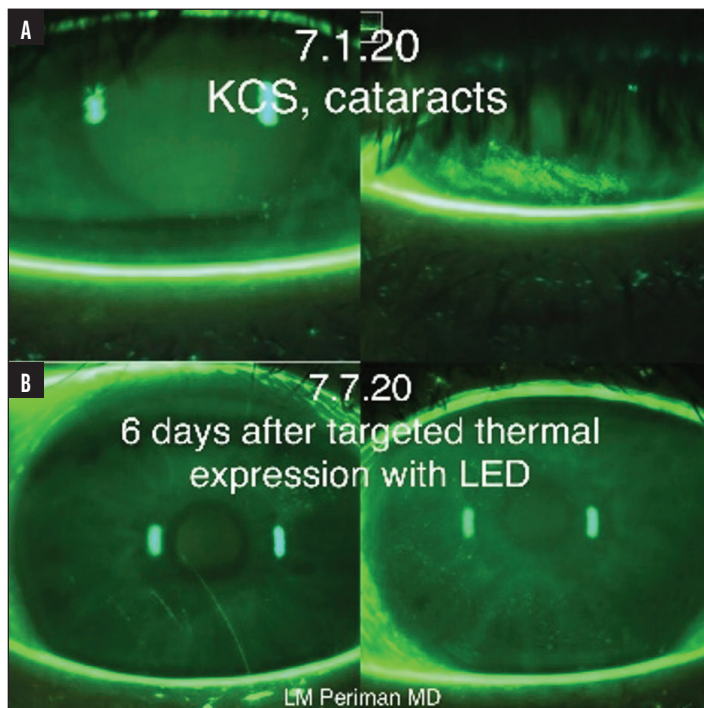


Figure 2. Keratoconjunctivitis sicca and cataracts (A). Results 6 days after targeted thermal expression with LED (B).

“It is very useful for diagnosis and showing the footage to the patient,” said Marguerite B. McDonald, MD, FACS. “It also captures the entire treatment so you can choose to show how much material was expressed.”

AUTOMATED VECTORED THERMAL PULSATION

Automated vectored thermal pulsation, which was the first thermal treatment introduced, has a larger footprint than semi-automated thermal pulsation. During the 12-minute treatment, the inner eyelid surface is heated to 108.5°F while the device also massages the eyelids to evacuate the gland contents (Figure 3).

“Several studies have demonstrated the sustained effects over 12 months or more following a single treatment, including a significant reduction in symptoms and improvement in meibomian gland secretions,” said Alice Epitropoulos, MD.³⁻⁵

Combining microblepharoexfoliation with automated vectored thermal pulsation, Dr. Epitropoulos explained, helps maximize results. “Removing that biofilm that builds up over the lid margin reduces bacteria and *Demodex* that contribute to inflammation and obstruction of the glands,” she said.

“If patients with advanced atrophy have viable remaining glands, they may still benefit from therapy to try and save the glands that are still there. I think it is worth having the conversation with the patient,” Dr. Epitropoulos said. “A lot of times the upper glands become the last to get damaged, so it is not unusual for them to have complete dropout on the lower and some atrophy on the upper.” Dr. Epitropoulos discusses with patients that the goal of treatment is to prevent further damage, and patients with advanced atrophy of the glands may not experience as much improvement in their symptoms compared with those with less atrophy.

“Patients who have this procedure often have improved anatomy, and it just depends on their level of disease in terms of how dramatically the symptom improvement occurs,” Dr. Gupta said.⁵

“It protects the cornea and the globe from heat,” Dr. Johnston said. “Part of what differentiates this procedure from some of the other products is it is automated.” He also believes it is gentle and comfortable. Dr. Johnston typically uses it for patients with mild MGD or those who benefited from the procedure previously and ask for it by name. Treatment cannot be customized because it is automated, but it allows for consistency and efficiency.

Dr. Kataria explained that the procedure is repeatable. “It is comfortable for patients every 6 to 12 months, depending on their structure and symptoms,” Dr. Kataria said. “I like to prime



Figure 3. Automated vectored thermal pulsation.

Courtesy of Brandon D. Ayres, MD



patients before this procedure with step 1 treatments, especially nutraceuticals.”

Dr. Kataria shows patients their meibography and anterior segment images and staining on the cornea. “They come back a month later and they see a significant improvement in their pictures that correlates with how comfortable they feel,” Dr. Kataria said. “It definitely has a role for my mild to moderate patients.”

INTELLIGENT HEAT AND MANUAL EXPRESSION

The intelligent heat device, which is controlled by a microcomputer, externally heats the eyelids for 12 minutes and then meibum is expressed manually from the glands (Figure 4). One week after treatment, all patients in a prospective postmarket multicenter trial had significant improvement in dry eye signs and symptoms.⁶ Clinically meaningful symptom relief was reported in 83% of patients. Gupta et al reported that results were similar to those achieved with vectored thermal pulsation.⁷

Melissa Barnett, OD, FAAO, FSLs, FBCLA, has found it useful in patients with mild, moderate, and severe MGD. “People who have had symptoms for many years have noticed an improvement in their comfort, quality of life, and sometimes an improvement in their vision,” Dr. Barnett said. “It is something I bring up very early in the MGD conversation because I have seen that it is so beneficial for so many different types of patient.”

