Corneo-scleral topography allows for precise fitting

Elise Brisco OD, FAAO, FCOVD, CCH

Scleral contact lenses are a new mainstream specialty lens modality that is embraced by optometry to manage a variety of ocular conditions. Although they are primarily used to fit patients with corneal irregularity, especially keratoconus, they also can manage patients with ocular surface disease and high ametropia or astigmatism.

The vast majority of scleral lenses are fit using diagnostic lens fitting sets that are specific to a particular scleral lens design. Diagnostic lens fitting is a trial-and-error process that is inherently inefficient, making lens design more art than science. This is what makes the learning curve steep for the beginner but can challenge even experts with difficult cases. The solution to this cumbersome methodology is to image the anterior ocular surface first, then use measurements to design a custom scleral lens to fit an individual eye.

See Scleral lenses on page 18
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Chairman’s letter
THE YEAR OF OPTOMETRY IS FINALLY HERE
By Mike Hennessy, Sr

Yes, it’s the year 2020. This is the year that eye-care practitioners have been waiting for likely since their first year of optometry school. Although it’s only January, I hope you’re not already sick of comments about this momentous year and visual acuity. Stay tuned for more from us about the year of 2020.

Jump into our ocular surface disease section with a look at the importance of treating the surface before cataract surgery. Plus, Katherine Mastrota, OD, MS, FAAO, delves into the effects of overactive bladder therapy on dry eye. Finally, Ernie Bowling, OD, FAAO, kicks off an ocular surface disease series examining why ODs need to own dry eye for the benefit of their patients.

In this issue we also address cotton-wool spots, sickle-cell disease, new glaucoma treatments, and what’s new in managing macular and retinal disease.

Don’t overlook how technology expands ODs’ role in cataract surgery as well as how Elise Brisco, OD, FAAO, FCVO, CCH, uses precise measurements in scleral contact lens fitting.

Kick off 2020 with a walk through our first issue of the year. Thanks for reading.
Why practice owners should create a simple business budget

Michael A. Kling, OD, believes simple but effective budgeting is the foundation for a healthy practice, just as it is for any other profession. These are his top tips for ODs on how to budget effectively.

OptometryTimes.com/simplebusinessbudget

Treat dry eye disease first, address comfort next

Dry eye medications’ intended purpose, more than anything else, is to stabilize patients’ disease. So why are ODs worried about the amount of comfort that they bring patients when the number-one concern should be slowing or halting the progression of the disease? David Kading, OD, FAAO, FCOI, asks this question and more in a blog on dry eye treatment.

OptometryTimes.com/treatmentfirst
Sights are set on perfect vision in 2020

By Benjamin P. Casella, OD, FAAO

Chief Optometric Editor
Practices in Augusta, GA, with his father in his grandfather’s practice
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I used to show more patients the 20/15 line during a refraction. I’m not sure when I stopped doing that as much—or why. At any rate, most of my refractions stop at 20/20 these days. Every now and then, I get that guy who wants to see the 20/10 line to make sure he’s the finely tuned machine he claimed he was on his patient history form.

Maybe I’m just a little more tired. For example, I used to jump at the chance to correct patients who (for some reason in a rather braggadocious fashion) would tell me that they’re legally blind without their glasses. I also used to jump at the chance to correct people who were deadset on the notion that they were farsighted because they couldn’t see far away. Don’t even get me started with those patients who said they’ve never seen well since they had their eyes dilated 17 years ago. I suppose I’m not motivated to debate such points any more. However, in 2020, things are going to change.

Yes, this is that cute editorial that makes a pun with reference to the year 2020. You knew it was coming, didn’t you?

Why not push our patients to 20/15? It would probably take another 30 seconds (time which I can certainly find). People come to us because they want to see well, right? Few patients want to know why they added or gave up a 0.25 D of refractive error over the last year. They just want their best vision.

With respect to ocular disease, few glaucoma patients want to know how many microns of retinal nerve fiber they have left. They just want their best vision for as long as they shall live.

Let us not lose sight of the foundations from whence we came. Vision science is—and has traditionally been—a defining attribute of optometry which separates us and makes us exceptionally special to healthcare. Let us also not lose sight of the fact that optometry would have never come into existence without a product: glasses. So, in the year 2020—pun intended—I’m going to focus on vision as much as I do disease. These aspects of patient care should have never been separated in my mind to begin with, and I’m sorry that they are from time to time.

I’m going to use the year 2020 as a catalyst to push my patients to 20/15 and beyond. I likely need to set aside another minute or two per patient in order to reach this goal, and that is not a bad thing. Not a bad New Year’s resolution, I suppose. Since I’m not joining a gym, I should be able to carve out the time.
New guidelines in OSD evaluation before surgery

OSD evaluation remains imperative before cataract referral, even in asymptomatic patients

By Jill K. Showalter, OD

With all of the recent publications concerning dry eye disease, as well as updates on technology and pharmacologic agents to diagnose and treat it, many practitioners are tuning out of the conversation. Whether they are overwhelmed by the amount of information to decipher, tired of hearing about it, or think the condition is being overemphasized to create revenue for industry, many optometrists are not eager to hear more about dry eye disease.

With that being said, dry eye disease is still being undertreated by optometrists and ophthalmologists alike. One facet of the patient population that is particularly being underserved is those being referred or evaluated for cataract surgery.

Guidelines
Recent publications have underscored the importance of screening all patients for ocular surface disease prior to cataract surgery. The American Academy of Ophthalmology’s Dry Eye Syndrome Preferred Practice Pattern, published in 2018, recommends that “all patients undergoing cataract surgery should be evaluated and managed for dry eye preoperatively.”

In May 2019, the Journal of Cataract and Refractive Surgery published an article proposing new guidelines for how to pre-operatively evaluate and manage ocular surface disease (OSD). Christopher Starr, MD, and his colleagues on the American Society of Cataract and Refractive Surgery (ASCRS) Cornea Clinical Committee propose that it is imperative to fully evaluate the health of the ocular surface before considering cataract surgery in all patients, even those who are asymptomatic.

They outlined a clinical assessment algorithm to be sure that “visually significant” OSD is diagnosed and treated prior to surgery until it is well-controlled, or “non-visually significant.” In the article, the ASCRS claims that “by treating OSD preoperatively, postoperative visual outcomes and patient satisfaction can be significantly improved.”

