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MODERN OPTOMETRY

MGD CONSENSUS PANEL: TAKING AIM AT MEIBOMIAN GLAND DYSFUNCTION

This activity is supported by unrestricted educational grants from Johnson & Johnson Vision and Sight Sciences.

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MGD Consensus Panel: Taking Aim at Meibomian Gland Dysfunction

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CONTENT SOURCE:

This continuing education activity captures content from a roundtable discussion.

ACTIVITY DESCRIPTION:

The following activity focuses on the rising awareness of meibomian gland dysfunction (MGD) and its impact on ocular surface disease.

TARGET AUDIENCE:

This educational activity is intended for optometrists.

LEARNING OBJECTIVES:

Upon completion of this program participants will be better able to:

- Improve understanding of the incidence of MGD
- Better understand the impact of MGD on outcomes related to contact lens wear and drop out, and overall cataract and refractive surgery outcomes
- Understand how to best assess meibomian gland structure and function, and why to integrate meibography as a part of the initial point-of-care workup
- Increase confidence in making therapeutic decisions for patients with variable stages of MGD
- Identify methods to practically implement processes to improve surgical and ocular surface disease outcomes through comanagement of cataract and refractive patients

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1. What was stated to be the most commonly missed symptom of MGD?
a. Foreign body sensation
b. Variability in vision
c. Redness
d. Burning

2. According to the ASCRS preoperative algorithm, if a patient has positive matrix metalloproteinase 9 results during screening, what is the next step?
a. Look, lift, pull, and push examination
b. Tear breakup time
c. MGD treatment
d. None of the above

3. Which is NOT a benefit of meibography?
a. Building a repository of patient data
b. Patient education
c. Examining the structure of the meibomian glands
d. Examining meibum quality

4. Research reported that patients with _____ had more variability in measurements before cataract surgery.
a. High noninvasive tear breakup time
b. Positive MMP-9 results
c. Hyperosmolarity
d. None of the above

5. Which treatment was reported to increase contact lens wearing time?
a. Thermal pulsation
b. Intraductal meibomian gland probing
c. Tea tree oil compresses
d. Artificial tears and ocular lubricants

MGD Consensus Panel: Taking Aim at Meibomian Gland Dysfunction

Experts examined the impact of MGD and the standard of care for diagnosis and treatment.

MEIBOMIAN GLAND DYSFUNCTION: PREVALENCE AND IMPACT

Awareness of meibomian gland dysfunction (MGD) and its impact continues to grow.

Alghamdi et al reported that 59% of elderly patients had at least one meibomian gland abnormality and Trattler et al reported that 63% of cataract surgery candidates had a tear breakup time of 5 seconds or less.[1,2] Cochener et al found that 52% of cataract surgery patients had MGD; however, 50% of patients with MGD did not have symptoms.[3]

A survey of more than 550 optometrists was conducted in the summer of 2019 through *Modern Optometry*. Participants were asked about their clinical understanding and practice patterns, including their beliefs about diagnosing and treating patients with ocular surface disease (OSD) and MGD. According to this 2019 *Modern Optometry* Clinical Survey, 70% of respondents believe patients with OSD have MGD.

Moreover, Lemp et al stated that 86% of patients with dry eye had signs of MGD, and Gupta et al reported that 42% of children between 4 and 17 had signs of meibomian gland atrophy.[4,5]

Marc Bloomenstein, OD, FAAO, believes MGD is more prevalent than some studies indicate. "Traditionally, we did not have a good way to evaluate the meibomian glands," he said. "We used tear breakup time or looked at the structure of the glands from the outside, but now that we have meibography, we are doing a better job looking at form and structure as well as looking at the secretions, performing expression."

