Using point-of-care testing to diagnose and manage DED.


RECLAIMING THE DRY EYE PATIENT

PANELISTS:

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INTRODUCTION

As cornea specialists, we perceive an unmet need in the management of patients with dry eye disease (DED), starting with our frustrations regarding diagnosis. Here, we discuss how ophthalmologists can use point-of-service testing to not only make the right diagnosis more frequently, but to also improve the efficiency of the preoperative corneal examination.

—Edward J. Holland, MD

THE CLINICAL PERCEPTIONS OF DRY EYE DISEASE

Dr. Starr: During the past decade, the world of dry eye disease (DED) has undergone some exciting evolutions. There are so many new diagnostics, new treatments, and many exciting innovations in the pipeline.

One question that has been widely discussed and debated in recent years is whether LASIK significantly increases postoperative DED. What is the opinion of this panel?

Dr. Holland: Determining LASIK’s impact on DED depends on how one diagnoses the disease. In 30% to 40% of LASIK patients, we will find surgically induced dry eye.1,2 I have learned to delay surgery in those patients who show signs of preoperative DED. Now, I take steps to optimize their ocular surface before scheduling them for laser vision correction.

Dr. Starr: I think that strategy is paramount—diagnosing DED early, before performing surgery; treating it aggressively; and then proceeding with surgery, with the anticipation that the eye is going to become a little drier afterward.

Dr. Kim: I think that LASIK helped alert many clinicians to the importance of ocular surface health. Previously, there was a tendency for refractive surgeons to overlook the ocular surface and underestimate its optical significance, which is the reason we started seeing various corneal issues postoperatively. As a profession, we now pay more attention to DED, especially in relation to LASIK surgery.

Dr. Holland: I agree—it was the postoperative complications created by DED and the need to identify and treat patients with the disease preoperatively that attracted refractive surgeons’ interest in the ocular surface. It is my experience that ocular surface disease is the most common reason for patient dissatisfaction after refractive cataract surgery. We have reached a point where cataract surgeons and their patients are interested in DED, because the ocular surface is so important to cataract outcomes.

Dr. Starr: I agree. Also, I believe that this increased attention to ocular surface health has affected practitioners’ presurgical regimens for both cataract and refractive surgery. How many of your cataract patients present with sufficient ocular surface dysfunc-
tion to necessitate presurgical treatment beyond artificial tears? In my practice, those numbers are high, perhaps 35% to 40%.

**Dr. Holland:** Dr. Starr, as a tertiary care cornea specialist, you treat patients with complicated dry eye. In optometric practices with walk-in patients, artificial tears are usually the first-line therapy.

**Dr. Kim:** As a cornea, cataract, and refractive surgeon in an academic environment, my practice receives a high percentage of referrals for complex cornea patients. Eventually, these individuals need cataract surgery, but they generally have significant comorbidities, including ocular surface disease. These patients are usually taking a number of topical medications, and they may have undergone previous refractive surgery, or a glaucoma filter/tube shunt surgery, and/or a complex retinal procedure.

Making other ocular specialists more aware of the importance of maintaining ocular surface health certainly helps us when it comes time to proceed with cataract surgery.

**Dr. Starr:** This increased interest in the ocular surface has also given us a better understanding of the etiology of DED than we did previously. For example, the current consensus is that meibomian gland disease (MGD) is a lot more common than pure aqueous deficiency. For instance, we were unable to diagnose or even treat DED very effectively, which created frustration on the part of the physician and the patient. Patients would keep returning to our offices because they were not getting relief from their symptoms. Now that we have objective means of diagnosing DED, the patient can also understand his or her data, which can lead to better treatment compliance.

**Dr. Holland:** There is a tendency, especially with busy anterior segment surgeons, to overlook, downplay, or simply ignore the ocular surface, because this area requires additional conversation and therapeutics that may perhaps delay surgery. But, it is much more advantageous to inform and educate our patients about their DED, where they can at least have a disease state to blame for their symptoms. By ignoring the ocular surface, patients have a higher chance of ending up with a suboptimal surgical outcome for which the patient will now blame us, the practitioner. We are much better off addressing any issues with the ocular surface before commencing with surgery.

**Dr. Starr:** Yes, if you do not spend a couple of minutes preoperatively warning the patient about potential complications, you will end up spending more time postoperatively, trying to convince the patient that you did not make a mistake.