Undiagnosed dry eye
Although experts agree that controlling dry eye pre-operatively is a must, it has previously been reported in literature that dry eye disease is often left undiagnosed prior to cataract surgery.

In a 2018 prospective study, Gupta et al found that 50 percent of asymptomatic patients evaluated for cataract surgery had an abnormal tear osmolarity or matrix metalloproteinase (MMP-9) levels, both positive indicators of OSD.

The Prospective Health Assessment of Cataract Patients’ Ocular Surface study (PHACO), published in 2017, concluded that 15 to 20 percent of patients evaluated for surgery would have remained undiagnosed if they had not had a full ocular surface evaluation. Furthermore, they determined that it is necessary to perform multiple tests in order to identify OSD.

Cataract surgery and the ocular surface
But what is the harm to patients if they are not diagnosed and treated prior to cataract surgery? Can’t we just manage the side effects afterwards?

One important reason to treat prior to surgical evaluation is that unresolved dry eye disease results in poorer visual outcomes for patients. Precise preoperative measurement of the cornea is critical to minimizing refractive error postoperatively. The cornea is responsible for approximately 70 percent of the total refractive power of the eye, so accurately assessing its’ power is key to selecting the correct intraocular lens (IOL) power.
Chuang et al published a review of recent studies in the Journal of Cataract and Refractive Surgery in 2017. They concluded that “an impaired ocular surface affects preoperative planning for cataract surgery.” They proposed that unresolved dry eye reduces the repeatability of keratometry and topography measurements, thereby reducing the accuracy of IOL calculations. They conclude that diagnosing and treating dry eye prior to surgery will result in better visual outcomes for patients.

Gibbons et al completed a retrospective review of patient cases over a five-year time period to determine the causes of patient dissatisfaction with presbyopia-correcting IOLs. They published their results in Clinical Ophthalmology in 2016, concluding that the leading cause of patient dissatisfaction with cataract surgery due to preoperative causes was dry eye disease. They also found that 57 percent of patient dissatisfaction due to postoperative causes was due entirely or in part to uncorrected refractive error.

Another key reason to proactively identify and manage dry eye preoperatively is that cataract surgery has been shown to both cause and worsen dry eye disease. If eye care practitioners identify, treat, and educate these patients prior to surgery, the patients will understand that postoperative symptoms are due to their disease. If practitioners do not address dry eye preoperatively, the patient is much more likely to place the blame on us for their symptoms.

**Dry eye post surgery**

A recent study by Cetinkaya et al found that Ocular Surface Disease Index (OSDI) scores, fluorescein staining, and tear break up time (TBUT) all worsened in the month following cataract extraction.

In another study, Chuang et al found that 87 percent of dry eye patients became symptomatic after surgery, with half of these patients exhibiting corneal staining. Prospective studies found an increase in patient dry eye symptoms, a decrease in tear meniscus height and Schirmer’s test scores, an increase in patient dry eye symptoms, a decrease in tear film break-up time (TBUT), and a loss of clarity and MMP-9 testing to be extremely "essential data" in diagnosing ocular surface disease. However, if these tests aren’t available, you can still find many of these patients with a thorough inspection of the ocular surface. Look carefully at the lid margins for signs of meibomian gland dysfunction, such as telangiectasia, erythema, fine crusting of the lashes, or changes in lid morphology like notching or loss of lashes.

The ASCRS Guidelines recommended the use of a SPEED II Preop OSD Questionnaire, which was modified from the original SPEED specifically for use with preoperative patients.

Which method you use doesn’t matter as long as you utilize a thorough and uniform tool to elicit patient symptoms.

**Step 1**

The first step in identifying patients with ocular surface disease is asking the right questions. Dry eye patients often have been living with their symptoms for a long time and feel they are “normal.” They often do not report symptoms without prompting, so having a standard patient questionnaire is critical in finding these patients.

There are many options to assess patient symptomology, including Ocular Surface Disease Index (OSDI), Standard Patient Evaluation of Dryness (SPEED), and even the less complex Dry Eye Summit 2014 questions (see box). The ASCRS Preoperative OSD Algorithm recommends that an OSD Screening include three elements:

- Patient questionnaire
- Tear film osmolarity
- Testing for inflammatory markers (MMP-9)

**Step 2**

The second step is to make sure you are looking for signs of ocular disease with the slit lamp. The ASCRS algorithm considers tear film osmolarity and MMP-9 testing to be extremely “essential data” in diagnosing ocular surface disease. However, if these tests aren’t available, you can still find many of these patients with a thorough inspection of the ocular surface. Look carefully at the lid margins for signs of meibomian gland dysfunction, such as telangiectasia, erythema, fine crusting of the lashes, or changes in lid morphology like notching or loss of lashes.

- Use of povidine-iodine solution for sterilization
- Prolonged exposure of the ocular surface to a microscope light during surgery
- Damage to corneal nerves caused by incision
- Aggressive irrigation of the eye during surgery

Press on the lid margin with your finger tip, a cotton swab, or a tool such as a Korb evaluator (Tear Science/Johnson & Johnson Vision) to assess gland function and the quality of the meibum. Observe the quality of the tears, especially looking for foamy tear meniscus, a sign of MGD.

Finally, use fluorescein to look for staining of the cornea and/or conjunctiva. Also, evaluate the tear meniscus height to look for aqueous deficient dry eye disease. The ASCRS developed a helpful mnemonic for clinicians evaluating cataract patients preoperatively: “Look, Lift, Pull, and Push” (see box).

Do not refer the patient for cataract evaluation until the corneal surface is healthy and the patient is comfortable.

Treat the patient prior to referral if:

- There is any ocular surface damage (staining)
- The patient has dry eye affecting the quality of vision (e.g. has to blink to see clearly)
- The patient has significant symptoms (SPEED >8)

The ASCRS committee considers OSD to be “non-visually significant” once the cornea is smooth and free of staining or irregular astigmatism and the patient’s vision no longer fluctuates.

Once you feel certain the patient’s dry eye is “non-visually significant,” it is important to educate the patient prior to referral. Advise her that her dry eye is likely to worsen after surgery, but that you will help her to manage it so she remains comfortable throughout the postoperative period.