“It gives patients relief relatively quickly, and that relief can last between 6 and 9 months,” said Brandon D. Ayres, MD. “Manual expression helps me understand what is going on, how treatments and therapies are working, and it gives me something to discuss with patients as I see the quality of the meibum being expressed.”

Dr. Johnston’s practice primarily uses this device to treat MGD. “It is highly portable, customizable, a little more invasive for us as physicians, and offers a little bit more aggressive treatment,” he said.

“The data show an improvement in signs and symptoms within 1 week,” said Brandon Baartman, MD. “That is effective and helps shape how I am bringing patients back in a couple of weeks and reassessing them for their preoperative treatments, whether it is biometry for cataract surgery or refractions for laser vision

correction. I know it is having an effect relatively quickly. I use it postoperatively a lot of times when I am trying to assess the ocular surface, making sure I have optimized it to get a crisp refraction to decide whether we need to perform an enhancement with laser vision correction or it is simply a fluctuation in vision from dry eye. It is a very useful tool, particularly in a refractive surgery and refractive cataract practice.”

Dr. Devries likes that he can use this device to customize treatment and focus on specific meibomian glands. Panelists who use the device also appreciate the lower acquisition cost of the technology as well as the small footprint of the device.

Dr. Ayres has been using intelligent heat and manual expression for the last few years and appreciates the lower cost, so he can use it in multiple offices. “It fits in your pocket, so it is very easy to transport,” Dr. Ayres said.

“This particular device seems to be a patient favorite because they are encouraged to blink throughout the process and can keep their eyes open,” said Jade Coats, OD. Technicians apply it, and she expresses the meibum afterward.

“It’s probably the easiest for patients during the heating process,” Dr. Lang said. “The manual expression is a little more aggressive, but I think patients know that it is where the rubber hits the road.”

INTENSE PULSED LIGHT

Laura M. Periman, MD, explained that intense pulsed light (IPL) addresses five of six mechanisms of MGD (Figures 5 and 6).⁸⁻¹⁰

“To me, it represents a broad-spectrum approach to the problem

Courtesy of Brandon D. Ayres, MD.



Figure 4. Treatment with intelligent heat device.



Courtesy of Laura M. Periman, MD.

Figure 5. Thirty-nine-year-old woman evaluated for LASIK (A). Chalazion and MGD were treated with IPL (B). MMP-9 testing had strongly positive results and converted to negative (C).



Courtesy of Laura M. Periman, MD

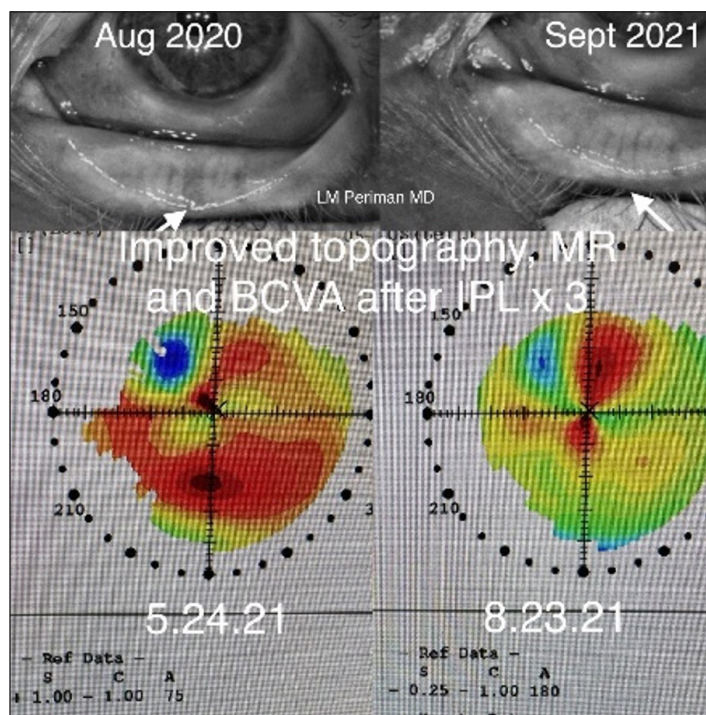


Figure 6. Improved corneal topography, manifest refraction best-corrected visual acuity, and meibography after three IPL treatments.

that is particularly helpful if you recognize rosacea, which is a very commonly found overlap with MGD,” Dr. Periman said.

“IPL technology was originally introduced by dermatology, and that is exactly what I tell my patients. It has been used for years cosmetically to improve fine lines by stimulating collagen production, by addressing rosacea and helping to photocoagulate those little delicate vessels and for removing sun and age spots on the skin,” said Dr. Devries, who has been using it for 6 years. “It was just serendipitously discovered that in doing IPL, the patients’ dry eyes were improving particularly these MGD patients. If there is telangiectasia on the lid, then I want to introduce IPL to my patients.”

Dr. Devries explains to patients that he is using IPL therapeutically and will manage the cosmetic side effect. “I think it is a draw that helps patients move toward IPL,” Dr. Devries said. He performs thermal expression after four IPL treatments.