**DIAGNOSTIC TESTING**

**Dr. Starr:** In response to the advent of new point-of-care diagnostic tools, the adoption rates of old and new diagnostic tests is changing within ophthalmology. Increasing numbers of practitioners are adopting point-of-care tests such as the TearLab Osmolarity System (TearLab Corporation), Lipid layer interferometry (LipiView; TearScience), matrix metalloproteinase 9 (MMP-9) markers (InflammaDry; Rapid Pathogen Screening), and blood work for systemic inflammatory conditions (the Sjögren Diagnostic Test; Bausch + Lomb). What are the panel’s perceptions of these diagnostic tests and their implications for preoperative testing?

**Dr. Holland:** We are in a time of transition. Those of us already using these tests clinically need to explain the science-based data and allow clinicians to examine it. Unfortunately, many clinicians are defending the tried-and-true tests they have been using throughout their entire career, and those methods are truly not supported by data. The positive predictive value of the standard tests we used to conduct—Schirmer’s test, corneal staining, tear breakup time—is...
very low, 30% to 50% at best.\textsuperscript{45} The positive predictive value of osmolarity,\textsuperscript{6} the lipid layer thickness,\textsuperscript{7} and the levels of MMP-9,\textsuperscript{8} are much higher—85% to 95% in these tests.

Personally, I do not use Schirmer’s tests at all. I will always look at corneal staining, because it helps me determine the severity of damage to the cornea. I do not rely on corneal staining to diagnose DED, however, and I do not perform tear breakup time tests.

Dr. Kim: I still rely on tear breakup time, but I agree with Dr. Holland. Practitioners are comfortable using the same tests year after year, but they do not really know for sure that their measurements are effective. We need to change that paradigm and hopefully improve the diagnostic accuracy for the benefit of our practitioners as well as our patients.

THE CLINICAL UTILITY OF POINT-OF-CARE TESTING

Dr. Starr: I use point-of-care diagnostics as the “answer key.” This diagnostic tool tells us whether our diagnosis is right or wrong, with very high sensitivity and specificity. The diagnosis of DED due to ocular surface dysfunction is not as easy and straightforward as we all have thought. There are many variables contributing to ocular surface dysfunction—it is not just dry eye, allergy, or viral conjunctivitis.

As Dr. Holland mentioned, our traditional tests can be largely subjective, highly variable, unreliable, and unreproducible.\textsuperscript{9} Current challenges in DED include a poor correlation between subjective symptoms and objective signs. It is difficult for doctors to make a diagnosis in the absence of slit-lamp signs, and it is even harder for patients to accept our diagnosis if they are not experiencing any symptoms.

Dr. Holland: It seems that ophthalmologists sometimes do not understand that the science and symptoms do not always correlate. I see this type of classic patient quite frequently. For example, a young woman comes into my office with contact lens intolerance; her symptoms are classic for DED. When we see an abnormal number on the TearLab Osmolarity System, both the physician and the patient can understand it, and we can make the diagnosis of DED. This is an example in which point-of-service testing and tear osmolarity are going to play a big role in obtaining a proper diagnosis earlier in the process than if we relied on clinical signs only.

Dr. Starr: An article published by Michael Lemp, MD,\textsuperscript{3} stated that 86% of patients with DED have a subtype and demonstrate signs of MGD. So, 86% of DED is likely caused by MGD and evaporation. About 15 years ago, we assumed that aqueous deficiency was the most common cause of DED, and that all sufferers had decreased aqueous production. We now know that is true in only about 10% of cases.\textsuperscript{3}

Similarly, acute conjunctivitis is misdiagnosed in 50% to 75% of all cases.\textsuperscript{9,10} Frequently, clinicians say that if the patient’s eyes are itching, the cause is allergy, but that diagnosis is often incorrect. There is a tremendous overlap between itch and foreign body sensation or dryness between allergic conjunctivitis and DED. If you are going to make your diagnosis based on those classic symptoms, you will be wrong rather often.

What can we do to improve the diagnostic challenges that we just discussed? We need new diagnostic tools, which should be highly sensitive and specific, with a high positive predictive value. They should provide quick and reproducible results. These tools should be easy to incorporate with minimal training of staff and doctors. They should reduce our chair time rather than increase it. Ideally, any new tests that we incorporate should be reimbursable, generate some revenue, and at a minimum, allow us to break even. There are many new diagnostic tests for DED available today, and of course, some are more popular than others.