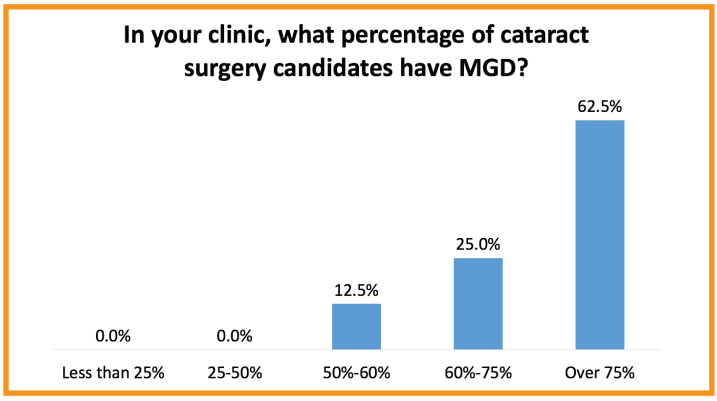

Figure 1. Most MGD Consensus Panel participants reported that more than 75% of cataract surgery candidates have MGD.

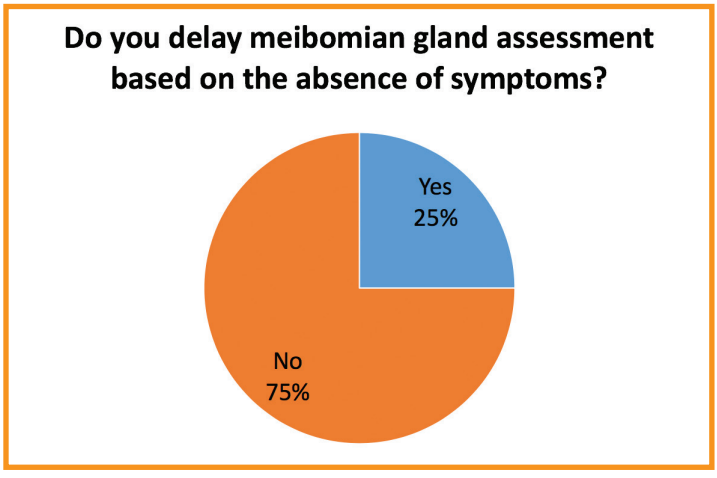

Figure 2. Three-fourths of panelists do not delay meibomian gland assessment based on the absence of symptoms.

EXAMINING RESULTS

All participants in the MGD Consensus Panel perceive that MGD is increasing in their patients, and 63% believe more than 75% of their cataract surgery candidates have MGD (Figure 1).

However, Josh Johnston, OD, FAAO, asserted that clinicians also may be paying more attention to MGD. "It's hard to say if the true prevalence is increasing versus our awareness and attention to it," he said.

Percentages also may be affected by doctors' priorities or the extent of their eyelid examinations. Some may examine every patient for MGD, while others look for it only in symptomatic patients (Figure 2). Furthermore, clinicians may miss symptoms. "I think the number-one symptom that is not identified is variability in vision," said Douglas Devries, OD.

IMPACT OF MGD

"We estimate that approximately 90% of MGD is caused by an improper blink," said David Kading, OD, FAAO. "So many of our patients are on digital devices all day. While on digital devices, we see that they blink 50 to 75% less often and over time we see that patients end up developing a partial blink that is less complete. Stagnation within the meibomian glands begins to happen."

If not treated, MGD impacts preoperative measurements, surgical outcomes, and spectacle and contact lens wear.[6,7]

In a small study at the Southern College of Optometry, ocular surface disease index and noninvasive tear breakup time were performed in patients who sought remakes of their glasses. "Both were lower in the remake population than the control population who were satisfied with their spectacles to a point of statistical significance in the non-invasive tear breakup time," said Whitney Hauser, OD, FAAO.

MGD also may increase contact lens fitting time in patients with multifocal contact lenses.

In cataract surgery patients with tear hyperosmolarity, Epitropoulos et al reported significantly more variability in preoperative measurements, which impacted intraocular lens calculations.[6]

Several years ago, Justin Schweitzer, OD, FAAO, observed that some patients with suboptimal surgical outcomes were not having gland evaluations during the preoperative evaluation. "If we are trying to do the best for our patients, we need to address these issues before we refer them for any kind of procedure," he said.

MGD also affects patients' lifestyles. "Especially with digital device use and other forms of near work, you need to have a stable tear film," said Scott Hauswirth, OD, FAAO. "You need to have a stable lipid layer to work on a computer or read for extended periods of time."