**Case report**

A 58-year-old white female presented with complaints of blurred vision and her eyes being dry, red
A study conducted by CooperVision and burning, especially after prolonged video display or monitor use. Pertinent exam findings were:

- Best-corrected visual acuity 20/60 OD and OS
- 2+ nuclear sclerotic cataracts
- 1+ superficial punctate keratitis OU
- Inferiorly
- Tear film break-up time 3 to 4 seconds

She was started on an initial therapy of Retaine MDG Q1-2H, warm compresses, and blink exercises (frequent breaks with intentional, firm blinking), especially while using the video display terminal and was scheduled for a full dry eye evaluation. This evaluation yielded the following results:

- SPEED 15/28
- Tear osmolarity normal (293 OD and OS)
- MMP-9 positive
- Tear film break-up time 2 to 3 seconds
- 2+ superficial punctate keratitis
- Cloudy meibum

The patient was prescribed Xiidra (lifitegrast, Novartis) bid and 2,000 mg omega-supplement daily. At her follow-up visit in six weeks, the patient’s symptoms had improved (SPEED 4/28), but she still had 2+ superficial punctate keratitis and reduced tear film break-up time, with a positive Inflamm-Dry test (Quidel).

The patient was eager to resolve her dry eye quickly so she could have the cataracts removed, so it was decided to place a Prokera Slim (BioTissue) amniotic membrane graft to promote corneal healing. The Prokera was placed in one eye at a time for three to four days each.

At the final visit to remove the Prokera, her superficial punctate keratitis was resolved entirely in both eyes and her best-corrected visual acuity had improved to 20/40 OD and 20/50 OS. The patient was referred for cataract evaluation. Post-operatively, she achieved OD 20/20 and OS 20/25+ unaided visual acuity, was satisfied with the results and had no complaints of ocular discomfort.

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CooperVision studies reasons for contact lens dropout among new wearers

San Ramon, CA—A study conducted by CooperVision identifies why some patients drop out of contact lens wear. The company partnered with eye care professionals (ECPs) around the world to deliver product, services and consumer viewpoints to advance clinical successes and practices’ business outcomes.

The research garnered from their latest Consumer Insights Series was conducted among more than 1,000 adults in the U.S. and Germany wearing lenses between two to 12 months.

Among the observations found was a boost in wearer dedication to contact lenses after they’d worn them for six months or longer. Of respondents who’d been wearing their contacts for three to six months, 31 percent said they’d likely stop wearing them within six months. That figure drops to 19 percent and 18 percent among individuals who began wearing their contacts nine and 12 months ago, respectively. Moreover, dual contact lens wearers and spectacle wearers were four times more likely to continue using lenses in the next six months versus contact-only wearers.

Problems and benefits

Another area of contact lens wear that was studied was concerns of new wearers. The top obstacles that were identified were insertion and removal handling as well as comfort. In a nod to the unceasing advancements of products and education, 75 percent of new wearers reported no problems with these elements at all.

In one implausible finding, wearers who reported a belief that they’d continue lens wear after six months indicated a higher degree of concern with handling and comfort compared to those who reported they’d likely drop out of wear.

Unsurprisingly, loyal wearers came in at least 10 percentage points higher on benefits they had already experienced from contact lens wear versus non-loyal wearers. Some of the benefits loyal wearers reported experiencing included feeling confident in their appearance, ability to play sports or take part in physical activities without worry, convenience and wearing sunglasses of their choosing.

Health, hydration and technologies

Participants reported health and hydration as most important when asked about their interest in new or existing contact lens technologies. More specifically, they ranked a technology that is healthier for the eye, like one that allows more oxygen into the cornea, as number one with 32 percent of adults while lenses that improve hydration as second most important with 29 percent of adults.

Similarly, about one in four participants conveyed interest in currently available technologies like multifocal contact lenses, UV protection, and assistance for tired eyes caused by digital device use.
Overactive bladder treatment affects dry eye

Discontinuation of OAB medication dramatically improved the signs and symptoms of dry eye in a 65-year-old patient

By Katherine M. Mastrota, MS, OD, FAAO

One of my most gratifying dry eye cases was that of a 65-year-old hospice nurse who suffered from debilitating dry eye symptoms. My patient had seen two or three doctors prior to myself, one a corneal specialist at top New York City hospital. She had tried the usual palliative therapies, punctal plugs, and cyclosporine therapy. She had given up on her contact lenses.

She did admit to working long hours, drinking little water (so she could avoid running to void frequently during working hours) and lots of coffee to keep her alert in the evening hours of her demanding shift.

She also was taking oral medication to temper her over-active bladder (OAB). Discontinuation of the OAB medication dramatically improved the signs and symptoms of dry eye in my nurse-patient.

What is overactive bladder?

Overactive bladder (OAB) is a prevalent condition in both men and women. It may have a significant impact on overall quality of life, sexual function, sleep, and mental health. OAB consists of urinary urgency with or without urge incontinence, often accompanied by frequency and nocturia (nighttime urination).1

Every time I examine a woman, I think of my patient and her OAB. However, OAB is common in both men and women with equal prevalence.

The coexistence of benign prostatic hyperplasia (BPH) with OAB can worsen quality of life, sexual function, sleep, and mental health. OAB consists of urinary urgency with or without urge incontinence, often accompanied by frequency and nocturia (nighttime urination).1

By Katherine M. Mastrota, MS, OD, FAAO

Director of Optometry, New York Trades Council, Hotel Association of New York City, Health Center, Inc.

KATHERINE M. MASTROTA, MS, OD, FAAO

Treatment and dry eye

Anticholinergic drugs that slow the bladder’s contractions, such as oxybutynin, are the mainstays of therapy for OAB. In men, it may be used in combination with BPH medication.

Anticholinergic drugs, however, are notorious for the side effect of provoking eye dryness. Male dry eye patients, especially those with BPH, should be queried regarding their use.

Lifestyle changes can reduce the need to therapeutically manage OAB.2 These changes include reducing fluid intake, especially alcohol and caffeine; avoiding medications that stimulate muscles in the bladder neck and prostate such as pseudoephedrine and other decongestants; and reducing or changing diuretic medication use for treating high blood pressure.