Some adapted technologies that we have used in other fields, such as optical coherence tomography (OCT) and retinal and optic nerve imaging are now being used in the dry eye world as well. The DEWS report II study is currently underway, and we will see if the definition of DED, which was so significantly changed in 2007,\textsuperscript{6} incorporates increased osmolarity as a key pathogenic mechanism in addition to inflammation of the tear film.

Dr. Holland: Many clinicians believe that the first screening test should be for tear osmolarity, because higher levels of tear osmolarity equate with more severe disease. Instability of the tear film leads to apoptosis, which then leads to more inflammation and more cell death.\textsuperscript{11}

THE TEARLAB OSMOLARITY SYSTEM

Dr. Starr: I would like to further discuss the TearLab Osmolarity System. It is the first objective and quantitative test for diagnosing and managing patients with dry eye. It is a noninvasive, objective point-of-care tool that provides an indirect measurement of tear osmolarity. With this test, you measure the tear meniscus, although you could make an indirect assessment of the precorneal osmolarity, which is probably the most important part of the tear film for vision—the part that sits on the cornea. It only requires a 50-nL sample of tear fluid from the lateral tear meniscus to diagnose DED. The device is small, technicians can be easily trained to administer it, and the test results come back very quickly.

Dr. Holland: Another important point is that, as we use the TearLab Osmolarity System to monitor our patients, we can see the osmolarity number lowering in response to treatment. We feel as though our therapies may be working, but these patients may say their symptoms are becoming worse—so there is that disconnect between science and symptoms. Often in individuals with chronic DED, we see a neurotrophic change in the cornea. The patients know their symptoms are related to dry eye, but they sometimes worsen before improving because the sensation returns. The data from the TearLab system help me reassure my patients that their symptoms will, in fact, improve.

Dr. Starr: The positive predictive value is important when evaluating a medical test, and with the TearLab test, we see the tear osmolarity at 87%—much higher than Schirmer’s, tear breakup time, and corneal staining, which are much lower. The American Academy of Ophthalmology’s preferred practice pattern published in 2013\textsuperscript{12} stated that osmolarity is a much more sensitive method of diag-
"The diagnosis of DED due to ocular surface dysfunction is not as easy and straightforward as we all have thought."
—Dr. Starr

nosing and grading the severity of dry eye compared to traditional measures such as staining and tear breakup time, Schirmer’s testing, and meibomian gland grading.

The LipiView instrument is a means of assessing the lipid layer of the tear film. Dr. Holland, what do you think of it?

Dr. Holland: The LipiView II, which images the meibomian glands, is going to be very helpful clinically. Using meibography to view the architecture of the glands is very useful to patients so they can see gland dropout.

Dr. Kim: I think the addition of meibography will change the utility of this diagnostic tool quite a bit, because now we will have a way to show the patient the disease process. I expect this to improve acceptance and adoption by the patient. It helps patients to have a visual image of their disease process, so they can understand why they have the symptoms, and the importance of earlier treatment and compliance. To me, it will be analogous to an x-ray that a dentist may show a patient to help illustrate the importance of regular oral hygiene to prevent tooth decay.

Dr. Starr: We all have OCT in our offices, usually for imaging optic nerves and retinas. Perhaps in the future, we will be able to use OCT to help assess patients with DED. We also have a new system called the Sjö Diagnostic Test. It adds three new proprietary markers to the traditional biomarkers, which has certainly increased sensitivity and specificity, possibly leading to an earlier diagnosis.

I believe that substantial educational gaps exist among the ophthalmologists. Thus, the three of us and our committee members on the ASCRS Corneal Clinical Committee are in the process of creating a consensus-based, nonsponsored, novel OSD algorithm that will be available soon. Our protocol starts with tear osmolarity as the key first diagnostic test.

Dr. Kim: I agree with the importance of having quantitative data (i.e., tear osmolarity values) up front prior to examining and talking with the patient. It is very similar to when we evaluate cataract surgery patients. They often have their biometry and keratometry readings taken in advance of the examination and discussion with the physician. Having that testing conducted up front provides important information that greatly assists the physician’s decision-making process, whether it is which IOL patients should receive, or explaining to them the type of ocular surface condition they have and how you plan to treat it.