IPL has doubled thermal pulsation treatments in Dr. Devries’ practice. “The increase has been maintained for 6 years because people are looking at this comprehensive treatment of removing some of the inflammation of those inflammatory vessels and then removing the obstruction by heating and using compression,” he said.

Dr. Periman explained that IPL is not only helpful for dry eye associated with MGD, but also dry eye without MGD.¹¹ “We know that IPL can dramatically drop the typical inflammatory cytokines associated with dry eye and MGD in a statistically significant way.¹² So it is a rapid way to control the bacterial component, the *Demodex* component.¹³ You can actually see improvements in inflammation immediately after the procedure, including lid thickness and lid edema, tenderness of the lids, the altered melting

After use of interventional MGD treatments, what percentage of these patients have significant reduction of MGD signs and symptoms 3 months after treatment?

The average percentage of MGD patients who have a significant reduction of MGD signs and symptoms 3 months after treatment: 65%

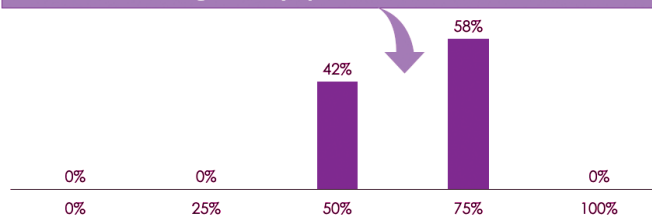


Figure 7. Consensus Finding #5.

temperature, the obstruction, and the expressibility. The quality of the meibum improves over the course of treatment. It dovetails well into our immunomodulators and thermal expression modalities,” Dr. Periman said.

“What is unique about IPL is, unlike the thermal pulsation treatments, it is focusing on that vascular component,” Dr. Gupta said. “So in my practice, the rosacea component is a big driver of selecting IPL.”

“IPL can be a really helpful option in teeing us up for success with our premium lens implants in cataract surgery,” Dr. Coats said. “If we know they have chronic inflammation and MGD prior to surgery, it is not going to go away after surgery, and it does affect the outcome of our results. IPL is an easy, repeatable procedure. As a bonus, it seems patients like the cosmetic benefits.”

Some doctors refer patients out for IPL. These patients sometimes return for other interventional MGD treatments.

CONSENSUS FINDINGS

According to Consensus Finding #5, on average, 65% of MGD patients have a significant reduction of MGD signs and symptoms 3 months after interventional treatment (Figure 7).

Panelists attribute this percentage to a number of factors. “More severe patients will actually have more physical signs of improvement in their anatomy, but sometimes the symptoms can lag, and the correlation might not be as direct in terms of treatment,” Dr. Gupta said.

“I think it is very much dependent on so many other factors—dietary control, rosacea, and systemic diseases such as diabetes—that play a part,” Dr. Kataria said.

Dr. Johnston believes approximately 75% of his patients have improvement. “We have therapies now that work within 4 weeks.² The clinical trials show that,” he said. “We know there is no cure, but we set up expectations for that and we can improve clinical signs and symptoms in most patients these days.” ■

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Combining MGD Therapies to Maximize Impact

Clinicians tailor treatment and achieve benefits by combining therapies.

Panelists often seek to increase the therapeutic benefits of interventional treatments by combining them and customizing strategies on a case-by-case basis (Figure).

Alice Epitropoulos, MD, describes meibomian gland disease (MGD) treatment as a three-step process: lid margin hygiene, removal of obstruction, and reduction or elimination of inflammation. “These three treatment categories work synergistically and are most effective when performed earlier in the disease process, before patients reach end-stage atrophy or dropout,” she said.

“As far as interventional therapies, I rarely do vectored thermal pulsation without microblepharoexfoliation first,” said Marguerite B. McDonald, MD, FACS. “You remove the biofilm and then perform any of the procedures that warm the glands and allow you to extract the altered meibum. It is a one-two punch.”

“It is a combination of managing the debris and the bacterial and *Demodex* load on the lids, addressing the blepharitis, removing the superficial obstruction, addressing the inflammation, stimulating meibum production and quality from the meibomian glands



“As far as interventional therapies, I rarely do vectored thermal pulsation without microblepharoexfoliation first.”

— Marguerite B. McDonald, MD, FACS

with intense pulsed light (IPL), and then following it with in-office meibum expression modalities,” said Laura M. Periman, MD.

Brandon Baartman, MD, likes to remove debris, capping, and inspissation of the meibum, optimizing the lids for thermal treatment. He supplements interventional treatments with conventional options, such as warm compresses, lid hygiene, topical steroids, and oral antibiotics, especially in patients with later-stage disease. “I am a big proponent of using topography and particularly looking at the Placido disk mires on the cornea,” Dr. Baartman said. “I evaluate those in every patient. For cataract surgery, if I see abnormalities in the tear film in those mires, I know it’s impacting optical quality and I use everything at our disposal in these patients.”

“I perform microblepharoexfoliation and expression and have the patient return 4 to 6 weeks later, and then we will do a thermal treatment,” said Preeya K. Gupta, MD. “Sometimes we will alternate microblepharoexfoliation and IPL in their maintenance mode. I am a big believer in removing debris, scar tissue, and biofilm because I think it does make a difference, but you still have to treat the glands themselves.”

