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**DRY EYE DISEASE:
CREATING
MORE
AWARENESS**

A round table discussion with members of American Society of Progressive Entrepreneurial Surgeons (ASPENS) that is designed to be a toolkit for the best practices in managing ocular surface disease.



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DRY EYE DISEASE: CREATING MORE AWARENESS

This round table discussion with members of American Society of Progressive Entrepreneurial Surgeons (ASPENS) is designed to be a toolkit for the best practices in managing ocular surface disease.

The goal of this ASPENS round table is to identify the best practices in the management and prevention of dry eye disease (DED)—we want to create a practical approach. Today, more is known about DED than ever before, and a variety of diagnostics and new treatment modalities are available. The problem is that many eye care practitioners do not even know where to start when it comes to identifying and treating DED. These patients require a lot of time, and often that does not fit into the common practice flow. How do we go about creating more awareness among eye care providers and the community? If we wait for patients to present with symptoms, it is too late. —Sheri Rowen, MD



Alice T. Epitropoulos, MD, is co-founder and owner of The Eye Center of Columbus and partner at Ophthalmic Surgeons & Consultants of Ohio. Dr. Epitropoulos is also clinical assistant professor at The Ohio State University Department of Ophthalmology. She serves as a consultant to Allergan, Bausch + Lomb, Shire, TearScience, TearLab, PRN, and NovaBay. Dr. Epitropoulos may be reached at (614) 221-7464; aepitrop@columbus.rr.com.



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P. Dee G. Stephenson, MD, is the founder and director of Stephenson Eye Associates in Venice, Florida. Dr. Stephenson is also associate professor of ophthalmology at the University of South Florida in Tampa and president of the American College of Eye Surgeons. She acknowledged no financial interest in the products or companies she mentioned. Dr. Stephenson may be reached at (941) 485-1121; eyedrdee@aol.com.



Sheri Rowen MD, FACS, Physician CEO, is the Founder of Rowen Vision and Cosmetic Center, and has served as a Clinical Instructor at Johns Hopkins Hospital as well as a clinical assistant professor at the University of Maryland. She is now with NVision Centers in Newport Beach, California, and is an in-house consultant for Alphaeon and



Elizabeth Yeu, MD, is in private practice at the Virginia Eye Consultants in Norfolk, Virginia, and serves as an assistant professor in the Department of Ophthalmology at Eastern Virginia Medical School. She is a consultant to Abbott Medical Optics, Alcon, Allergan, RPS, Shire, and TearLab. Dr. Yeu may be reached at eyeu@vec2020.com

Strathspey Crown. She disclosed a financial relationship with Ace Vision Group, Allergan, and Bausch+Lomb. Dr. Rowen may be reached at (410) 402-0122; srowen10@gmail.com.

EARLY DIAGNOSIS IS CRITICAL

Alice T. Epitropoulos, MD: Meibomian gland dysfunction (MGD) is extremely underdiagnosed because many times it is nonobvious. MGD is a progressive disease, so if we can get to these patients before they have severe damage, they are going to respond better than if we wait until the glands are nonfunctional. Meibography using the LipiView II (TearScience) is an excellent tool to identify these patients early, it is also a great opportunity to educate our patients and guide the discussion about the disease. The prevalence studies show that 43% of patients who have DED are asymptomatic.¹ We have to actively look for the disease and not just rely on symptoms.

Cathleen McCabe, MD: In my practice, we have posters in the waiting room and examination rooms that alert patients to some of the symptoms of DED.

Elizabeth Yeu, MD: A lot of physicians almost turn a blind eye to DED. It is a chronic disorder that, until recently, there were not many prescription or therapeutic interventions available beyond lid hygiene and lubrication—then of course came cyclosporine (Restasis; Allergan), in-office meibomian gland (MG) interventions, and advanced tear diagnostics. The impact of ocular surface health on outcomes in refractive cataract surgery is certainly helping to drive surgeons' awareness. Many patients do not present with the classic signs, but we are identifying them as having the condition with advanced tear diagnostics, particularly tear osmolarity and InflammDry (Rapid Pathogen Screening [RPS]). This occurs before they actually have vital dye staining and the devitalized epithelium.

