

The Effective and Practical
DRY EYE PRACTICE

FROM FOUNDATION TO FULFILLING AN UNMET NEED

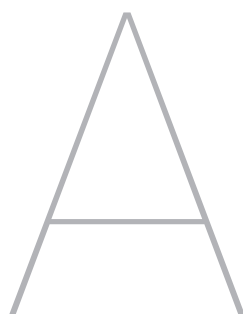
Highlights from a program held during the 2019 Global Specialty Lens Symposium
with Arthur B. Epstein, OD, FAAO

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HOW I DEVELOPED A PRACTICE FOCUSED EXCLUSIVELY ON DRY EYE



Arthur B. Epstein, OD, FAAO is co-founder of Phoenix Eye Care in Arizona. He leads the Dry Eye Center of Arizona, Phoenix Eye Care's dry eye/ocular surface disease center, and serves as its director of clinical research. Dr. Epstein, a Distinguished Practitioner of the National Academies of Practice, has published hundreds of articles, scientific papers, and book chapters and has presented more than 1,200 invited eyecare lectures in more than 50 countries. He also serves as an editor or reviewer for numerous clinical and scientific publications.



AFTER PRACTICING IN NEW YORK FOR MANY YEARS, I moved to Arizona, where my wife and I were bit by the entrepreneurial bug. Against advice from most of our friends, we opened a new practice, Phoenix Eye Care, cold. At the same time, I wanted to pursue my long-standing passion for dry eye and ocular surface disease in a more focused way, so we launched the Dry Eye Center of Arizona — a practice within our primary care practice. Assuming many physicians would already be focusing on dry eye in the arid Arizona climate, I was

initially unsure of how successful such an endeavor might be. As it turned out, very few practices in the Phoenix area focused on dry eye. This left a substantial unmet need and led to rapid practice growth and success.

Despite all of the attention being paid to dry eye, a significant unmet need still exists across the country. In fact, the need is actually increasing. In addition to the populations we expect to have dry eye — for example, the elderly

and post-menopausal women — more and more younger people are also developing dry eye, due in large part to the explosion in digital device use and diets increasingly deficient in Omega-3s.

Focused exclusively on dry eye and ocular surface disease, the Dry Eye Center of Arizona has achieved a better than 95% success rate for effectively managing patients with dry eye and meibomian gland dysfunction (MGD). For many of our patients, this has been life changing.



Above: Dr. Epstein's practice has a specialty focused on treating ocular surface disease.

Dry eye care is one of the greatest opportunities in vision care and certainly a tremendous opportunity for optometry. In the following articles, I discuss what I consider to be the keys to the success of the practice (including a simplified treatment algorithm), how a dry eye practice can be enhanced by — but also started without — an investment in advanced technology, and the best way to interact with patients. ●

DIAGNOSING DRY EYE: WHAT WE'RE ACTUALLY LOOKING TO IDENTIFY

Tear film instability, usually driven by meibomian gland dysfunction, is at the center of the disease state

Dry eye/ocular surface disease is the single most misunderstood and overcomplicated disease state that optometrists see. It can't be fixed by wetting the eye because, in most cases, "dry" isn't the problem. This is clarified in the new definition from the Dry Eye Workshop (DEWS), which describes "loss of homeostasis of the tear film as a central concept."¹ Fundamental to the loss of homeostasis is that the ocular environment struggles to maintain balance in the face of myriad challenges and that MGD drives much of the dysfunction of the tears and ocular surface. Lemp and colleagues reported that 86% of patients diagnosed with dry eye demonstrate signs of MGD.² I actually find that to be a significant underestimation in my patient population. Dear friend and mentor Donald Korb hit the nail on the head with his seminal paper "Dry Eye Is the Wrong Diagnosis for Millions."³ As he wrote, an "MGD-first approach has the potential to revolutionize the timing of diagnosis and the choice of frontline therapy in most patients with dry eye."