“For some patients, nutraceuticals can help before and after interventional MGD treatments,” said Melissa Barnett, OD, FAAO, FSLs, FBCLA. She also combines eyelid hygiene with interventional treatments. She finds that the duration of treatment benefits sometimes does not correlate with patient compliance or noncompliance. “A person can be exceptionally compliant and may require an interventional treatment every 3 to 4 months compared to others who are compliant and need treatment in 9 to 12 months,” Dr. Barnett said.

“I think it is crucial to manage inflammation either before or while you are doing any thermal pulsation,” said Jacob Lang, OD, FAAO. “I use a lot of pharmaceuticals to manage inflammation on the front end as well as addressing the lids. We do lid debridement before any thermal pulsation treatment as our standard protocol just to maximize effect.” He also combines interventional treatments. ■

Courtesy of Hardeep Kataria, OD, FAAO

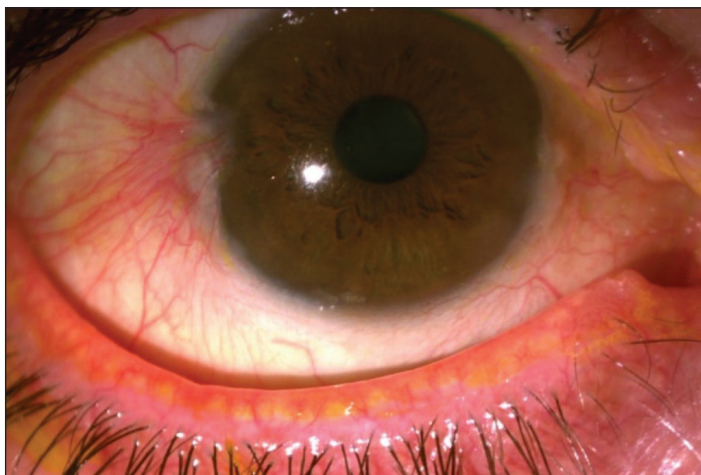


Figure. Eyelid telangiectasia consistent with ocular rosacea and inspissated glands. Dr. Kataria noted that this is a good example of a candidate for combination interventional MGD treatment.



Integrating MGD Interventional Treatments Into Practice

Clinicians share approaches to meet patients' MGD needs.

Consensus Finding #6 showed that 11 of 12 panelists agree that it is important and very important to incorporate modern interventional meibomian gland disease (MGD) treatments into a standard ocular surface disease (OSD) treatment practice (Figure).

BEGINNING TREATMENT

"There is a lot of confusion in terms of whether clinicians need all of these therapies," said Preeya K. Gupta, MD. "I think they should pick the one they are most comfortable with and work from there because there is a lot of great data behind these treatments, a lot of science, and a lot of clinician hours in using and testing the technology. I have used all of these treatments, and I think there is a sweet spot for all of them. A lot of it comes from your own clinical practice and learning about who responds well and correlating that so you can ultimately set realistic expectations for patients."

Douglas K. Devries, OD, echoed her thoughts. "As we look at some of the results that we get, I think you start utilizing technology and determine the value of what the treatment does," he said.

"I agree that MGD treatment should be standard of care for anyone diagnosing OSD or treating dry eye," said Jade Coats, OD. However, she does not believe clinicians need to make a substantial investment in the latest diagnostic technology to begin. "You can get started tomorrow by looking at the patients' eyelids, staining, and asking the right questions," she said.

Another early step is patient education. "We need to have these conversations about behavioral, environmental stress, dietary systemic control," said Hardeep Kataria, OD, FAAO.

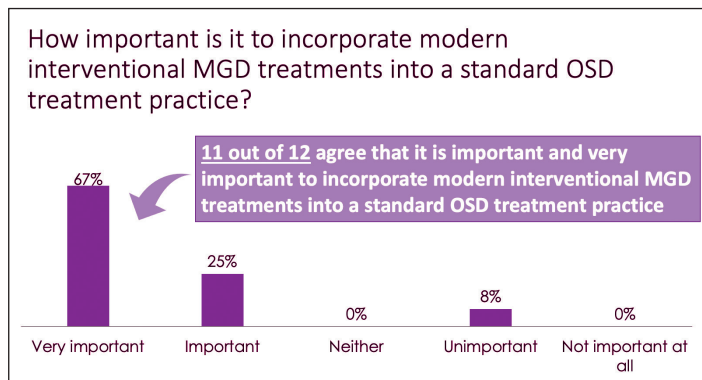


Figure. Consensus Finding #6.

"I agree that modern interventional MGD treatments are extremely useful," said Melissa Barnett, OD, FAAO, FSLs, FBCLA. "The future is now, and it is exciting to be able to help our patients more than we ever could before."

"If you are doing this in a dry eye clinic, you will need these treatments. We can start with other things, but ultimately, patients need to get relief," said Josh Johnston, OD, FAAO.

"Similarly to how we talk about options for patients with lens technologies or glaucoma therapies, these are therapeutic options for our patients. They deserve to know all their options," said Jacob Lang, OD, FAAO. "I think of these MGD treatments as standard ocular surface treatments. I do not see a differentiation between them."