I have completely eliminated Schirmer’s testing from my practice, because there are newer and better tests available. One of the reasons why clinicians have held on to this test is because they can see a number. Now, the point-of-care diagnostic tests provide a much better number with which to follow these patients. For me, a Schirmer’s test result of 1.0 provided some value, but the clinical relevance of tear osmolarity testing becomes much more evident with the patients who come in with symptoms but a lack of signs for DED.

MANAGING PATIENTS WITH DED

Dr. Holland: Dr. Starr, you mentioned that treating DED can be a practice builder, but the average clinician has the mindset that these patients are a hindrance. How do you handle these patients? In the past, clinicians would try to get these individuals out of their offices, and now you are saying that treating these patients is actually building your practice.

Dr. Starr: The most important issue is patient satisfaction. Many patients with DED have been swept under the carpet, their doctors thinking, “It’s probably just dry eye, use artificial tears.” You need to take these patients seriously and run diagnostic tests to confirm DED and grade its severity. When present, it should be treated early, appropriately, and aggressively to provide rapid results. These patients are very happy because you have finally solved their problem. They tell their friends; a lot of these individuals are likely to undergo LASIK, and many of them are going to develop cataracts at some point. In this way, you have built your practice.

Dr. Holland: I am often asked, “How do I get started? I want to try to modernize my practice.” I tell clinicians to investigate tear osmolarity and go from there. Incorporate that type of testing into your practice as the first point-of-service diagnostic. It will give you the most information that is also the easiest to use. I would actually consider the Sjö test as my second choice, because it is so
significant in terms of the information it provides to change our therapy along with the MMP-9 test. For further investment, I suggest using the LipiView I and II.

THE OCULAR SURFACE

Dr. Kim: There is no question that examining the ocular surface is an important aspect of evaluating these patients with DED. It is not uniform reductions of tear film thickness that affect these patients, but rather the irregular thickness that occurs over the ocular surface that can degrade their image quality. Many surgeons have been spending a great deal of time and attention on tightening their surgical outcomes, without paying attention to the ocular surface. So, tear osmolarity is not only a measurement that is going to help diagnose patients with ocular surface disease earlier and more accurately, but it is also going to play an important role in terms of alerting clinicians to the patients who may have abnormal or inaccurate keratometry readings on biometry. Measuring tear osmolarity will help identify these patients and also warn us to not always trust these measurements and proceed with surgery.

To illustrate this point, a recent multicenter study13 was performed to evaluate the effects of osmolarity on the repeatability of keratometry in patients presenting for cataract surgery. In this study, 75 subjects were evaluated at two separate preoperative visits (up to 3 weeks apart) with tear osmolarity (using the TearLab device) and biometry (using the IOLMaster [Carl Zeiss]/manual K readings). Twenty-five patients were found to have normal test results with a tear osmolarity of <308 mOsm/L in both eyes, and 50 patients were found to be hyperosmolar with a tear osmolarity of >316 mOsm/L in at least one eye. Results showed that 8% of the hyperosmolar eyes (compared to zero of the normal eyes) demonstrated a difference of at least 0.50 D in their average K readings measured between visits (Figure 1), and 17% of hyperosmolar eyes (compared to one eye in the normal group) had >1.00 D of change in corneal cylinder values between two visits (Figure 2). The hyperosmolar group also demonstrated a wider variation in corneal cylinder measurements between visits relative to the normal group \( (P = .013) \).

Dr. Holland: It is important to educate and empower your technicians. Our technicians grade the keratometry readings from 0 to 4 in terms of quality, and they consult me if they feel they need to.

Dr. Kim: Regarding refractive surgery, we know that tear osmolarity levels can relate directly to visual outcomes after LASIK surgery. A study presented by Eric Donnenfeld, MD,14 at the 2011 ESCRS meeting showed differences between LASIK patients who were pretreated with ocular lubricants versus those who were not and were only treated postoperatively. The study involved 250 eyes of 128 subjects. At 1 month, it was determined that 81 patients had a healthy ocular surface, and 47 patients were hyperosmolar. The patients were classified as hyperosmolar if their preoperative osmolarity reading was greater than 308 mOsmol/L. The first group (60 eyes) underwent topical lubrication thera-
Reclaiming the Dry Eye Patient

How tear osmolarity levels relate to visual outcomes following LASIK, and if differences exist in patients who are pretreated with ocular lubricants versus those treated only postoperatively.