Neda Shamie, MD: The availability of diagnostic tests enables us to pay more attention to younger patients too, as we can now visualize the MGs and actually see atrophy. We know that it starts early. In fact, I use the Sjö test (Bausch + Lomb), and have offered it to some patients who I thought would not be positive and yet they were. It is alarming to see so many asymptomatic patients who have significant disease.

Sheri Rowen, MD: When the Sjö test came out the Sjögren's Foundation estimated about 10% of the patients would have the disease, but anecdotally, in overall practices, about 26% have come back as positive tests. There is an autoimmune component to DED that we are seeing in some of the younger patients. With early diagnosis we can help treat their whole system. Regarding the lids, I don't think any of us would have ever looked at meibomian glands routinely in a young person and considered this entity of nonobvious meibomian gland disease (MGD).

Dr. McCabe: What we hope is that we can identify these patients early and change that statistic of 80% of patients developing DED later in life.² If our goal is to treat them for a

lifetime, we can force that statistic to drop; this could make such a huge difference in patients' quality of life.

P. Dee G. Stephenson, MD: It is about the total patient and his or her total health.

Dr. McCabe: How do we almost "automate" the detection

TAKE-HOME POINTS

by Neda Shamie, MD

- individualize treatment
- assess inflammation
- prescribe 2-week course of steroids plus 3 to 6 months (and often longer) of cyclosporine 0.1% (Restasis; Allergan) twice a day
- increase intake of omega-3 fatty acids
- look for comorbid conditions (ie, conjunctivochalasis, incomplete blink reflex, etc.)

Patients who rely on daily artificial tears deserve a closer evaluation to rule out dysfunctional tear syndrome or to be monitored for progressively worsening symptoms. It is important to treat each patient with a customized approach. The patient may have significant MGD, ocular surface inflammation as a result of underlying allergies, or possibly conjunctivochalasis or other mechanical abnormalities that can contribute to the OSD. The most likely scenario is a combination of factors.

After determining the presence of inflammation, based on clinical presentation or the use of InflammDry (RPS), I proceed with a 2-week course of steroids. My preference is loteprednol (Lotemax; Bausch + Lomb) administered at bedtime, with at least 3 to 6 months of therapy with cyclosporine.

I also advise my patients to increase their intake of omega-3 fatty acids through supplementation; my preference is Physician Recommended Nutraceuticals brand, and I also suggest to my patients that they add more omega-3 fatty acids to their diet.

If significant rosacea is present, I prescribe 50 mg/day oral doxycycline for at least 3 months or topical azithromycin (AzaSite; Akorn) nightly. If there is trichiasis, I remove those lashes, and if the patient has conjunctivochalasis and symptoms of discomfort remain despite aggressive treatment of the ocular surface, I proceed with conjunctival resection.

For patients with severe punctate epitheliopathy or dry eyes related to neurotrophic keratopathy, I recommend autologous serum drops. I offer the option of a PROSE (prosthetic replacement of the ocular surface ecosystem) scleral lens to patients who have little to no improvement with topical treatments.

and treatment of DED? We want to make it something that is automatic to think about for each patient, because as surgeons, we have so many other things we want to concentrate on.

Dr. Yeu: The goal of this is to try to change our threshold to identify and treat DED.

CHANGING PRACTICE PATTERNS

Dr. Rowen: The first change that must be made to traditional practice patterns is to see patients before they have visual issues. In fact, we need to see patients on a yearly basis to examine for potential development of early DED. This falls in line with the dental hygiene and preventive medicine models. I have seen DED in patients as young as 17 years, and we have also seen it in young children with chronic chalazia.

Dr. Yeu: There is much greater demand on our eyes today, with electronic video display devices. That is part of the problem. When reading computer monitors, tablets and smartphones, people do not blink enough or completely.