Another strategy is timed urination (following a bathroom schedule instead of “urge”). Exercises to strengthen the pelvic floor (Kegel exercises) are also beneficial in controlling OAB symptoms. Biofeedback is another option.

Botox (onabotulinumtoxin A, Allergan) bladder treatments are another alternative to control OAB symptoms. Botox works for the bladder by relaxing the muscle of the bladder wall to reduce urinary urgency and incontinence: it can help the bladder muscles from squeezing too much. The effects of Botox last up to six months.

Another potential treatment is neuromodulation therapy. This type of treatment sends electrical pulses to nerves that share the same path for the bladder. In OAB, the nerve signals between your bladder and brain do not communicate correctly. These electrical pulses help the brain and the nerves to the bladder communicate so the bladder can function properly and improve OAB symptoms.

Look for other solutions

Remember to carefully consider the dry eye patient’s medical history and medication list. Be equipped with suggestions or alternatives to modify those pathologies that prompt other colleagues to prescribe medications that thwart our best dry eye therapies.

Empower your patient to have important conversations and be involved in decision-making with every member of their healthcare teams to limit or avoid oral therapies that impact the ocular surface system.

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Source: Michael Woo-Ming, MD, MPH, and Medscape
Ocular Surface Disease

Remember the basics as dry eye treatments expand

Because of its prevalence, it’s more important than ever that ODs are well versed in DED

By Ernie Bowling, OD, FAAO

Dry eye is a topic eliciting much discussion among our colleagues. Many of us dive headlong into the topic. There has been an explosion of information about the condition in the last decade, every continuing education meeting has several presentations on the subject, and a cottage industry has sprung up concerning diagnosis and management of the disease. For good reason. What was once considered an afterthought in our practices has been shown to be ubiquitous and has become an inevitable public health problem.

Dry eye has a significant impact on quality of life due to chronic symptoms of ocular pain and discomfort in addition to functional vision impairment. Dry eye can impact functional vision, interfering with everyday activities such as driving, reading, computer usage, watching television, and work performance. Dry eye negatively impacts mental health as dry eye patients report higher rates of anxiety and depression.

Dry eye disease is among the most common ophthalmic conditions, affecting hundreds of millions of people worldwide. Dry eye affects five percent to 30 percent of the population 50 years and older, with women representing approximately two-thirds of those affected. The disease is increasing in younger patients.

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Dry eye has a significant impact on quality of life due to chronic symptoms of ocular pain and discomfort in addition to functional vision impairment. Dry eye can impact functional vision, interfering with everyday activities such as driving, reading, computer usage, watching television, and work performance. Dry eye negatively impacts mental health as dry eye patients report higher rates of anxiety and depression.

Dry eye disease is among the most common reasons for visiting eye care practitioners and represents a substantial health and cost burden. Financially, dry eye is estimated to cost $3.84 billion per year to the healthcare system with an average annual cost of $783 per patient for treatment.

Where to start

So, it is obvious that a lot of patients are suffering with dry eye. Dry eye is everywhere, going undiagnosed/undiagnosed/untreated, and our patients need our help. It is in our patients’ best interests to properly recognize and treat the condition.

Still, with the abundance of information available, it is easy for one to be overwhelmed with the data available. Where to start? How do I start? Do I really need all the bells and whistles available in the marketplace to properly diagnose and treat dry eye?

More to come

Which is where this project comes in. Over the course of this coming year, we will explore developing a dry eye subspecialty within optometric practices.

We will cover the nuts and bolts of starting a dry eye clinic, using the knowledge from experienced practitioners who have done just that in their practices. We aim to provide information on where to start, how to start, and some of the pitfalls and missteps along the way so you can avoid those stumbles.

Dry eye is a great practice builder. It is an excellent entry point into medical optometric care. You can spend as much or as little as you like, based on your budget and desire, to develop your dry eye practice.

Even more importantly, you’ll be providing a much-needed service to the scores of patients in your practice who are suffering from dry eye overtly or in silence. Your patients will thank you for recognizing their problem and addressing their needs.

And who knows? You may have fun along the journey.

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Take-home message

ODs around the globe are expanding their views of Dry Eye Disease (DED) and the scores of underlying etiologies to keep up with increasing patient demand for treatment. As industry pours resources into clinical research, it’s easy to lose focus of the key characteristics of DED. Most dry eye patients are undiagnosed, the disease is increasing in younger patients, women represent two thirds of those affected and up to 30 percent of the world population suffers.
5 exam findings that should spur a neuro referral

Continued from page 1

mated 7.4 million adults are stroke survivors; this accounts for 3 percent of the United States population.

Optometrists are in an ideal position to provide both primary care and neuro rehabilitation for A/TBI patients. As a primary care optometrist, following are five key exam findings which indicate a patient would benefit from referral to a neuro-optometrist who has expertise in the assessment and treatment of visual disturbances associated with damage to the central nervous system.

Injury in their histories

Patients with a history of brain injury commonly experience specific visual and visual processing symptoms that persist indefinitely if untreated. Table 1 summarizes the findings from Cuiffreda et al regarding common visual symptoms.1,4

Most common visual effects of CVA are loss of central vision, loss of visual field, visual processing disorders including spatial neglect, and eye movement disorders.2

Traumatic brain injury most commonly leads to symptoms such as blurry vision, light or glare sensitivity, and double vision.

A convenient way to establish the level of functional impairment due to visual consequences of brain injury is to use a symptom survey. The Brain Injury Vison Symptom Survey (BVISS) was validated for a brain injury population and pertains to both acquired and traumatic causes of brain injury. The survey can be accessed via the Neuro-Optometric Rehabilitation Association (NORA) website.6,7

A score of 31 or higher on the 28-item survey is predictive for functional impairment from brain injury. A patient with a high score on this symptom survey would benefit from additional evaluation by a neuro-optometrist.

Visual complaints

Blurred vision is common complaint. Near vision blur affects 40 percent of CVA and 43.8 percent of TBI cases. Distance blur affects at least 31 percent of CVA cases.