"We also have to take a look at the impact treatment has in terms of outcomes for the patient. Is it going to improve outcomes? Is it going to help them achieve more success with their functional vision?" Dr. Devries said. "What is adding the technology going to do from the practice standpoint? It generally means that you are providing a higher level of care."

PATIENT EDUCATION

Panelists take different approaches in describing the cost versus benefits of interventional treatments to patients.

Marguerite B. McDonald, MD, expresses the cost of treatment to her patients, which is not covered by insurance. "If this is in advance of surgery, I explain, 'We have to get you in tip-top shape so your preoperative measurements will be more accurate and you will be more likely to sail through the postoperative period and be happy with your outcome.'"

Dr. McDonald also tells patients that postoperative infections that occur result from bacteria that were living on their eyelids, so the eyelids need to be cleaned to further decrease the remote risk of a devastating eye infection.¹

"I mention the cost. I tell them that most patients fill out a credit form and pay a bit each month with no interest for 2 years," Dr. McDonald said. This reduces embarrassment if they need to ask about credit. "A high percentage of patients will listen, and you think they have rejected your suggestion," she said. "But they are going home to talk to their spouse because this is a high-ticket item. Many times, they call back the next day, a week later, even a month later to say they want to have it done."

Dr. McDonald acknowledges to patients that the procedure is expensive, but the cost is significantly less than it was several years ago, and her practice is passing on the savings to patients.

"I usually try to encourage family to come into the room so they can listen to that conversation," said Alice Epitropoulos, MD. "Even if they are not in the office, I try to get them on the phone so they can hear via speaker phone about the goals of treatment, potential advantages, and costs."

Patients seem to be more accustomed to noncovered medical expenses. "I think there is definitely a trend, at least in the last couple of years, to more out-of-pocket expenses," said Brandon D. Ayres, MD. "People are paying more for their insurance



and still paying more out of pocket, but I think the realization that some things are going to cost is more readily accepted by patients now.” If he believes the procedure will help and transmits that belief to the patient, cost may be less of an issue, Dr. Ayres continued. “We try to keep our costs at a minimum so cost is not the barrier to treatment.”

Dr. Gupta stresses the importance of emphasizing the benefits of treatment and setting realistic expectations for patients when using interventional MGD treatments.

Patients often think that if they pay out of pocket, they will be cured, and there is not a direct correlation, Dr. Gupta said. “There is no cure for this disease. It is a chronic disease, and I think it helps everyone if we set appropriate expectations,” she said.

Dr. Lang explains his findings to the patient, recommends treatments, and discusses costs. His scribe and clinical assistant aid in the conversation. If an option is not feasible for the patient, he recommends alternatives. “I would say 75% of patients are willing and able to take my first recommendation,” Dr. Lang said.

“I think it is important to hear about the procedure more than once and to hear it from the doctor in a very matter of fact way: ‘Here is what I recommend and here is what it costs,’” said Laura M. Periman, MD. In larger clinics, a dry eye counselor can reiterate this message, she suggested.

“I think clinicians have a tendency to make assumptions about what a patient will spend money on,” Dr. Periman said. “At the end of the day, our job is to make the diagnosis, provide the treatment options, and make a recommendation. It is not up to us to make judgments about what is valuable to that patient. Having more comfortable eyes and better vision is very valuable to patients.”

Dr. Johnston also discusses treatment benefits and costs with patients, and a dry eye technician reinforces this. Approximately seven of 10 patients in his practice proceed with the interventional procedure. Costs have decreased and some companies offer rebates, which may make the decision easier for patients. “A lot of patients who come in are suffering with symptoms,” Dr. Johnston said. “They are motivated for therapy. They trust us as the experts and what we are recommending, and most end up getting the treatments.”

“Initially my staff were the first ones to review costs, but I found that once I started talking about the cost in a very straightforward way—‘This is my recommendation. This is the cost.’—I had increasingly more buy-in from patients,” Dr. Barnett said.

According to Dr. Barnett, “Once doctors gain experience with MGD interventional treatments, it will be easy to talk to patients about costs because the treatments work so well.”

“An overwhelming majority of my patients at the first evaluation will have sticker shock, and I would say about 70% will say no to the in-office treatments,” Dr. Kataria said. She takes a holistic approach to the first visit, discussing environmental behavior and prescribing palliative treatments, and asks them to



“I try to empower each of my technicians, which I call ‘super-techs’ because they are with the patient during the workup and in counseling with me in the room and afterwards.”

— Brandon Baartman, MD

return for a 3-week follow-up. “Then we re-evaluate their photos and they might see there has not been a change or they do not feel a change in their symptoms,” she said. At this point, patients may consent to interventional treatment. Dr. Kataria also advises patients to bring a friend or family member. “I think the biggest buy-in and biggest way of building that trust with my patients is the time that I am taking,” Dr. Kataria said.

Dr. Devries introduces interventional treatments during the first visit, when MGD is diagnosed, providing literature and directing patients to his staff, who discuss out-of-pocket costs. Then he recommends palliative and/or prescription treatments to get the patient started.

ENGAGING STAFF

An educated team is a vital part of the process of diagnosing and treating MGD.

“My technical staff is quite helpful, but I will say that the whole team needs to be involved,” Dr. Barnett said. “My front desk staff are familiar with the treatments and know how to explain them to patients on the phone, which is also helpful.”