Dr. Stephenson: The digital device usage is what triggers young patients to come into our offices.

Dr. Yeu: We need to not only educate the eye care professionals we work with, but also primary care doctors and pediatricians.

Dr. Shamie: A public health campaign could be targeted to patients in the 20- to 40-year-old range, especially contact lens wearers. We could target college students via campus health services and educate them about the importance of ocular surface health. Perhaps create stickers for computer screens that remind students to blink more often, use artificial tears, or beware of dry eyes if their eyes burn with computer use.

Dr. Yeu: The average DED patient is younger. I am diagnosing more kids who habitually play video games, and contact lens overusers come in as teenagers with obvious DED.

Dr. Epitropoulos: Everybody should be looking for MGD, I think it is the root of what causes many of our patients to be frustrated, dissatisfied or unhappy with their results after cataract or refractive surgery. MGD is the most common form of OSD and is a silent gland killer.

Dr. Rowen: Our diets today, certainly in our culture, have become more processed, and we consume more omega-6 and other inflammatory mediators and less omega-3, a natural anti-inflammatory. What happens then, is the composition of that meibum turns into something thick, yellow, dark, cheesy, and toothpaste like. It should look like clear olive oil.

TAKE-HOME POINTS

by Elizabeth L. Yeu, MD

- listen to the patient
- assess the causes of OSD, which are likely multifactorial

The diagnosis and management of DED has blossomed in the past several years. We have to keep in mind that listening to the patient's symptomatology is just as important as incorporating the diagnostics and clinical exam into the big picture.

For example, the timing and qualities of the patient's discomfort can be very revealing. Regarding the timing of the disease, OSD in a patient who complains more of a burning sensation first thing in the morning from MGD is very different from the patient who suffers from fluctuating foreign body sensation that worsens throughout the day due to aqueous-deficiency issues. Likewise, for the symptomatic morning patient, a bilateral burning quality to their eyes with MGD is different from a recurrent corneal erosion syndrome patient with unilateral sharp pains and tearing.

Dr. McCabe: It should well up like an oil well and spread out over the lid margin. Instead, it retains its shape, like toothpaste coming out of a tube.

Dr. Shamie: We do not want to wait until the meibum is the consistency of toothpaste to really determine if there is disease. The tear quality and stability is important. You need to stain the tear film, or if you have LipiView (TearScience), you can determine the tear breakup time (TBUT) and the quality with which it covers the ocular surface.

Dr. Stephenson: I think that we pay a lot less attention to TBUT than we should. It is a measure I find very helpful, and I track it over time.

Dr. Yeu: The slit-lamp evaluation of the lids is crucial; and it can be very quick. The three things that we are looking for is the (1) actual architecture of the meibomian glands, (2) the quality of the meibum, and (3) presence of telangiectasia, which demonstrates greater inflammation.

Dr. Shamie: One of the challenges in treating DED is that we do not really know what the natural progression is, and we do not know what normal is. We have to talk about the need for more population-based studies and create normative data among our target population.

Dr. Epitropoulos: Results from a recent study evaluating the role of omega-3 for DED supports the recommendation that re-esterified omega-3 supplementation should be included as a primary therapy for DED and MGD.³ The point we need to drive home is early intervention—rather than waiting until there is irreversible damage—is really going to lead to better outcomes.

Dr. Rowen: We come back to eye awareness: if you are aware of your eyes, you probably have a problem.

Dr. McCabe: In terms of interventions for a younger patient, I would say they do not need to be as broad spectrum as in an older patient because they are earlier in the disease process. I talk more about lid hygiene, diet, and omega-3 supplements with these patients. In my experience, omega-3s really have a big impact on the quality of patients' lid margin and meibum.