Patients who have experienced A/TBI are often more sensitive to small changes in the spectacle prescription and can be very sensitive to the distortion induced by progressive addition lenses. In A/TBI patients, sometimes blur is associated with non-refractive sources, such as:

- Dry eye
- Accommodative dysfunction
- Spatial distortion
- Small misalignment of eyes
- Photosensitivity and glare

If your patient has no change in the refractive findings compared to habitual but still complains of blur, a neuro-optometrist can evaluate the need for adds, prism, tints, and/or occlusion.

Something missing

Visual field defects are commonly found in the initial assessment of A/TBI patients. Stroke yields a more defined scotoma while trauma, anoxia, and other diffuse injuries yield generalized visual field defects. Visual field assessment is dependent on attention, and A/TBI patients can experience a range of visual attention challenges. Selective visual attention, unilateral spatial inattention, and hemispatial neglect have various effects on the visual field presentation.

In the first six months of recovery, patients may note significant changes in the visual field which can be attributed to clearing of the damaged components along the pathway as well as improvements in visual attention and spatial awareness. The visual field presentation typically stabilizes around 12 months post-injury.

If you are evaluating a patient within the first year of recovery from A/TBI, a neuro-optometrist may be able to enhance the visual field recovery through therapy. If your patient demonstrates poor visual attention throughout your exam, neuro-optometric intervention can improve the visual attention to allow a true assessment of the visual field. Persistent visual field defects often require adaptations to work around; a neuro-optometrist can provide therapy to speed up the adaptation period.

Movement challenges

Eye movements involve the coordination of several reflexes and pathways and are dependent on attention. Post-brain injury, patients can experience pain or discomfort with eye movements, gaze restriction, and/or a sense of disorientation, dizziness or unease when moving their eyes. Assessing the quality of your patient’s eye movements can be as simple as direct observation. Use of a standardized grading scale applies quantitatively; injury, unilateral spatial inattention, and hemispatial neglect have various effects on the visual field presentation.

In the first six months of recovery, patients may note significant changes in the visual field which can be attributed to clearing of the damaged components along the pathway as well as improvements in visual attention and spatial awareness. The visual field presentation typically stabilizes around 12 months post-injury.

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**TABLE 1** Common symptoms following brain injury

<table>
<thead>
<tr>
<th>TBI</th>
<th>CVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of balance</td>
<td>Loss of balance</td>
</tr>
<tr>
<td>(58.1%)</td>
<td>(55%)</td>
</tr>
<tr>
<td>Dizziness (66.3%)</td>
<td>Dizziness (31.7%)</td>
</tr>
<tr>
<td>Vertigo (28.1%)</td>
<td>Vertigo (15%)</td>
</tr>
<tr>
<td>Motion sickness</td>
<td>Motion sickness</td>
</tr>
<tr>
<td>(7.5%)</td>
<td>(1.7%)</td>
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<tr>
<td>Eyestrain with</td>
<td>Eyestrain with</td>
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<tr>
<td>near vision tasks</td>
<td>near vision tasks</td>
</tr>
<tr>
<td>(51.9%)</td>
<td>(38.3%)</td>
</tr>
<tr>
<td>Near vision blur</td>
<td>Near vision blur</td>
</tr>
<tr>
<td>(43.6%)</td>
<td>(40%)</td>
</tr>
<tr>
<td>Headaches with</td>
<td>Headaches with</td>
</tr>
<tr>
<td>near vision tasks</td>
<td>near vision tasks</td>
</tr>
<tr>
<td>(44.4%)</td>
<td>(33.3%)</td>
</tr>
<tr>
<td>Increased light sensitivity (49.4%)</td>
<td>Distance vision blur (31.7%)</td>
</tr>
</tbody>
</table>

**TABLE 2** Quantifying observation of oculomotor performance

<table>
<thead>
<tr>
<th></th>
<th>NSUOCO</th>
<th>SCCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient position</td>
<td>Standing</td>
<td>Seated</td>
</tr>
<tr>
<td>Scale</td>
<td>1 to 5, 5 is perfect score</td>
<td>1* to 4*; 4* is perfect score</td>
</tr>
<tr>
<td>Scoring</td>
<td>Each category receives a score:</td>
<td>Overall performance score given</td>
</tr>
<tr>
<td></td>
<td>accuracy, ability, head movement,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>body movement</td>
<td></td>
</tr>
<tr>
<td>Failure</td>
<td>Ability, head movement, body movement: Less than 5</td>
<td>Less than 2*</td>
</tr>
<tr>
<td>Notable Observations: Smooth Pursuit</td>
<td>Loss of fixation, ability to re-engage target, excessive facial/head/body movement, midline crossing</td>
<td></td>
</tr>
<tr>
<td>Notable Observations: Saccade</td>
<td>Hypermetric (overshoot) vs. hypometric (undershoot), anticipatory movement versus slow response, excessive facial/head/body movement</td>
<td></td>
</tr>
</tbody>
</table>

See Neuro on page 12
Neuro referral
Continued from page 11

Cutting corners before cutting corneas?

If you haven’t been testing for MMP-9 you might be.

If elevated MMP-9, a key inflammatory biomarker for dry eye, is tested for and detected prior to surgery, you have an opportunity to customize your treatment plan which may improve post-surgical outcomes and reduce complications.

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AND AN ESTIMATED 7.4 MILLION ADULTS ARE STROKE SURVIVORS; THIS ACCOUNTS FOR 3% OF THE UNITED STATES POPULATION

Dr. Zare-Urankar works with students in the vision therapy, pediatrics, and adult primary care clinics. Her interests include visual development, neuro-rehabilitation, and neurological disorders. Dr. Zare also serves as chair of the poster committee of the Neuro-Optometric Rehabilitation Association.
Unlock the potential of refractive surgery

Modern refractive surgery offers additional approaches for collaborative patient care

By Greg Hill and Marek Biernaciński

Given that 88 percent of annual eye exams are conducted by optometrists, it might seem strange that merely 20 percent of LASIK cases are referred to ophthalmologists by ODs. What’s the disconnect?

Kyle Sandberg, OD, FAAO; Bobby Saenz, OD, MS, FAAO; and Michael Shumski, MD, sought to answer this question by providing an overview of the spectrum of modern refractive surgery at the American Academy of Optometry 2019 meeting in Orlando.