“I try to empower each of my technicians, which I call ‘super-techs’ because they are with the patient during the workup and in counseling with me in the room and afterwards,” said Brandon Baartman, MD. “They start the conversation. I am a big believer in priming. When the patient comes in, they have filled out the questionnaire. My technician has already looked at it and decided whether or not we want to initiate some dry eye testing.” Dr. Baartman prefers that the doctors in his practice discuss costs with patients.

Dr. Johnston’s lead technician provides patient education, performs all of the diagnostic testing, and places the lid devices on the patient’s eyelids for intelligent heat and manual expression.

“The doctor is an integral piece of the puzzle, but the technical staff is needed to help run some of the devices and educate patients along the way,” Dr. Lang said. “The patients’ experience starts when they walk in the door and ends when they leave. During every part of the journey, patients need to be educated about their options for therapeutic success with MGD.” ■

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Case Discussion

Panelists discuss treatment strategies for specific MGD cases.

CASE 1: STRUCTURAL LOSS, STILL EXPRESSING WELL

In this case, Brandon Baartman, MD, would begin by assessing the patient's symptoms, tear film, and tear breakup time (Figure 1). "Even if they are expressing well, we may find the quality of the meibum is not up to snuff and we are seeing some functional changes. I will paint the entire clinical picture with as many functional and structural examination components as I can. I am probably going to choose an interventional treatment," Dr. Baartman said.

Dr. Baartman expresses the glands and explains to patients that he wants to protect that ability, especially if evaporative dry eye disease is present. "If they are symptomatic, I am going to explain the importance of that and hope to see them back with improvement in some of that structural loss. I think there is a good chance of saving the patient from deterioration to more severe disease," he said.¹

"I definitely would treat this patient with at-home treatments, and I am going to talk about interventional meibomian gland disease (MGD) therapy at the first visit," said Hardeep Kataria, OD, FAAO.

"I would want to know what they are currently using and what has not worked in the past," said Jade Coats, OD. "I would also like to know about their environment and other details such as contact lens wear."

In this case, Marguerite B. McDonald, MD, would show the patient the meibography image and compare it with an image of normal glands. "It is very impactful; this image comparison makes a big difference in their decision-making process," she said.

Alice Epitropoulos, MD, would pay particular attention to the quality of the meibum and whether it has the consistency of toothpaste or olive oil. "I think it is important to have a discussion with these patients about nutraceuticals," Dr. Epitropoulos said. "I think awareness of the benefits of quality omega-3 supplementation has increased dramatically during the last few years, and it has become widely accepted as a primary therapy for MGD. It is included in all the preferred practice patterns and

the dry eye algorithms, so I routinely have that discussion with patients who have signs of MGD."²

Brandon D. Ayres, MD, is not very concerned about whether the patient has symptoms and would treat the obstruction and inflammation. "I'm going to prescribe a long-term anti-inflammatory and recommend at least one round of interventional therapy," Dr. Ayres said. "If we do not intervene now, it is not going to get better. I am going to treat a patient like this with 30% loss of their glands almost as aggressively as someone who has 100% loss because we do not want it to get worse."

CASE 2: NOT EXPRESSING, NO STRUCTURAL LOSS

Dr. Ayres would provide the same treatment to this patient (Figure 2) as he would in Case 1. "In a patient like this, it is even more important to do something interventional because these are the patients where I think we can hit the home run. They have all of the structure. We just have to get it working better," Dr. Ayres said.

"This is our opportunity," said Jacob Lang, OD, FAAO. "This is when we can hit it out of the park and help this patient."

"These images are the ones where I tell the patient, 'This is really good news because we have good structure and can intervene and rehabilitate your meibomian glands,'" said Douglas K. Devries, OD.

"As you look very closely at the pattern, you will see that there is terminal obstruction in most of the glands," said Laura M. Periman, MD. "This is superficial obstruction, and that is an early warning sign that there is active ocular surface inflammation. We know that with dry eye disease, the inflammatory cytokines incite a hyperkeratinization response of the lid margin." Therefore, Dr. Periman would treat the patient with debridement and an in-office thermal expression modality and address the underlying ocular surface inflammation to decrease the drive to the hyperkeratinization response that is creating terminal ductal obstruction.

CASE 3: SEVERE ATROPHY, POOR EXPRESSIBILITY

In this case, showing severe loss of glands in a 20-year-old patient, Dr. Periman would take a deep dive into the cause (Figure 3). "Is this someone with chronic allergies? Are they an eye rubber? Have they had exposure to isotretinoin or significant amounts of topical acne medications? Is there anything here that is reversible? Do

Images courtesy of Brandon D. Ayres, MD.



Figure 1. Structural loss, still expressing well.

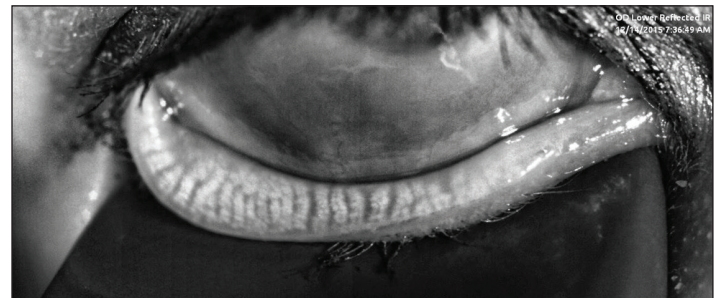


Figure 2. Not expressing, no structural loss.