Dr. Rowen: Studies of the Physician's Recommended

TAKE-HOME POINTS

by Alice T. Epitropoulos, MD

- assess for unstable tear film
- early treatment necessary
- Standard Patient Evaluation of Eye Dryness (SPEED) questionnaire
- increase intake of omega-3 fatty acids
- tailor treatment to each patient's severity of disease
- topical corticosteroid with cyclosporine 0.1% (Restasis; Allergan)

The tear film is the most important refractive surface of the eye. An unstable tear film can result in unpredictable biometry, delayed healing, and suboptimal results after surgery.

Evaporative DED is most common form of OSD. In my opinion, this condition is the root of what causes some of our patients to be frustrated, dissatisfied, or unhappy with their results after cataract or refractive surgery.

MGD is a progressive disease and if not treated can lead to glandular atrophy and loss of function. Meibography using the LipiView II (TearScience) is an excellent tool to identify these patients early, and it also serves as a great opportunity to educate our patients and guide the discussion about the disease. I think this is what is going to take LipiFlow (TearScience) thermal pulsation to the next level. Patients can now see what their glands look like versus what they should look like. Conventional treatments do not address meibomian gland obstruction.

There are several traditional but valuable ways of evaluating

Nutriceutical (PRN) brand, which is the natural triglyceride or re-esterified form of omega-3, have backed this up.^{3,4} We need to talk about diet with younger patients.

ENGAGE, EDUCATE YOUNG PATIENTS

Dr. Stephenson: I find that when college-age patients come home after their first semester of college, they present to me with complaints. This is the perfect time to assess them and deliver education, because they have done two new things: moved away from home and changed their diet. They are working on their computer, reading, and studying. One of the pearls I use for women is to tell them they have to remove their makeup completely at night, and I recommend that they do not use waterproof products. Additionally, a tube of mascara should only last a couple of months. They need to throw away old makeup.

Dr. Shamie: I make sure I use language that resonates with my patients. When I talk about Restasis, for example, I talk about the health and youthfulness of the ocular sur-

DED. I have found TBUT, corneal topography, and fluorescein staining to be most helpful. Current options have changed dramatically during the past several years with improved specificity and objectivity of point-of-care testing. OSD results in hyperosmolarity, which in turn contributes to an unstable tear film, the hallmark of DED.

Treatment should be tailored to the severity of the disease. Reducing inflammation is the primary goal of treating moderate to advanced dry eye. Restasis is extremely effective in my patients with DED because it increases natural tear production and reduces the disease's progression. Using a topical corticosteroid provides a tool to rapidly reduce inflammation and works synergistically with cyclosporine. I also recommend omega-3 fatty acids because it reduces inflammation and increases tear production. I prefer re-esterified nutritional supplements by Physician Recommended Nutriceuticals, a high-quality, purified triglyceride formulation with excellent tolerability and absorption.

Blepharitis is a common diagnosis associated with dry eye disease. Conventional treatments, such as cleaning the lids with baby shampoo can sometimes exacerbate symptoms. I have found a new approach: Avenova (NovaBay Pharmaceuticals) is a treatment that utilizes hypochlorous acid in saline, which is a bactericidal component found in our white blood cells. I have found this to be extremely effective in treating patients with MGD and blepharitis.

DED decreases surgical predictability and can adversely affect our outcomes. Never hesitate to delay surgery until the ocular surface is healthy enough to generate accurate measurements.

TAKE-HOME POINTS

by P. Dee G. Stephenson, MD

- listen to the patient
- SPEED questionnaire
- tear osmolarity and InflammDry (RPS) testing are a must
- treatment with cyclosporine 0.1% (Restasis; Allergan), omega-3 fatty acids, and topical steroids
- new treatment available for blepharitis

DED can be extremely burdensome to both the patient and the doctor. It is real, and the treatment for this disease is everchanging and chronic. A good game plan is a must, along with patience, understanding, and listening to the patient about their symptoms. Nearly all of my patients complete the SPEED questionnaire. It is important to determine what type of disease the patient has or if it is a combination.

Corneal evaluation should be done using fluorescein stain and

conjunctival evaluation with lissamine green, as well as TBUT. I also assess the MGs. I examine the lid margins for *Demodex*, greasy lashes, and lash loss. Treating the inflammatory component of the disease part is important. I use cyclosporine, omega-3 fatty acids, and topical steroids to reestablish the tear film. I use punctal plugs if needed.