Refractive treatment options

Among the treatment options for refractive surgery, laser-assisted in situ keratomileusis (LASIK), photorefractive keratotomy (PRK), and the more recent small incision lenticule extraction (SMILE) techniques are the most common.

Modern laser technology for use in these approaches is improving, offering more accurate results and better outcomes for patients. It is easier than ever for surgeons to create corneal flaps at the proper depth, improve refractive outcomes, and reduce side effects during procedures. For example, the blackouts experienced by some patients during flap creation can be addressed with newer laser platforms.

With VisuMax Femtosecond Laser (Zeiss), it’s down to zero,” Dr. Shumski says.

These advances apply to PRK as well with new protocols to prevent corneal haze and better bandage contact lenses that accelerate epithelial healing.

Phakic implants

For patients who don’t fit the criteria for more traditional refractive therapies, phakic implants such as Visian Implantable Collamer Lens (ICL, Staar Surgical) and Verisyse (AMO) offer a new fresh approach.

New options on the market, such as toric ICLs, were approved to treat myopic reduction up to 20.00 D, and they are changing the way we deliver refractive care. Just like with LASIK, patients receiving phakic implants must undergo a pre-surgical evaluation to determine whether they will be successful. But ODs using these newer implants will need to make sure they’re evaluating the right criteria.

In particular, temporary intraocular pressure (IOP) spikes are a concern for ICLs. As such, the vault measurement is crucial to monitor.

“Troubleshooting early on with IOP is really important for grading the vault,” Dr. Saenz says.

Presbyopia management

For concerns like presbyopia, ODs may need to take a blended approach to refractive care.

“You can do blended vision with any of the laser vision correction procedures or even ICL,” Dr. Saenz says.

Blended options for presbyopia management include the following approaches:
- LASIK, PRK, ICL, SMILE
- Corneal inlays
- Refractive lens exchange

ODs should also consider the presbyopic IOLs on the market, including monovision, accommodating, trifocal, and extended depth of focus lenses.

Screening and expectations

Particularly for patients with more complex vision needs like presbyopia, it is crucial for ODs to screen refractive surgery candidates carefully and establish clear expectations for outcomes from the beginning.

A good candidate for refractive surgery is someone who is low risk for complications.

The best way to make assessments and help patients understand what to expect from their treatments is to become familiar with available research and technologies.

Getting familiar with current research and the technologies available are the best way to make these assessments and help patients understand what to expect from their treatments.

“Patient-reported outcomes are critical,” Dr. Saenz says, especially in managing after-effects of refractive cataract surgery.

This is a key aspect of managing outcomes for patients undergoing refractive cataract surgery. ODs should make sure to understand their patients’ activities of daily living and what type of correction they’re used to.

Overall shift to collaborative care

Alongside the new refractive surgery options available to ODs is a change in attitude. Optometrists should avoid falling into a referral mindset in which patient care is managed by individual providers and instead embrace the concept of collaborative care.

Both optometrists and ophthalmologists have their own strengths and roles to play in patient care.

“Ophthalmologists want your help,” Dr. Shumski says.

From patient education to inter-office communication to follow-up evaluations, there is a lot that ODs can do to facilitate these collaborative relationships.

“Know who is in your area, know what they offer, and discuss those offers with them,” he says.

Greg Hill is a medical freelancer writer based in Atlanta.
Marek Biernaciński is a freelance writer based in Las Vegas.
Technology

SD-OCT shows schisis advancements due to sickle cell

By Benjamin P. Casella, OD, FAAO

Sickle cell disease is one of the most common genetic hemoglobinopathies in the United States, where it affects about 100,000 people. It is characterized by irregular and malfunctioning red blood cells which can cause anemia, vascular occlusion, and end-organ damage. The eye is both an end-organ and contains part of the central nervous system. Potentially serious complications from sickle cell disease in the eye include ischemic retinopathy and subsequent neovascularization which can lead to retinal detachment and vitreous hemorrhage.

An uncommon ophthalmic manifestation of this disease is retinoschisis, which is thought to be due to areas of relatively mild ischemia within the inner retina and subsequent intraretinal separation. Such a process may lead to glial proliferation and subsequent retinal traction, resulting in vision loss.

Case example

I have one patient whom I have been following as a suspect for primary open-angle glaucoma for about a decade who also has a diagnosis of sickle cell trait. Sickle cell trait means she inherited one copy of the normal hemoglobin (HbA) gene and one copy of the mutated hemoglobin (HbS) gene. This 65-year-old African-American female is originally from the Caribbean. Her medical history is remarkable for chronic back pain and systemic hypertension, for which she is currently medicated with oxycodone-acetaminophen and hydrochlorothiazide, respectively. She also daily takes a 1 mg folate acid supplement and a 50,000 unit vitamin D capsule.

Her family history is significant for cataracts, open-angle glaucoma, diabetes, and hypertension. She has an uncle with glaucoma and several siblings who reportedly do not have glaucoma.

The patient is a low hyperope with moderate astigmatism for which she wears spectacles. Best-correct visual acuity to date is 20/20 OD and 20/25 OS. She exhibits a mild degree of eccentric fixation OS.

Her anterior segments have always been unremarkable, and she has a mild amount of nuclear sclerosis and cortical spoking in each lens.

Back of the eye

I inherited this patient as a referral on the grounds of suspicion of glaucoma. Her initial presenting intraocular pressures (IOP) were 17 mm Hg OD and 18 mm Hg OS in the mid-morning. Those have been, to date, the highest IOPs I have measured, with IOPs typically running between 11 mm Hg and 15 mm Hg.

Since 2009, when I initially began seeing this patient, her optic nerves and retinal nerve fiber layers have not declined. Periodic visual field testing has also failed to show any frank glaucomatous defects. She has a central depression in her visual field OS which has been relatively stable.

Her SD-OCT study at this visit was more impressive than her previous studies with a high degree of inner retinal disorganization.

Her SD-OCT study periodically from 2009 to 2019. Note the advance in the schisis cavity in her inner retina from 2013 to 2017 with the appearance of a vitreomacular adhesion in 2019. Also note that her outer retina has remained intact.