Tears form a perfect refractive surface, and our ability to see is so fundamental to survival that the eye is equipped with incredible mechanisms to maintain homeostasis and function of the tear film. The system is elegant and beautiful in both its simplicity and complexity. The lipid layer of the tear film consists of numerous species of lipids, produced by the meibomian glands, that create a coherent, tense

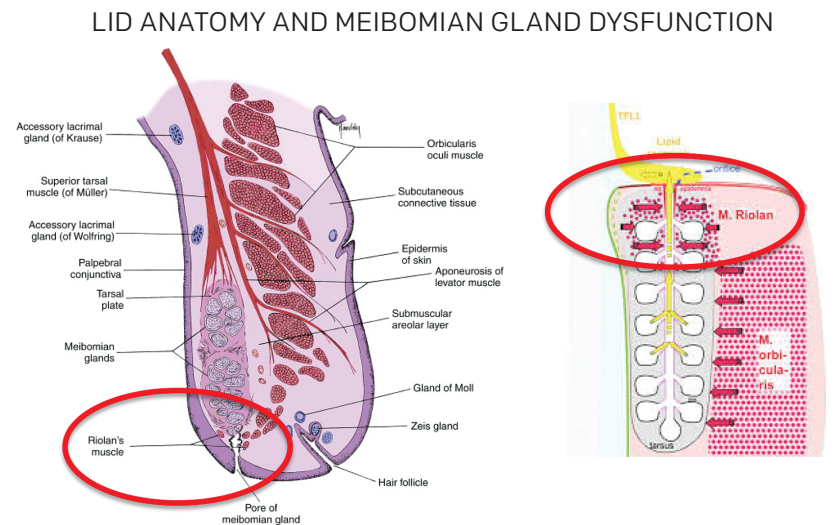


Figure 1. Riolan's muscle prevents the meibomian glands from releasing lipid until the eyelids touch during a blink. Spent tears are sucked out of the system and lipid is metered out in a concise amount.

outer surface that gives the tear film structure. And the blink, a beautifully choreographed movement, actively contributes to the integrity of that structure. I believe that the blink itself doesn't directly express meibum; it pressurizes the meibomian glands as the orbicularis muscles contract with the blink. Gland expression is controlled by the muscle of Riolan (Figure 1) at the distal end of the gland. Riolan's muscle prevents lipid expression, except when the eyelids touch as the blink completes. In a sweeping movement, the upper eyelid sweeps down, out, and around, squeegeeing tears off of the ocular surface. The lower eyelid pulls these spent tears toward

the lacrimal drainage system, which is under negative pressure during the blink. The spent tears are sucked out of the system, and lipid is metered out in a concise amount and evenly spread on up-blink.

When homeostasis breaks down, many factors associated with dry eye come into play, including tear hyperosmolarity, ocular surface inflammation, and apoptosis, but, as I see it, tear film instability is the root of all the problems. We use the term "dry eye" largely because it's historical. But it is the structure of the tears and the ability of the tears to create a stable surface that are really important. Christophe Baudouin's Proposed Vicious Circle of the

Pathology of Dry Eye Disease⁴ is an apt distillation of this, and it places MGD at the center of dysfunction (Figure 2).

IDENTIFY THE PATIENTS

There are two ways to build a viable dry eye practice based on either a primary care or a specialty care model. The former is proactive, whereby dry eye symptoms and meibomian gland function and structure are routinely screened in all patients. With this approach, dry eye and MGD – including gland obstruction – are identified early, with the short- and long-term goals being ocular surface health. Similar to how we approach glaucoma, this is a disease-preventative strategy. A specialty care approach is more reactive. The signs and symptoms of dry eye are managed as they present. Although a proactive approach is good, and likely where the field is headed, it can be difficult to implement because many patients are asymptomatic, unaware of the problem, and resistant to treatment, adhering to the old mentality, “If it ain’t broke, don’t fix it.” As a result, focusing on symptomatic patients may be a better way to start.

The good news is that symptomatic patients are already in the waiting room of every optometric practice, and

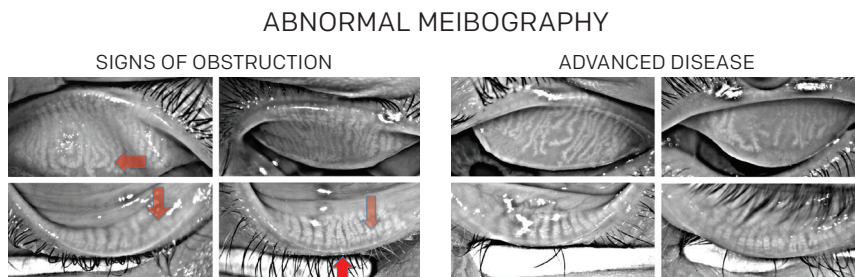


Figure 3. Meibography reveals the signs of meibomian gland dysfunction: gland obstruction, convolution, tortuosity, dropout, and dilated ducts.