Evaluation of the MGs and at the oil layer of the tear film is crucial. I use the LipiView Interferometer with keratography and LipiFlow treatment (both from TearScience) as needed. I perform a DED workup on preoperative cataract patients and treat them aggressively so that optimal preoperative testing can be performed.

BlephEx (RySurg) is a great new addition to the treatment of blepharitis. This in-office procedure removes the excess bacteria biofilm and inflammatory exotoxins along the lid margin that will help improve MGD and symptoms of DED.

by Sheri Rowen, MD, FACS

- importance of lid hygiene is underrecognized
- early recognition of MGD needed
- manual gland expression performed at the initial office visit

We have missed the boat in understanding lid hygiene. With the rapidly increasing prevalence of dysfunctional tear syndrome, we need to take a second look. Every patient should have their glands evaluated in their 20s to 30s to determine who will be at risk for plugged glands.

Every patient who walks into our practices should routinely have these diagnostic tests performed: First, a SPEED questionnaire to determine if symptoms exist. If positive (> 6), these patients should have their tear osmolarity tested. InflammDry should also be performed for inflammation assessment, along with fluorescein stain with fluorescein strip only, and balanced salt solution to evaluate staining and TBUT. A lissamine stain will assess conjunctival stain even, if fluorescein shows no corneal staining.

If inflamed, patients are directed to use cyclosporine drops twice daily and omega-3s as needed for oil film composition and anti-inflammatory effect. I add Lotemax as well. If just the glands are affected, the patient will have a LipiView test to properly image the meibomian glands and assess the oil layer. The Keratograph corneal topographer (Oculus) can also evaluate TBUT.

I examine the lid margins for flaking and anterior blepharitis, and, if present, I institute lid scrubs and warm compresses. I have found that Avenova (NovaBay) is effective in killing *Staphylococcus*.

Every patient should have manual MG expression performed at the initial office visit. This will reveal the preliminary level of blockages and the composition of the oil, which will range from olive oil

to complete blockage with no oil expressed. I cannot stress enough how important this step is and how rarely it is utilized. The dysfunction and blockages of MGs very often precedes the signs and symptoms and we must start to incorporate this for early diagnosis and prevention. This would mimic the dental hygiene model where we would evaluate and then express MGs early to prevent long-term blockages, dilation, truncation, and permanent atrophy of the MGs.

Early treatment with LipiFlow (TearScience) or intense pulsed light can be instituted to unblock the MGs and manual expression of MGs every 3 months with a cotton swab will prolong the effect until they finally produce normal oil. This process can take as long as 2 years in very diseased patients.

Following treatment with cyclosporine 0.1% (Restasis; Allergan) for at least a month, a Schirmer test can be performed; if results are low, plugs can then be placed. This pre-treatment with cyclosporine helps to reduce the inflammatory mediators that are residing in the tear lake.

In 86% of patients, the MGs will be affected, and as soon as they are expressed to assess the quality and quantity, they can start performing again.¹ Until now, this was not a part of the normal eye exam, but we can make a big difference by just recognizing this condition, especially earlier in life. With limited and partial blinking, especially with digital devices, the meibomian orifices actually become keratinized, leading to the eventual blockages. These can be lightly debrided with a spud or BlephEx (RySurg), and we can release the blockages using simple debridement and expression. I predict routine meibomian expression with control of inflammation will become the new norm for eye exams and lid hygiene, with the creation of a new specialty of ocular hygienists.

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TAKE-HOME POINTS

by Cathleen McCabe, MD

Top 13 Practice Pearls

1. Early recognition and treatment is key. Look carefully for signs and symptoms even in younger patients. This is especially important in patients prior to refractive or cataract surgery to improve the quality of measurements and the outcome of surgery. This also helps avoid the misconception that patients have about the cause of the problem if DED is only identified, discussed, and treated after surgery, even though it was present before.