TAKE-HOME MESSAGE

Sickle cell disease can make diagnosing open-angle glaucoma tricky for optometrists when retinoschisis, a rare complication of sickle cell trait, manifests. Retinoschisis is a splitting of the retina’s neurosensory layers and is thought to be due to areas of relatively mild ischemia within the inner retina and subsequent intraretinal separation. In this patient’s case, Latanoprost was the only plausible explanation of the cystoid macular edema.

Figure 1.

Her SD-OCT study at this visit was more impressive than her previous studies with a high degree of inner retinal disorganization.

Since 2009, when I initially began seeing this patient, her optic nerves and retinal nerve fiber layers have not declined. Periodic visual field testing has also failed to show any frank glaucomatous defects. She has a central depression in her visual field OS which has been relatively stable.

Her optic nerves are of average size with vertical cup-to-disc ratios of approximately 0.5. Her central corneas are of average thickness with values of 557 µm and 566 µm for the OD and OS, respectively. Her angles are open to ciliary body with flat approaches and mild to moderate pigment for all quadrants of each eye.

I last saw this patient in October 2019, and, to date, she has not converted to glaucoma.
When I first examined her in 2009, her entering visual acuities with her habitual spectacle correction were 20/25 in each eye. I documented her optic nerves with fundus photography and invited her back for ancillary glaucoma testing.

It was on spectral domain optical coherence tomography (SD-OCT) testing that I noted a mildly disorganized inner retina on the temporal aspect of her left macula (Figure 1).

**Follow-up**

I did not yet have SD-OCT software which included quantification of the ganglion cell complex, but I was performing macular scans on all glaucoma patients and glaucoma suspects with the notion that when I attained the software, it would be retroactive.

I advised that she check her vision in each eye independently every day and call me as soon as possible should any visual distortions occur.

I followed up with her every six months or so until 2013, when an unfortunate family event kept her away from receiving health care for several years.

When this patient presented again for follow-up care in 2017, her visual acuity was unchanged with entering corrected acuities of 20/25 in each eye. She had no complaints.

Her SD-OCT study at this visit was more impressive than her previous studies (Figure 1) with a high degree of inner retinal disorganization.

I obtained a consultation with a retina specialist in order to ensure that no treatment was necessary, and he referred her back to me for continued optic nerve monitoring; he sees her annually. Her last visit with him was June 2019.

Note that her SD-OCT study from 2019 shows an area of vitreomacular adhesion as well.

The retina specialist and I are in agreement that although schisis cavities are relatively rare complications of sickle cell trait, there is likely a connection between her left macula and her blood disorder.

**REFERENCES**


Cataract surgery problem solving: Is technology the answer?  

New techniques and technologies are expanding the optometrist’s role in cataract surgery

By Greg Hill and Marek Biernacinski

Cataract surgery may be common, but managing complications can be challenging for ODs. Each year, new and old technology is adopted and reimagined to explore the best surgical approaches to cataract surgery. The goal is to improve safety, speed and simplicity to make it safer, faster, and easier.

This year has been no different, and Clark Chang, OD, MSA, MSc, FAAO; and Jim Owen, OD, MBA, FAAO, explored some of the complications and solutions during their lecture on the subject at Las Vegas’s Vision West Expo 2019.

Advantages of laser-assisted cataract removal

Although both femtosecond lasers and manual cataract removal each have advantages, Dr. Owen says that the two have noteworthy distinctions.

“Cataract surgery is five steps, the laser can be three,” Dr. Owen says.

The primary advantage of the femtosecond laser is precision. When compared to manual surgical methods, the femtosecond laser may offer better wound closure and less endophthalmitis, he says.

“If you can get better closure and better sealing, you get less endophthalmitis.”

This supports the optometrist’s goal of minimizing pro-inflammatory mediators during any type of refractive surgery, Dr. Chang says.

“That is going to eventually lead to quicker recovery for our patients,” he says.

Reduce operative complications

The femtosecond laser also offers advantages for managing capsulorhexis—a key challenge in cataract management.

“Believe it or not, capsulorhexis always has been touted as the hardest step in cataract extraction,” Dr. Owen says.

Dr. Chang described the reasons why a well-performed capsulorhexis can be crucial to good cataract surgery outcome. In addition to lens capsule being very thin, not knowing the level of adherence between cortex and capsule also make it challenging to obtain a well circumscribed and tear-free capsulorhexis. Once you have capsular tear that may extend to the posterior capsule, the risks of vitreous loss and even endophthalmitis significantly increases.

The laser-assisted cataract procedure subverts many of these challenges.

“The femtosecond laser gets a perfectly concentric circle, perfectly centered,” Dr. Owen says.

He also details new methodologies to come, such as the Zepto cataract capsulotomy system.

But optometrists are not limited to referring patients for one surgical methodology over the other, says Dr. Chang. Many surgical practices use a combination of technologies, such as femtosecond laser to assist in lens defragmentation in order to reduce the overall ultrasound energy during subsequent phacoemulsification. Less mechanical energy in the eye means less collateral tissue damage and lowered inflammatory induction; hence, quicker recovery and potentially better visual outcome.

“It doesn’t always have to be 100 percent femtosecond laser,” he says.

But, like any procedure, complication management starts at the beginning of the procedure. Dr. Owen cautions ODs to keep this in mind.

“Making sure lids and lashes are as clean as possible and as healthy as possible, pre-operatively, is important,” he says.

Setting patient expectations

There is a large, fast-growing market for cataract procedures. People are living longer and working longer careers, presenting changes in the way optometrists deliver cataract care.

“The patient is definitely different, so we have to approach it a little differently,” Dr. Owen says.

Chief among these developments changes is the way ODs manage patient care, from the earliest pre-operative appointments to post-surgical follow-ups. Primarily, Dr. Owen says that optometrists need to start prioritizing thinking of cataract management in terms of vision clarity.

“I think ODs being involved in the refractive portion of this is crucial for patient outcomes,” he says.

ODs need to walk patients through the process and make sure that patients’ expectations are clear from the beginning. Although the procedure is common and low risk, patients are often concerned about eye surgery. ODs will need to mitigate these concerns in the patient’s early consultations.

Overall, it’s important for the patient to have confidence in his OD as they neuroadapt during post-operative care.

“That’s probably the most important piece,” Dr. Owen says.