Courtesy of Brandon D. Ayres, MD.

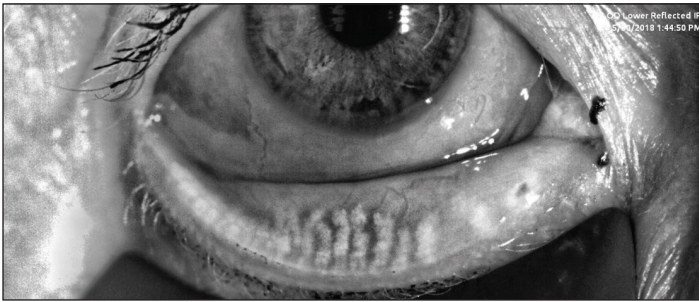


Figure 3: Severe atrophy, poor expressibility.

they have some type of incomplete lid seal at night when they are sleeping?" she said. "I strive to identify and to correct all the contributing factors that I can."

"This is what I worry about for kids in the future," said Melissa Barnett, OD, FAAO, FSLS, FBCLA. She would obtain more history and talk to the patient about preserving the glands to make sure his or her symptoms do not worsen, using multiple treatments.

Given the severity of this case, panelists would take a "kitchen sink" approach, trying a full range of treatments and educating patients about their importance.

"The alarm on this one is high," Dr. Ayres said. "We have to keep this from getting any worse and figure out why it is happening." He explained that he would essentially treat all three types of cases with a high level of acuity, but he counsels patients differently about what they will experience and what they can expect.

"I would swing for the fences on this one," Dr. McDonald said. She would perform microblepharoexfoliation, followed by a thermal pulsation procedure, as well as many of the conventional treatments, including nutraceuticals.

Dr. Kataria would treat the patient immediately and aggressively, with customized expression, combination treatments, and a multifactorial approach, possibly adding allogeneic eye drops.

Dr. Epitropoulos suggested, once the obstruction is addressed with an in-office procedure, it is important to recommend a posttreatment regimen, including warm compresses, lid scrubs, re-esterified omega-3 supplementation,³ blinking exercises, and



"Interventional therapies can be very successful and are appropriate for all levels of disease."

— Preeya K. Gupta, MD

making sure patients are implementing their 20/20/20 rule when on their digital devices.

"I want to impress upon the patient how important it is and that the treatment we have is necessary to prevent at all costs further deterioration," Dr. Baartman said. "We do not have replacement lids or glands, so we have to care for what we have."

CONCLUSION

Clinicians need to be proactive in addressing MGD and search for it in everyone, Dr. Devries said. "There is no reason with the affordability of these devices and the number of patients who have MGD that practices are not integrating and using some interventional treatments," he said.

It is also critical to share with colleagues clinical results from interventional treatments and how they improve contact lens wear time and potentially improve surgical outcomes, Dr. Devries continued.

"Interventional therapies can be very successful and are appropriate for all levels of disease," said Preeya K. Gupta, MD. "But how you set expectations for symptomatic improvement is the linchpin in terms of patients understanding how they should define a successful outcome after the procedure—whether it is structural improvement or symptomatic improvement or maybe both in some patients." ■

1. Hura AS, Epitropoulos AT, Czyz CN, Rosenberg ED. Visible meibomian gland structure increases after vectored thermal pulsation treatment in dry eye disease patients with meibomian gland dysfunction. *Clin Ophthalmol*. 2020;14:4287-4296.
2. Starr CE, Gupta PK, Farid M, et al. An algorithm for the preoperative diagnosis and treatment of ocular surface disorders: a report by the ASCRS Cornea Clinical Committee. *J Cataract Refract Surg*. 2019;45:669-684.
3. Epitropoulos AT, Donnenfeld ED, Shah ZA, et al. Effect of oral re-esterified omega-3 nutritional supplementation on dry eyes. *Cornea*. 2016;35:1185-1191.

The Interventional MGD Consensus Statement: Detecting, Diagnosing, and Dealing With MGD

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DEMOGRAPHIC INFORMATION

Profession

___ MD/DO

___ OD

___ NP

___ Nurse/APN

___ PA

___ Other

Years in Practice

___ >20

___ 11-20

___ 6-10

___ 1-5

___ <1

Patients Seen Per Week

(with the disease targeted
in this educational activity)

___ 0

___ 1-15

___ 16-30

___ 31-50

___ >50

Region

___ Midwest

___ Northeast

___ Northwest

___ Southeast

___ Southwest

LEARNING OBJECTIVES

Did the program meet the following educational objectives?

Agree

Neutral

Disagree

Review the definition, prevalence, and impact of various meibomian gland diseases (MGD)

Understand how to best assess meibomian gland structure and function, and why to integrate these diagnostics as a part of the initial point of care workup

Understand the different types of mechanical MGD treatments and how these differ from other types of MGD treatments

Review how to correctly perform mechanical MGD procedures and best integrate these into an OSD practice

Identify the types of MGD patients that would benefit from mechanical MGD treatments, how to communicate with these patients, and the type of outcomes to expect

POSTTEST QUESTIONS

Please complete at the conclusion of the program.