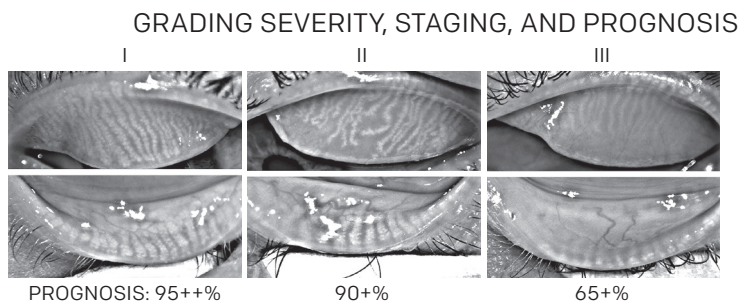


Figure 4. Dr. Epstein’s approach to categorizing patients takes into account severity AND prognosis.

their symptoms are or will soon be making them miserable. In more advanced cases, many feel frustrated and invalidated with prior care, and most are willing to do anything for relief. The best way to identify these patients is by using a validated questionnaire, such as the Ocular Surface Disease Index (OSDI) or the Standardized Patient Evaluation of Eye Dryness (SPEED). To

keep practice flow efficient, a technician or other staff member should sit with each patient and administer the questionnaire. This also works well because patients typically feel more at ease with a staff member than they do with the physician. The staff member should review the results with the patient and, if the scores are high, have them explain that the doctor will evaluate and discuss further. (For more information on patient communication, see “Understanding the Psychology of Dry Eye” on Page 7.)

DIAGNOSTIC TECHNOLOGY

Is investing in advanced technology a requirement for building a dry eye practice? Not necessarily, but I did so early on. I purchased the Oculus Keratograph 5M, which is an advanced corneal topographer optimized for external imaging. It includes many useful features, such as the ability to evaluate the meibomian glands, non-invasive tear film break-up time, tear meniscus height, and lipid layer thickness. We also have a LipiView II (Johnson & Johnson Vision), which includes blink evaluation and interferometry, both of which can be very helpful.

BAUDOIN’S PROPOSED VICIOUS CIRCLE OF THE PATHOLOGY OF DRY EYE DISEASE

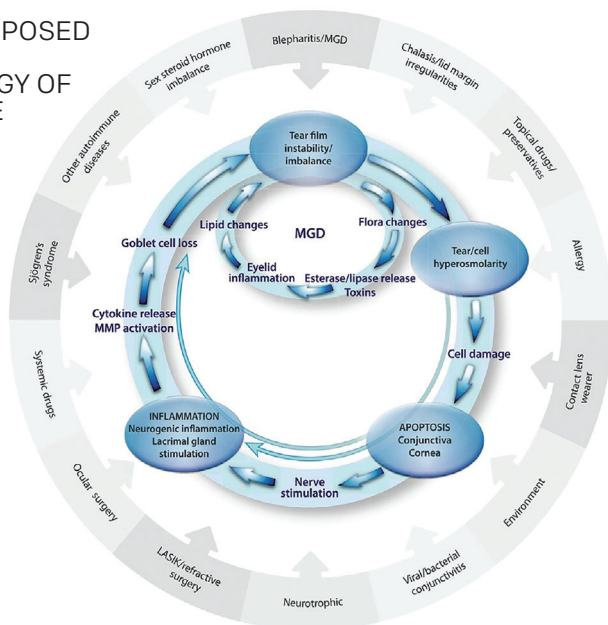


Figure 2. Baudouin illustrates that meibomian gland dysfunction is the prominent actor in ocular surface disease.