1. Alghamdi YA, Mercado C, McClellan AL, et al. Epidemiology of meibomian gland dysfunction in an elderly population. *Cornea*. 2016;35(6):731–735.
2. Trattler WB, Majmudar PA, Donnenfeld ED, et al. The Prospective Health Assessment of Cataract Patients' Ocular Surface (PHACO) study: the effect of dry eye. *Clin Ophthalmol*. 2017; 11:1423–1430.
3. Cochener B, Cassan A, Omiel L. Prevalence of meibomian gland dysfunction at the time of cataract surgery. *J Cataract Refract Surg*. 2018; 44(2):144–148.
4. Lemp MA, Crews LA, Bron AJ, et al. Distribution of aqueous-deficient and evaporative dry eye in a clinic-based patient cohort: a retrospective study. *Cornea*. 2012;31(5):472–478.
5. Gupta PK, Stevens MN, Kashyap N, et al. Prevalence of meibomian gland atrophy in a pediatric population. *Cornea*. 2018; 37(4):426–430.
6. Epitropoulos AT, Matossian C, Berdy GJ, et al. Effect of tear osmolarity on repeatability of keratometry for cataract surgery planning. *J Cataract Refract Surg*. 2015; 41(8):1672–1677.
7. Korb DR, Henriquez AS. Meibomian gland dysfunction and contact lens intolerance. *J Am Optom Assoc*. 1980; 51(3):243–251.

DIAGNOSING MEIBOMIAN GLAND DYSFUNCTION

A proactive approach is critical in diagnosing and treating meibomian gland dysfunction (MGD), rather than waiting until symptoms become evident, participants of the MGD Consensus Panel agreed. Many believe the profession needs a more standardized MGD definition and evaluation.

STREAMLINING DIAGNOSIS

The Corneal Clinical Committee of the American Society of Cataract and Refractive Surgery (ASCRS) developed an algorithm for diagnosing and treating ocular surface disorders before surgery.[1] If patients have any abnormality on the initial screen (ASCRS SPEED II questionnaire, tear osmolarity, or matrix metalloproteinase), the clinician performs the look, lift, pull and push (LLPP) clinical examination—looking at the lids, blink, lashes, and interpalpebral surface; lifting the upper lids to examine the superior cornea; pulling on the lids to assess lid laxity; and pushing on the glands to examine the meibum. This is followed by corneal staining and tear breakup time.

"That is a fairly comprehensive eyelid evaluation," said Douglas Devries, OD. "To see that taught in schools and from the podium would be a giant step forward."

According to the 2019 *Modern Optometry* Clinical Survey, 58% of respondents use tear film diagnostics for meibomian gland evaluation in most of their patients. However, MGD Consensus Panel participants believe the numbers are high compared with those in other practice modalities, especially in less medically oriented practices.

"Our definition of evaporative dry eye was always correlated to meibomian gland function. I think the vast majority of doctors who say that they do it are doing a tear breakup time and correlating tear breakup with evaluating the function of the meibomian glands," said Marc Bloomenstein, OD, FAAO.

"While speaking with my colleagues around the country, I rarely find ODs who are transilluminating and pushing along the eyelids to check the flow and quality of the meibum," said Tim Poirier, OD.

Doctors who do not perform lid examinations on a regular basis may not grasp the importance of early detection of MGD. "They don't understand how dry eye and OSD can progress over time and the impact it has on the visual system as a whole," said Scott Hauswirth, OD, FAAO.

ASSESSING MEIBOMIAN GLANDS

Six percent of *Modern Optometry* survey respondents use meibography in most patients and 24% use it on a case-by-case basis.

"Meibography is a great diagnostic to educate patients, increase clinicians' and patients' awareness, and distill that story to something simple to digest versus an explanation on glands," said Josh Johnston, OD, FAAO.

"It allows patients to know that there's an issue and, hopefully, that will help them be more compliant with management," said Justin Schweitzer, OD, FAAO.

Dr. Bloomenstein believes meibography is necessary in all cataract surgery candidates and useful in monitoring progression and determining how aggressively to treat disease. "With cataract patients, we know that perioperative care can be significantly hampered by a reduction in the quality of their tears, which creates the potential for inflammation in the cornea," he said.[2]

Dr. Poirier agreed and added, "Before my patients are referred to a surgeon's office, they always have a complete tear analysis, which includes understanding their blink pattern, meibography, and interferometry so they can understand how their oil flows or how obstructed their glands are."