128-subject (256 eyes) interim analysis
- At 1 month, n = 81 normal, n = 47 hyperosmolar
- Classified as hyperosmolar if the preoperative osm was ≥ 308 mOsm/L

Split into two groups:
- Presurgically (3 days) treated (n = 60) and untreated (n = 68) with AMO Blink Tears
- LASIK vision correction with the VISX STAR X4 with IR
- AMO Blink Tears and surgeon’s postoperative protocol
- Therapy uncontrolled after 1 month

This study illustrates the difference that treating the cornea preoperatively can make in terms of patients’ postsurgical visual acuity. It compared both groups’ UCVA versus their BCVA (Table 2 and Figures 3 – 4). In the group with elevated tear osmolarity, there was a significant difference between UCVA and BCVA in terms of Snellen visual acuity measured at 3 months following LASIK surgery. This difference was not seen in the patient group with normal osmolarity levels. This information tells us that these patients who had elevated tear osmolarity and were not treated preoperatively with tears had a higher likelihood of poorer visual outcomes after LASIK surgery. This study shows that osmolarity can have a role in terms of identifying and treating these patients earlier to decrease the chances of an unexpected visual outcome after refractive surgery.

Dr. Holland: The study Dr. Kim is referring to underscores why many refractive surgeons and refractive cataract surgeons say that tear osmolarity is a critical screening test for all patients prior to surgery.

Dr. Kim: This case example provided by Dr. Ken Beckman shows how an optimized tear film can not only improve the patient’s keratometric readings and IOL calculations, but also the wavefront aberrometry scan that we typically take before a customized ablation (Figure 5).

This study examined the stability of the tear film in post-LASIK patients. Figure 6 shows hyperosmolar eyes on the top row versus normal eyes (those with healthy ocular surfaces) on the bottom row. The graphs show the two groups at three separate 2-week interval visits (and where LASIK was performed on all patients between visit 1 and 2) in which they had three separate osmolarity readings at 5-minute intervals. In the normal osmolarity group (Figure 6) at the bottom, you can see the fairly strong correlation between the two eyes in terms of all the patients having values under 308 mOsmol/L. The difference in the osmolarity readings between the two eyes, which can be a sign of DED, was clearly evident in the hyperosmolar group as seen in Figure 6. This group also exhibited a high variability of osmolarity readings within that single visit, between the two eyes, and also between the visits. So, this study supports the finding that a difference of 8 points on osmolarity readings between the right and left eyes can serve as an indication of DED, and it points to the comment made earlier about talking to that patient more quantitatively about his or her disease process.

Dr. Holland: I think some clinicians do not understand that the variability in the osmolarity reading is probably as important as the actual number itself. These data certainly demonstrate the need to take variability into account.

Dr. Kim: If you look at how DED affects the satisfaction ratings of patients who undergo cataract surgery and LASIK, you can see the high percentage of individuals who are not satisfied with their outcomes. This does not even include their visual acuity data. We need to pay more attention to the ocular surface and not necessarily blame the procedure, the laser, or the IOL as the reason for the patient’s suboptimal outcome after cataract or refractive surgery.

William Trattler, MD, conducted a multicenter study that was enlightening in terms of showing how routinely patients with DED present for cataract surgery. It is important to identify individuals

### TABLE 2. TEAR OSMOLARITY IN REFRACTIVE SURGERY

<table>
<thead>
<tr>
<th>Osmolarity Level</th>
<th>Number of Patients</th>
<th>Visual Acuity Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>81</td>
<td>0.37</td>
</tr>
<tr>
<td>Hyperosmolar</td>
<td>47</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Figure 3. Change in Kcyl (visit 1 vs visit 2). The hyperosmolar group demonstrates a wider variation in Kcyl between visits relative to the normal group (P = .013).
with DED and treat them before we proceed with ocular surgery. It is encouraging that we practitioners now have a host of advanced tear-film diagnostic tools that can help cataract and refractive surgeons diagnose dry eye much earlier in the disease process and much more accurately in order to maximize their surgical results.

THE CLINICAL APPLICATION OF POINT-OF-CARE TESTING

**Dr. Holland:** Dr. Kim, in what percentage of patients do you either repeat testing or delay surgery, both in refractive surgery and refractive cataract surgery groups?