Meibography clearly reveals the signs of MGD — gland obstruction, convolution, tortuosity or dropout, and dilated ducts — that are caused by the glands not emptying properly and meibum stagnation (Figure 3). Functionally, the glands are pressurized to release lipid with every blink; but when the blink is inhibited — for example when one stares at a digital device for too long — they don't release, and back pressure can lead to structural changes. In addition, when lipid stays resident in the glands for too long, it eventually becomes rancid. The body doesn't like anything rancid, so it directs inflammatory cells to remove it. But the inflammatory response can't discriminate between rancid lipid and tissue, and glands are attacked and begin to drop out. I use a simple categorization scheme to group my patients based on prognosis (Figure 4). In group I, the glands are mostly intact but obstructed. The lipid layer has diminished thickness and coherence, i.e., the tear film is unstable. In group II, 20% to 80% of the glands have been lost, but the patients are still reasonably easy to manage. In group III, relatively few glands remain. These patients can be managed but usually require a great deal of adjunctive treatment. In conjunction with gland assessment on the Oculus Keratograph 5M, I utilize its non-invasive tear break-up time measurement. With this feature, it's easy to see the difference between a perfectly smooth, intact tear structure and a surface with a depleted dysfunctional lipid

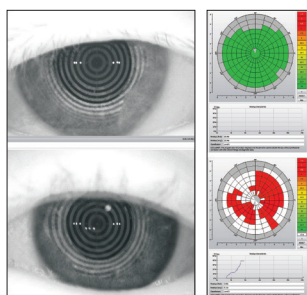


Figure 5. Non-invasive tear break-up time measurement shows an intact corneal surface and a surface with a depleted moisture barrier.

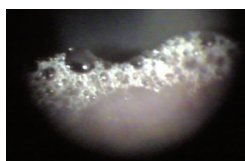


Figure 6. Saponification is a sign of severe tear film instability.



Figure 7. Ocular rosacea and inspissated glands visible upon slit lamp examination.

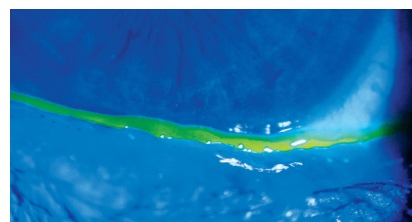


Figure 8. Fluorescein reveals eyelid notching and irregularity due to chronic tear film instability.

layer, which leads to exposure to the dry atmosphere, inflammation, and all the damage that ensues from that (Figure 5).

Many other diagnostic instruments, some more expensive than others, are available to aid in dry eye diagnosis. Point-of-care testing has also become popular, although my use is somewhat limited except in clinical trials. By my analysis [Clinical Benefit ÷ (Time + Cost) = Value], I don't use tests that don't change my treatment decision-making. Again, the most efficient and cost-effective way to gather diagnostic data that's automatically generated is to utilize technicians. Once a technician has gathered the data, patients can transition to the exam room to see the optometrist.

Whether or not a practice chooses to purchase equipment specific to diagnosing dry eye, the external exam and the slit lamp are invaluable. Bell's phenomenon, for example, can be tested by holding the eyelids open and having the patient try to forcibly close his or her eyes. The eyes should turn up and out. If they don't, and this protective reflex is failing, any exposure due to poor lid closure during sleep will cause corneal and conjunctival damage and worsen dry eye symptoms because the ocular surface won't get a chance to recuperate during the night. In any dry eye patient, findings at the slit lamp may include saponification (Figure 6), which occurs as a result of bacterial lipase activity on tear lipids. (More on saponification in "Simplified Treatment Flow Chart Drives Successful Outcomes.") The clinician should always look closely at the eyelids for signs of disease (Figure 7). Fluores-

cein, in addition to providing a picture of corneal health via staining, including specific patterns such as the inferior staining typically seen with exposure, helps to highlight the regularity of the eyelids. It may reveal, for example, notching in eyes with chronic MGD (Figure 8). Fluorescein can also be used to determine tear break-up time and break-up patterns. Breakup in the same area repeatedly indicates the underlying surface has become hydrophobic due to chronic damage. Breakup sporadically in different areas generally indicates that the lipid layer is insufficient.

A useful, and free-of-charge, instrument is the clinician's finger. To evaluate meibum, healthy and clear or otherwise, use the finger to apply pressure to the eyelids slightly greater than the force of a blink. With practice, doing this effectively becomes second nature. Finally, I find that my most sensitive instrument is listening to patients. I listen, and they tell me what's wrong with them and, thus, how to fix it. For example, a patient says, "I wake up in the morning and my eyes feel terrible, like sandpaper. I can barely get them open." What's wrong? Without even examining this patient, I am confident he has exposure.