Whitney Hauser, OD, FAAO, also noted that meibography is helpful to build a repository of data. "We will be able to curate the images and look at them year over year," she said. "The final element that meibography gives us is it is a practice distinction. It says that you take this very seriously."

However, David Kading, OD, FAAO, relies on function to dictate whether to treat a patient. "Because the disease is called meibomian gland dysfunction, I think that we need to rely on the function of the gland as the dictating factor on whether or not to treat," he said.

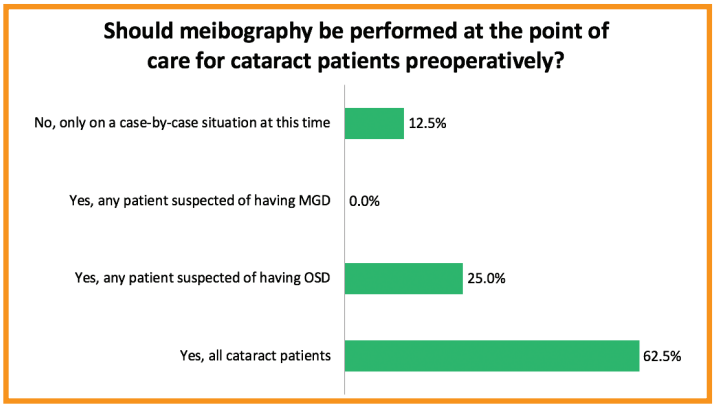

Figure 1. Most panelists believe meibography should be performed at the point of care for all cataract patients preoperatively.

"Regardless of the level of atrophy, if the glands are not flowing, I am going to be aggressive in my treatment because my goal is to have and keep glands that are functional."

DEVELOPING PROTOCOLS

All panelists strongly agreed that routine eyelid evaluation should be part of a standard evaluation of all cataract and refractive surgery patients. Sixty-three percent responded that meibography should be performed at the point of care for all cataract patients before surgery (Figure 1).

Dr. Schweitzer added that it would be helpful for doctors to get started by using a questionnaire to triage patients.

Dr. Hauser suggested that it would even be helpful to have technicians ask patients the four key questions from the 2014 Dry Eye Summit, regarding dry eye discomfort, vision changes, red eyes, and the need to use eye drops.[3]

"Every patient who comes in, whether it's for a cataract consult, glaucoma consult, refractive consult, in my mind they all have MGD until I can prove otherwise," Dr. Schweitzer said.

Dr. Poirier transilluminates the meibomian glands of every patient at the slit lamp and then performs gland expression. If obstruction is present with or without meibomian gland atrophy, the patient returns for additional testing which includes meibography, interferometry, and blink pattern, which shapes the treatment plan.

Dr. Johnston emphasized the value of point-of-care diagnostics, such as tear osmolarity and matrix metalloproteinase 9 (MMP-9), which are performed during the screening part of the ASCRS algorithm. "These are great diagnostics, but not everyone has these tests in their clinic. There are other tests you can do and you don't need to buy anything," he said.

"It is not going to add much time to the length of your exam, and I would argue patients appreciate it and it triggers questions about MGD and dry eye," Dr. Schweitzer said.

"It elevates the standard of care within the practice," Dr. Devries said.

1. 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.
2. Epitropoulos AT, Matossian C, Berdy GJ, et al. Effect of tear osmolarity on repeatability of keratometry for cataract surgery planning. *J Cataract Refract Surg.* 2015; 41:1672–1677.
3. 2014 Dry Eye Summit, December 11–13, 2014, Dallas, Texas.

ASSESSING STRUCTURE VS FUNCTION

Both structure and function are important components when evaluating a patient for meibomian gland dysfunction, however, Whitney Hauser, OD, FAAO, explained that function will be weighed more heavily in optometric practices, which may not have meibography.

"You can often look at meibography and the glands look structurally intact, but if you're not expressing and seeing what typically is coming out of the gland, you're going to be missing out," said Marc Bloomenstein, OD, FAAO.

Figure 1 shows the degree of meibomian gland function compromise that participants consider a concern, and Figure 2 shows their responses regarding function and structure in contact lens patients.