1. Based on this activity, please rate your confidence in your ability to detect, diagnose, and treat meibomian gland disease (MGD; based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - E. 5
2. Lemp et al identified MGD in ____ of patients with dry eyes.
 - a. 25%
 - b. 42%
 - c. 52%
 - d. 86%
3. Effective MGD treatments improve _____.
 - a. Intraocular lens selection
 - b. Corneal crosslinking
 - c. Intraocular pressure
 - d. A & C
4. MGD treatment is likely to _____.
 - a. Improve contact lens tolerance
 - b. Improve cataract surgical results
 - c. Improve prescriptions for glasses
 - d. All of the above
5. Gupta and Brooks published a study showing that ____ of patients in the 21 to 62 age range who are undergoing refractive surgery evaluations had meibomian gland atrophy.
 - a. 23.5%
 - b. 54.5%
 - c. 72.5%
 - d. 39.5%
6. Which of the following are obvious signs of MGD?
 - a. Lid inflammation
 - b. Gland inspissation
 - c. Gland dropout on meibography
 - d. All of the above
7. During the exam, the _____ test may indicate whether the patient has an incomplete lid seal.
 - a. Fluorescein staining
 - b. Korb-Blackie test
 - c. MMP-9
 - d. Tear osmolarity
8. The _____ test is used to examine the eyelids.
 - a. SPEED
 - b. LLPP (look, lift, pull, push)
 - c. MMP-9
 - d. LNEP
9. What do panelists often use to express the meibomian glands?
 - a. Microblepharoexfoliation
 - b. Fingertip or thumb
 - c. Cotton swab tip
 - d. B & C
10. Meibography helps the clinician _____.
 - a. Educate patients
 - b. Evaluate the function of the meibomian glands
 - c. Assess the meibum quality
 - d. Assess the quantity of the meibum
11. Research by Hura et al demonstrated that _____ stabilized or improved gland structure in most patients studied.
 - a. Thermal masks
 - b. Steroids
 - c. Vectored thermal pulsation
 - d. Blepharoexfoliation
12. One value of traditional topical treatments was said to be _____.
 - a. Reversal of MGD
 - b. Maintenance
 - c. Relieving gland obstruction
 - d. None of the above
13. _____ was stated to help remove biofilm from the lids.
 - a. Omega-6 supplements
 - b. Microblepharoexfoliation
 - c. Intelligent heat
 - d. Thermal pulsation
14. _____ is often used to treat rosacea.
 - a. Intense pulsed light
 - b. Intelligent heat
 - c. Thermal mask
 - d. Thermal pulsation
15. When patients pay out of pocket for procedures, they often expect _____.
 - a. Medicare reimbursement
 - b. A discounted fee schedule
 - c. A cure of MGD
 - d. None of the above
16. Which of the following may be recommended as part of a posttreatment regimen in a patient with severe MGD?
 - a. 20/20/20 rule
 - b. Nutraceuticals
 - c. Blinking exercises
 - d. All of the above

ACTIVITY EVALUATION

Your responses to the questions below will help us evaluate this activity. They will provide us with evidence that improvements were made in patient care as a result of this activity.

Rate your knowledge/skill level prior to participating in this course: 5 = High, 1 = Low ____

Rate your knowledge/skill level after participating in this course: 5 = High, 1 = Low ____

This activity improved my competence in managing patients with this disease/condition/symptom. ____ Yes ____ No

Probability of changing practice behavior based on this activity: ____ High ____ Low ____ No change needed

If you plan to change your practice behavior, what type of changes do you plan to implement? (check all that apply)

Change in pharmaceutical therapy ____

Change in nonpharmaceutical therapy ____

Change in diagnostic testing ____

Choice of treatment/management approach ____

Change in current practice for referral ____

Change in differential diagnosis ____

My practice has been reinforced ____

I do not plan to implement any new changes in practice ____

Please identify any barriers to change (check all that apply):

____ Cost

____ Lack of consensus or professional guidelines

____ Lack of administrative support

____ Lack of experience

____ Lack of time to assess/counsel patients

____ Lack of opportunity (patients)

____ Reimbursement/insurance issues

____ Lack of resources (equipment)

____ Patient compliance issues

____ No barriers

____ Other. Please specify: _____

The design of the program was effective for the content conveyed ____ Yes ____ No

The content supported the identified learning objectives ____ Yes ____ No

The content was free of commercial bias ____ Yes ____ No

The content was relative to your practice ____ Yes ____ No

The faculty was effective ____ Yes ____ No

You were satisfied overall with the activity ____ Yes ____ No

You would recommend this program to your colleagues ____ Yes ____ No

Please check the Core Competencies (as defined by the Accreditation Council for Graduate Medical Education) that were enhanced through your participation in this activity:

____ Patient Care

____ Practice-Based Learning and Improvement

____ Professionalism

____ Medical Knowledge

____ Interpersonal and Communication Skills

____ System-Based Practice

Additional comments:

____ I certify that I have participated in this entire activity.

This information will help evaluate this activity; may we contact you by email in 3 months to inquire if you have made changes to your practice based on this activity? If so, please provide your email address below.