THE HEART OF THE MATTER

I spend most of my time with patients listening and explaining to them what's wrong. I can afford to do this because I charge appropriately for the time and the diagnostic testing. It's time well spent because it's what leads me to the best management plan, which motivates patients to follow it. ●

SIMPLIFIED TREATMENT FLOW CHART DRIVES SUCCESSFUL OUTCOMES

Essential therapies can be supported by patient-specific adjuncts

In years past, if patients had questions about their dry, uncomfortable eyes, for most clinicians, artificial tears were the answer. Today, we know that artificial tears — while they have a place in therapy, particularly for aqueous-deficient dry eye — are largely palliative. True relief and optimal corneal health are achieved by addressing the underlying cause of tear film instability, which more often than not is meibomian gland dysfunction (MGD). Thankfully, the number of treatment options has grown substantially.

In my practice, which is dedicated exclusively to dry eye, I evaluate how every new treatment option works for

my patients. Several have become go-to therapies that I believe are crucial for successful outcomes. Others I use adjunctively as warranted for individual patients. Together, the crucial and adjunct therapies form my simplified treatment flow chart (Figure 1). I don't always reach some of the options at the end of the flow chart with a patient, because I often achieve good results with a conservative, holistic approach. For instance, not every patient goes on to debridement or gland expression, because they may not be necessary once more conservative therapies render the eyelids healthy, the blink normalized, and the meibomian glands functioning properly.

CRUCIAL TREATMENTS FOR SUCCESSFUL OUTCOMES

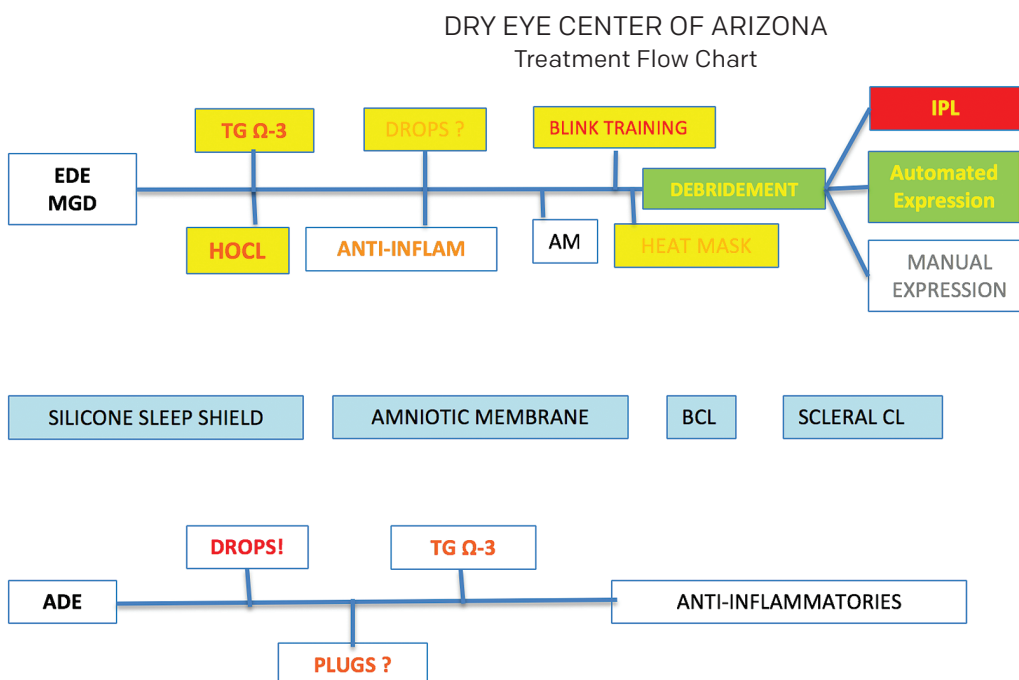
Nutritional supplementation

Nutritional supplementation with Omega-3 fatty acids is a foundational treatment in my practice. As with any other product, all options aren't created equal. Based on my interpretation of the literature and my experience, the requirements for an effective supplement are:

- triglyceride formulation
- 2.5 gms/day dosing
- 3:1 or greater ratio of eicosapentaenoic acid (EPA) to docosahexaenoic acid (DHA)

Hypochlorous acid

Hypochlorous acid, specifically



HyClear (Contamac), is a primary, essential treatment for my patients. It targets the most neglected aspect of the dry eye disease cycle, which is also the most under-recognized cause of tear film instability: shifts in the ocular microbiome associated with MGD. Baudouin has described this unfortunate and vicious cycle brilliantly in his recent paper.⁴ MGD decreases tear lipid levels and increases meibum stagnation. This encourages overgrowth of bacteria, primarily *Staph-*

ylococcus species, of the eyelids. Staph elaborate lipase, which degrades tear lipids. The degraded lipids mix with salts in the tears, causing saponification, which further degrades tear lipids and causes increased tear film instability. Bacterial eyelid overpopulation also leads to an increase in bacterial inflammatory toxins and a resulting influx of pro-inflammatory mediators.

Hypochlorous acid significantly reduces bacterial load, deactivates bacterial inflammatory toxins and pro-in-

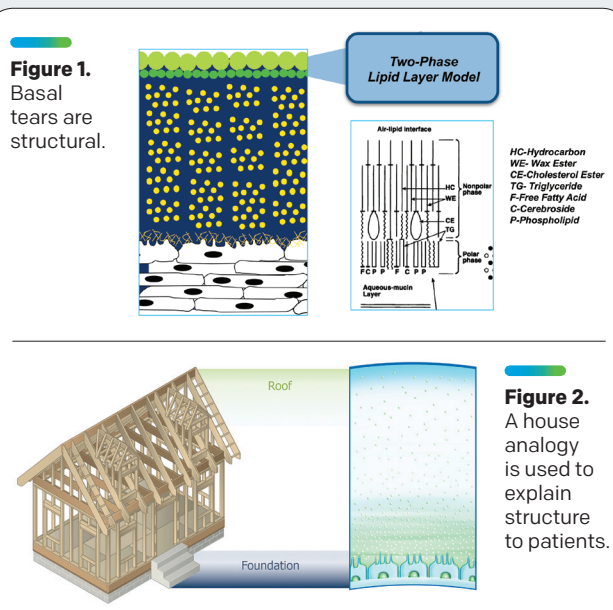
flammatory mediators, and degrades and blocks disruptive enzymes, including lipase.⁵ HOCl has been around for quite some time, originally used as a pre- and post-operative disinfectant. In that form, however, it was quite irritating to the skin. In contrast, while HyClear, a next-generation product, maintains the broad-spectrum antimicrobial activity of pure hypochlorous acid .01%, it is non-cytotoxic and comfortable for patients. It is manufactured via a proprietary process that results in

Understanding the Psychology of Dry Eye

For patients, dry eye can be as scary and emotional as any serious disease. When they haven't been able to find effective help, they feel the system has failed them. At my practice, the Dry Eye Center of Arizona, I have patients breaking down in tears at least once a week because no one has taken the time to sit and explain what's wrong with them and how it can be fixed. A surprising number believe they'll become non-functional or eventually go blind from dry eye. This delicate psychology makes it essential for the dry eye practitioner to spend time with these patients, educate them, reassure them that treatments are available, and manage their expectations with sensitivity and caring.

I find that dry eye patients really want to know "Why me?" — and it's important to have an answer. Mine is straightforward. I explain that technology and shifts in diet are primary factors. Nearly everyone is spending time glued to digital devices, which alters natural blinking. And our foods, many from animals fed with corn, are shifting the balance of fatty acids in the diet from Omega-3s, which are crucial building blocks for meibomian glands, to the less healthy Omega-6s.

Education-wise, a few key concepts need to be conveyed. First, why do we make tears? Except in the



case of reflex tears, which serve as a built-in emergency eye wash, the purpose of tears isn't to keep the eyes wet. It's to help us see clearly. Tears create a near perfect refractive surface. For all but a few patients, the problem isn't an inability to produce enough tears, it's that the tears they make don't work properly. I explain that the problem is with the basal tears (Figure 1). Basal tears are

constant and crucial and structural and functional. I use a house as an analogy to explain structure (Figure 2). The tear film has a foundation that allows it to defy gravity and remain adherent to the eye, it has a viscoelastic middle, and it has an outer layer, a "roof," which is where most of the problems occur. I always show them images of their meibomian glands and use images of non-invasive tear break-up time to explain the importance of tear stability.