In developing a standard of care, Josh Johnston, OD, FAAO, said examination with a penlight is an affordable way to view the gland structure. "You also need to express and grade the quality of the meibum and the quantity of the glands that are functioning. Start with these tests, and as you do more and more, there will be increased penetration and adoption of meibography-based technologies leading to higher level diagnostic technology," he said.

"I believe structure is a result of poor function," said David Kading, OD, FAAO. "So when identifying whether a patient has MGD, I focus

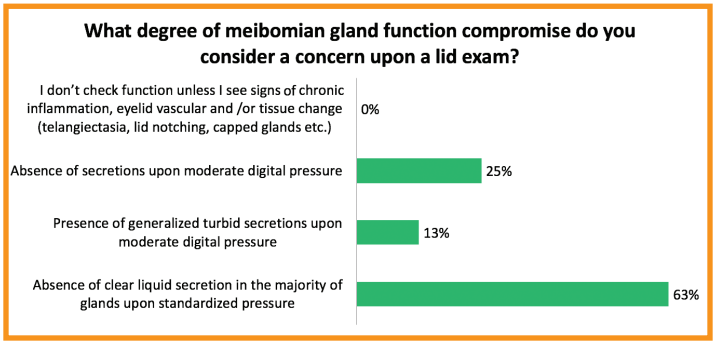

Figure 1. Most consensus panel participants consider a lack of clear liquid secretion a concern.

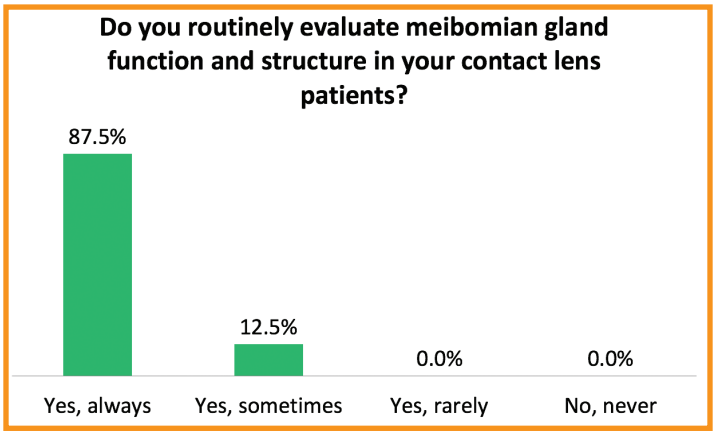

Figure 2. Nearly 90% of panelists evaluate meibomian gland function and structure in contact lens patients.

on function. I believe you can have functioning glands that have been revived and still have structure that resulted from the previously poor function. Put another way, atrophy is a result of what has occurred, not always a result of what is occurring."

"I'm also noting telangiectasia, ocular rosacea, floppy lids. I'm assessing the overall lid," Dr. Johnston said. "In terms of MGD, we express the glands, grade meibum quality and quantity, and we perform meibography and interferometry for a baseline. However, I think you can keep it quick and easy with just expression."

Scott Hauswirth, OD, FAAO, believes diagnosis based on structure has not yet been supported by research findings. "There are few to no longitudinal studies looking at structure at this time. And data[1] from Preeya Gupta, MD, indicate it may be happening much earlier in life and we are just seeing the sequelae later on because we are paying attention to it," he said.

"In addition, we don't know if the patients' glands have atrophied, the glands were lost, or a patient began with fewer glands than everyone else," Dr. Hauser said.

However, if optometrists evaluate the quality of the meibum in functioning glands prior to structural changes to determine when to initiate treatment, it then becomes a proactive approach to treatment and will result in initiation of treatment earlier as the quality of the secretion begins to change, according to Dr. Devries.

"It's still an emerging field," Dr. Johnston said. "There are so many data in the literature that are coming forward."

1. Gupta PK, Stevens MN, Kashyap N, et al. Prevalence of meibomian gland atrophy in a pediatric population. *Cornea*. 2018; 37(4):426–430.

EARLY INTERVENTION: TARGETING MEIBOMIAN GLAND DYSFUNCTION

Proactive treatment of meibomian gland dysfunction (MGD) is key, regardless of the patient, according to MGD Consensus Panel participants.