2. An intake questionnaire (we use a modified SPEED questionnaire) allows technicians to be empowered to perform important testing (tear osmolarity, staining of conjunctiva, and cornea) prior to seeing the doctor.

3. Evaluation of the quality and quantity of meibum can be easily performed in the office with pressure on the lower lid.

4. Low-tech equipment, such as a slit-lamp photograph taken with a smartphone camera, can be very useful in educating the patient on the problem.

5. Patients' understanding of the symptoms of dry eyes (tearing, fluctuating vision, burning, redness) can improve their compliance with treatment and follow-up. Educational posters and videos in the waiting room and exam rooms can be very helpful.

6. High-quality, bioavailable omega-3 fatty acid supplements are a powerful aid in improving MGD. I also discuss sources of omega-3s (fatty fish, walnuts, chia seeds, etc). I usually advise the patient that it can take 4 to 6 weeks to notice an improvement in DED, and will re-evaluate him or her around this time.

7. To help patients with symptoms exacerbated when reading or on the computer, I recommend the "20/20 rule": every 20 minutes put in a lubricating drop and close your eyes for 20 seconds. For presbyopes, I also recommend looking at distance (approximately 20 feet).

8. There are apps available for smartphones and tablets that

will remind patients to put in drops at regular intervals. Time Out (available in the Apple App Store) will fade the computer screen out to a color at set intervals for a set amount of time; eg, every 20 minutes for 20 seconds.

9. For patients with more severe DED symptoms who have difficulty instilling drops, lubricating gel in a tube (Systane or Genteal [both from Alcon]) used in smaller amounts during the day can be effective. I warn the patient that his or her vision will be blurry for 1 to 2 minutes after instillation. A gel formulation can be much easier to administer for patients with difficulty extending their neck because it can be instilled with the head in an upright position.

10. Microwave-heated compresses, such as the Bruder Moist Heat Compress, make complying with warm compress treatment easier for patients. An inexpensive alternative is to put several clean washcloths in a bowl with water, heat the bowl of water in the microwave, and serially remove the compresses to maintain a warm temperature on the lids. Re-heating a baked potato in the microwave after pricking the skin also works well.

11. Giving a brief explanation of how cyclosporine 0.1% (Restasis; Allergan) works (by down regulating receptors on inflammatory cells to interrupt the inflammatory cycle that exacerbates dry eye) helps patients to understand the importance of compliance with twice-daily dosing and the reason for the 2 months of treatment required before they notice an improvement in symptoms. I schedule the follow-up visit at 2 months and emphasize that treatment will be long term.

12. In cases of very severe and persistent DED, I have found serum tears and Prokera Slim amniotic membrane (Bio-Tissue) therapies to be very effective.

13. Effective evaluation and treatment of DED can be achieved without high-tech diagnostic and treatment tools. It is a great service to the patient to look early, treat early, and follow-up frequently in cases of DED, hopefully preventing the more end-stage disease we frequently see presenting to our clinics.

face. I believe that conjunctivochalasis is a result of chronic inflammation, ie, "wrinkling" of the surface of the eye.

Dr. Yeu: We are preparing for the future. With perseverance, we can impress upon our colleagues that earlier commitment to treatment will pave the way for better eye health, so patients can reach their visual goals later in life (LASIK, cataract surgery).

We are lucky to have the interventions we have in terms of thermal pulsation, but why are the MGs not being evacuated at a maintenance level? Thermal pulsation and MG evacuation is a great start, but the incomplete blinks that occur routinely cause greater MG congestion and worsening DED. There are lid ergonomics we can encourage people to do, such as five intentional blinks twice a day, where you actually hold each one for

two seconds. That helps the natural expression of the MGs and promotes evacuation.

Dr. McCabe: I recommend that patients take a 20 second break from the computer every 20 minutes, put in a lubricating drop, and look off to the distance at least 20 feet: 20/20/20.

Dr. Rowen: To stay 20/20! ■

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