Take-home materials are also useful for patients. All patients receive a treatment protocol sheet that lists the treatments I'm using, along with instructions for use and what's recommended for them. I also provide a sheet of blink exercises.

— DR. ART EPSTEIN

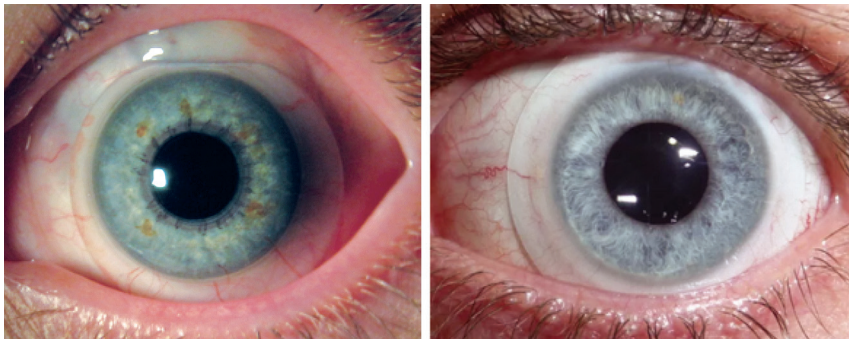


Figure 2. Today's scleral contact lens materials are highly biocompatible and comfortable for patients.

a pure and stable solution with a shelf life of 18 months.

From a patient management perspective, access to therapies is critical. HyClear is neither a prescription product nor an over-the-counter product that's available through mass merchandisers. It is a brand designed exclusively for eyecare providers to dispense from their practices. It's also easy for patients to use for daily dry eye management. They hold the bottle 6 to 8 inches from the face, close their eyes, and spray each one directly. They should then flutter the eyes to spread the product on the target area, which is the eyelids. I like the HyClear distribution model because I like to control the patient experience by having them walk out of their appointment with everything I want them to use. A 1- or 2-month supply of HyClear is very affordable for patients, and it provides a consistent revenue source for the practice.

Blink training

I recommend blink training for all of my patients. Donald Korb has developed a set of blink exercises, which I provide to patients as a handout. The

exercises are also available as an app from the Google Play Store and iTunes.

NOTABLE ADDITIONAL TREATMENT OPTIONS

A significant number of patients who have MGD will require clearance of their meibomian glands, lid debridement, or other treatments. This includes LipiFlow (Johnson & Johnson Vision), which



HyClear is designed exclusively for eyecare providers to dispense from their practices.

provides automated vectored thermal pulsation and expression, the new Tear Care MGD open-eye MGD treatment (Sight Sciences), and the Lumenis M22 IPL for patients with MGD associated with ocular rosacea. I use a variety of other approaches in more severe disease. For example, patients with severely compromised ocular surfaces due to autoimmune disease or severe corneal involvement often

benefit from bandage contact lens use. I assess the risk versus benefit for each patient and inform them of the potential risk of infection and other complications. However, I've been using bandage contact lenses for years in this scenario without encountering an unsolvable problem. They can be a powerful tool for managing some of these patients

until their prognosis improves.

Scleral contact lenses can be important in hard-to-manage cases. They are the most reassuring option for me, knowing I have something left to offer a patient when all other options have been exhausted. Scleral lenses provide an effective barrier separating the eye from the outside environment, protecting the ocular surface, and maintaining normal function and good vision in cases that might otherwise be unsalvageable. They're known to have a very low infection rate. The scleral lens materials in use today are advanced and very biocompatible and comfortable for patients. I have severe dry eye patients whose eyes look pristine while wearing scleral lenses, while otherwise their eyes would look and feel miserable.

PRACTICE MANAGEMENT IS IMPORTANT, TOO

To maximize efficiency and economics in the dry eye practice, schedule specialty services — such as scleral contact lens fitting, LipiFlow or Tear Care, intense pulsed light treatment, and amniotic membrane placement — separately from diagnostic workups. Bill services to insurers where appropriate and charge appropriately for services not covered by insurance. ●

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