When patients have had MGD for a long time, the eyelids begin to thicken with telangiectatic vessels growing along the eyelid margin. "The inflammatory circuit gets turned on and once the obstruction is relieved these patients may still be symptomatic until the inflammatory circuit is turned back off," said Tim Poirier, OD.

"Whenever we start to see any structural changes, since we cannot restore the glands, it is imperative to try to stop the destruction of the rest of the glands," said Marc Bloomenstein, OD, FAAO.

"Once you start seeing decreased secretion, that is going to eventually lead to obstruction, which leads to atrophy, so any level of decreased secretion starts to raise concerns for me," said Josh Johnston, OD, FAAO.

"As soon as I see decreased or altered secretions, I'm going to start recommending that they do at least some maintenance activity at home," said Scott Hauswirth, OD, FAAO.

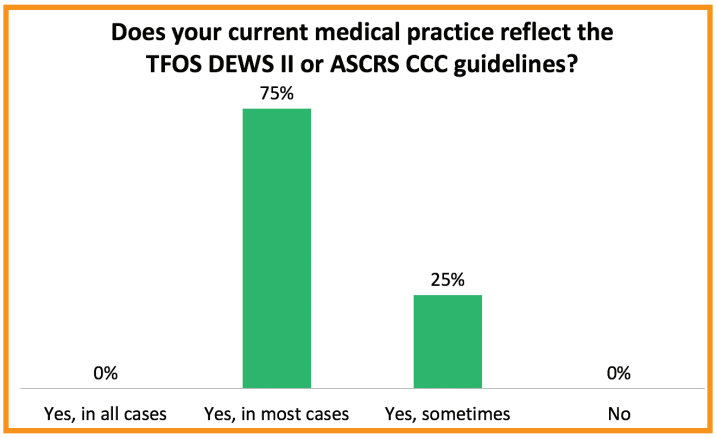

Figure 1. Most Consensus Panel participants follow the TFOS DEWS II or ASCRS CCC guidelines in most cases.

The current global scientific and medical consensus guidelines (TFOS DEWS II/ASCRS CCC) indicate that MGD should be identified and treated before surgical decision-making in cataract or refractive patients.[1,2] Nearly half of respondents to the 2019 *Modern Optometry* Clinical Survey said they probably followed the TFOS DEWS II guidelines for treating aqueous-deficient dry eye and MGD but were not certain; 15% regularly consult the guidelines and adhere to them closely; 20% know them but follow their own protocols. Seventeen percent do not know what the guidelines say.

Dr. Bloomenstein believes the numbers reported are high and that optometrists often are not familiar with the DEWS guidelines.

Figure 1 shows MGD Consensus Panel participants' responses regarding TFOS DEWS II or ASCRS CCC guidelines.[1,2]

TREATMENT PROTOCOLS

The *Modern Optometry* survey showed that 25% of respondents use thermal lid expression (manual expression, thermal pulsation, intense pulsed light [IPL], etc.); 22% use customized artificial tear/lubricants to a patient's condition; 18% use nutraceuticals, such as omega-3 fatty acids; and 10% use any artificial tear/lubricant.

Whitney Hauser, OD, FAAO, emphasized the importance of reading patients. "Some patients don't want to be as aggressive as others, so I think things like thermal masks and nutraceuticals are a great entry point into the conversation," she said.

Panelists also use a variety of in-office treatment devices (Figure 2).

One technology commonly used by most participants is a thermal pulsation system that uses heat and massages away the blockage (Johnson & Johnson Vision). This is a single-use device that cradles the upper and lower eyelid as therapeutic heat and proximal-to-distal peristaltic pressure is applied to the meibomian glands. This causes the obstructed meibum to liquefy and push up and out of the gland orifices.

Another treatment used by many of the participants is a software-controlled, wearable eyelid technology that targets thermal energy to the meibomian glands (SightSciences). This, along with natural eye blinking, facilitates meibum expression when meibum is in its melted phase.