**Dr. Kim:** I would guesstimate that I repeat testing or delay surgery in 10% to 15% of cases. That figure includes the contact lens wearers as well. Many of these individuals wear rigid gas-permeable lenses for a very long period of time, and their tear film dynamics and ocular surface are abnormal. I instruct those patients to take a break from wearing their lenses for 2 weeks for soft contact lens wearers; 1 month for each decade of wear for RGP wearers, and then I will repeat their measurements.

CASE EXAMPLES OF DED

CASE No. 1

**Dr. Holland:** Let’s discuss two last cases. A 65-year-old myopic patient with significant astigmatism and cataract wanted to get rid of glasses for distance viewing and complains of burning and itching that is worse in the morning. Other symptoms on the dry eye questionnaire related to fluctuation in vision, light sensitivity, and watery eyes. Our work-up showed the osmolarity was 308 mOsmol/L in the right eye and 322 mOsmol/L in the left. The MMP-9 test result was negative. Tear breakup time was abnormal at 5 seconds. Meibomian gland expression showed inspissated glands and abnormal expression. The Schirmer’s test result was relatively normal; there was inferior staining and foamy tears. What are your thoughts on this case in terms of the diagnostic testing and your diagnosis?

**Dr. Kim:** This patient primarily has evaporative dry eye syndrome related to MGD. Tear osmolarity helps to identify this type of patient as well. The staining score for MMP-9 is negative in this case. The secretions are abnormal, and the tear film is soapy and foamy, which is another hallmark of a patient with MGD. I would show the patient what the meibomian glands look like on meibography and then convince him or her that she/he needs to postpone surgery because of MGD. I would recommend thermal pulsation therapy to help expedite the treatment of the meibomian glands. I would also start the patient on a lipid-based artificial tear and have him or her continue lid hygiene therapy and add an effective oral omega-3 fatty acid supplementation.

If needed, I would probably start the patient on either topical azithromycin or oral doxycycline. Typically, I have the patient return in about 1 month for reassessment with repeat keratometry/biometry readings and repeat slit-lamp examination before commencing with surgery.

**Dr. Holland:** I agree with prescribing topical azithromycin, lipid-based tears, and oral omega-3 fatty acid supplementation. I would consider performing a LipiFlow procedure early in the treatment schedule for this patient to try to get the surface healthier faster. I would prescribe oral doxycycline if the patient were refractory. The key is managing the surface and delaying surgery on this patient. Otherwise, you are more likely to have an abnormal biometry and topography reading, thus missing your refractive target.

CASE No. 2

Another case involves a 71-year-old patient who came in for a second opinion after having cataract surgery 5 weeks ago. She received a multifocal IOL and paired limbal relaxing incisions (LRIs) during the surgery. This patient was extremely unhappy with her surgeon because she had fluctuating vision, poor quality of vision, glare, halos, starbursts, and foreign body sensation. Her work-up showed 20/40 UCVA with a great deal of fluctuation and minimal residual refractive error. Her K readings with mild astigmatism showed the staining of the LRIs. Her implant was well centered. On diagnostic workup, the tear osmolarity was 335 mOsmol/L and 310 mOsmol/L; the MMP-9 staining was positive. The tear breakup time was abnormal, meibomian gland expressions were thick and opaque, the Schirmer’s test result was abnormal, and corneal staining was moderate in the cornea as well as in the conjunctiva.

**Dr. Starr:** Any premium IOL patient, especially one with LRIs, will have a more neurotrophic ocular surface and unstable tear
film. Because she was experiencing halos and glare, this patient was concerned that there was a complication and felt that her surgery went wrong. In this case, the problem was her ocular surface. She had high tear osmolarity, her MMP-9 staining was positive, she had MGD, and a low Schirmer’s test score. To sum it up, she had ocular surface dysfunction leading to suboptimal vision after premium lens surgery. For this patient, I would prescribe lipid-based artificial tears, a topical steroid, azithromycin off-label, and oral omega-3 supplementation for the MGD. I would consider oral doxycycline, and use LipiFlow testing if available. In patients like this, if you treat the ocular surface, their vision improves. The glare, halos, starbursts, and the nighttime vision all improve, and the individual can usually be happy. Fortunately, this patient was very pleased with her outcome after ocular surface treatment.

**CONCLUSION**

**Dr. Holland:** As cornea specialists, we feel there needs to be a change in the way we diagnose and treat these patients. We believe that point-of-service testing is going to make a big difference, not only in our ability to improve as clinicians, but also in our outcome for patients, ultimately increasing our efficiency and patient satisfaction.

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