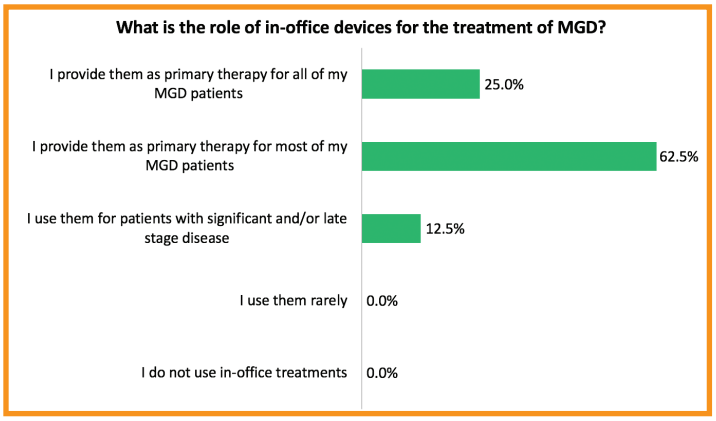

Figure 2. Panelists indicated the role of in-office treatment devices in their practices.

"We start with the thermal mask and possibly omega-3 supplements to tell them this will be their maintenance once we have performed the procedure," said Douglas Devries, OD. He considers microblepharoexfoliation before thermal pulsation. "In most cases, I combine IPL with thermal pulsation, doing sections of IPL first and then finishing with the thermal pulsation," he said.

David Kading, OD, FAAO, has historically used thermal pulsation. "We have well over 100 different papers pointing to its benefit and that benefit is of taking a gland from no flow to flow," he said.[3]

Dr. Bloomenstein uses surfactants to reduce the built up oils and debris, and a thermal mask, and discusses omega-3 supplements and diet. If a patient is not suited for thermal pulsation, he may use thermal therapy.

Another relatively new in-office treatment for MGD uses a portable, hand-held LED-based heat source to warm the inner and outer surface of the eyelids to melt waxy secretions trapped inside the meibomian glands (Alcon).

Regardless of the treatment, patient education is important.

"I remind patients that this is a progressive condition that will continue to worsen," Dr. Johnston said. Therefore, he encourages them to start thinking about treatment.

Dr. Hauswirth recommended that doctors who prefer not to manage MGD refer patients to colleagues who do.

OPTIMIZING CONTACT LENS WEAR

Practitioners can elevate the standard of care and create loyalty among contact lens wearers by explaining the consequences of MGD and effective treatment options, according to Dr. Devries. "I have a whole philosophy that there is tremendous potential within practices to adopt proactive care with MGD in their contact lens wearers, based on the statistics of contact lens dropout," he said.[4]

"The average contact lens wearer starts having dry eye or discomfort as early as 26 years of age," Dr. Kading said. "By the time they are 43, the majority have stopped wearing contact lenses. In fact, only 30% of all contact lens wearers are older than 42 and it is because of this degradation of the ocular surface. I think we're waiting too long to start treating ocular surface conditions."

Dr. Hauswirth believes treatment protocols for contact lenses should be similar to those for refractive and surgical patients. "Contact lens patients are also a higher risk group for MGD and subsequent dry eye and should be treated more aggressively. And dry eye—and MGD in particular—should be included as part of the initial assessment for contact lens wear, as well as monitored regularly during the course of one's lifetime in contact lenses," he said.

"At our office we were part of a research project that showed that thermal pulsation increased contact lens wearing time as long as 4 hours per day.[5] This was a huge surprise to both us and our patients," said Dr. Kading.

COMANAGEMENT RELATIONSHIPS

All panelists take the lead in managing MGD in a surgical patient.

"Regarding refractive surgery, I will not refer a patient until I'm convinced the tear film is healthy enough to support surgery," Dr. Poirier said. When seeing cataract surgery candidates, he does not recommend multifocal intraocular lenses (IOLs) unless the patient commits to properly treating the meibomian glands before the surgery consult so IOL calculations will be most accurate.

TAKING ACTION

Effective MGD management requires a proactive mindset. "Optometrists in general are reactive and will begin to treat when the patient becomes symptomatic," Dr. Hauswirth said. "We do not regularly look at it from a preventive or proactive standpoint. But it is helpful to our colleagues if we can engage the patient earlier by looking for MGD. Treatments are less invasive and we are potentially prolonging the patient's good quality of life." ■

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