MacuLogix introduces AdaptDx Pro guided by Theia

HARRISBURG, PA—MacuLogix, Inc., launched its AdaptDx Pro guided by Theia.

The company introduced the tabletop original AdaptDx automated dark adaptometer in 2014 to identify and monitor age-related macular degeneration (AMD). AdaptDx Pro is a headset designed for patient comfort and includes all the functionality of original instrument.

AdaptDx Pro requires no dark room or external computer and features an artificial intelligence-driven onboard technician named Theia. After the in-office technician selects the testing protocol and places the device on the patient’s head, Theia takes over to facilitate a reliable, consistent testing experience by using automated instructions and adaptive feedback spoken directly to the patient.

According to the company, impaired dark adaptation is the earliest biomarker of AMD. Impaired dark adaptation as measured by the AdaptDx Pro is 90 percent specific and sensitive to AMD, says MacuLogix.

“Patients and staff love Theia. Her gentle coaching, combined with the well-designed, comfortable headset puts patients at ease and frees up technicians while testing takes place,” says MacuLogix’s clinical advisor Jeffry Gerson, OD, FAAO. “Ultimately, the AdaptDx Pro enables us to test more patients to find disease that we may have otherwise missed and start those patients on a treatment plan to slow disease progression.”
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Continued from page 1

**Topography**

Corneal topography instruments have been around for decades, and they have been successfully used to diagnose and monitor corneal disease. They are also used to fit corneal gas-permeable (GP) lenses.

Unfortunately, the keratometry readings from topography are not useful for scleral lens fitting because the vault of a scleral lens is fit based upon sagittal height. Additionally, placido-based corneal topographers are not able to measure out onto the conjunctival/scleral surface, which is necessary to accurately design the geometry of a scleral lens haptic.

**Profilometry**

The relatively recent development of the first corneo-scleral topographers—instruments that can measure both the cornea and scleral surfaces—is revolutionizing understanding of the shape of the anterior ocular surface and allowing eye care providers to custom design scleral lenses from measurement.

The sMap3D (Precision Ocular Metrology) corneo-scleral topographer is an instrument that uses triangulation and structured light to measure both the cornea and scleral surfaces, including extreme irregular surfaces that can’t be measured with reflected placido based corneal topographers. The measurements taken with sMap3D have been shown to be repeatable and are used to design Europa and Latitude (Visionary Optics) scleral contact lenses.

**Taking measurements**

The first step for measurement using sMap3D is to instill fluorescein, which is required for the straight gaze measurement to be used.

The three image sets are stitched together using proprietary software that can provide data to 22 mm in diameter 360°, ensuring the ability to fit large scleral lens diameters. A three-dimensional model is produced from the stitched image sets that is used for lens design (Figure 2).

A diagnostic scleral lens is placed on the eye for over-refraction and power determination.

At this stage, the practitioner can send measurements to the contact lens manufacturer for a consultant to design a Europa or Latitude scleral lens.

Europa scleral lens has pre-designed parameters that can be customized, including back surface haptic toricity and quadrant-specific or multi-meridian designs, depending on the scleral shape measured. Precision Lifts can be added to the lens haptic to accommodate pingeruclias or conjunctival blebs.

Latitude scleral lens is a free-form custom and contoured lens designed directly from measurement. The lens is ordered directly without the need to adjust the lens curves because there are no pre-designed parameters.

Custom and contoured lenses have been made for several years using application of dental molding materials to the eye (EyePrintPro). I have found the use of sMap3D and Latitude lenses to be easier and more affordable for the patient.

**Scleral shape**

Two recent papers by the Scleral Shape Study Group (SSSG) have studied scleral shape and their findings have a significant impact on modern scleral lens fitting.

The first of these papers looked at the qualitative assessment of scleral shape patterns for a group of 152 eyes of prospective scleral lens patients. The findings of this study determined that scleral shapes have the following patterns: 6 percent sphere, 26 percent toric, and 65 percent asymmetric.

The second paper looked at the correlation of the cornea and sclera for eyes with corneal ectasias. Findings show that eyes with ectasia have asymmetric scleral shapes.
SSSG papers show that the majority of eyes fit with scleral lenses require a scleral lens beyond a toric design for optimal fitting. The advantage of the sMap3D is that it is able to determine quantitative and qualitative scleral shape measurements and use them for individualized lens design.

Case examples

Case 1. A 58-year old female patient who had previously had radial keratotomy surgery reported for contact lens fitting OD after previously failing in specialty soft contact lenses. Her most recent glasses prescription was: +4.25 -1.50 x 090; 20/20.

sMap3D corneo-scleral topography revealed her right sclera to have against-the-rule sclera toricity (Figure 3). An additional key finding is that the scleral toricity was symmetric, and a standard back toric design would best fit her ocular surface. A 16.5 mm Europa scleral lens was ordered with 241 µm of haptic back surface toricity.

Her visual acuity with the scleral lens measured 20/20. The lens demonstrated adequate central corneal clearance and even haptic alignment with no blanching of her bulbar conjunctiva. Topography showed the need for back surface haptic toricity and provided the exact micron amount that would fit the surface of her eye.

Case 2. A 47-year-old female patient had laser-assisted in situ keratomileusis (LASIK) surgery that resulted in corneal irregularity and loss of best-corrected visual acuity with glasses. Refraction OD was +2.25 -2.75 x 165; 20/40. She was originally fit with a back toric scleral contact lens that improved her vision, but she failed due to discomfort.

The patient was measured with the sMap3D scleral topographer. The resultant model identified an asymmetric toric sclera shape with a 300-µm nasal elevation. She was refit with a Latitude scleral contact lens.

Lens customization to match the conjunctival scleral surface of this eye with significant asymmetry allowed the lens to fit with haptic alignment, demonstrating no compression or impingement (Figure 4).

The Latitude lens improved the patient’s vision to 20/25 and she was, for the first time, able to comfortably wear a scleral lens. It wasn’t possible to determine the best design for this patient until the shape of the sclera was known.

Case 3. A 55-year-old female patient reported for scleral lens fitting OS. She had a history of keratoconus, penetrating keratoplasty, aphakia, and tube shunt surgery for glaucoma. A sMap3D measurement showed 173 µm of scleral toricity. The scleral map additionally measured a 250-µm conjunctival elevation of the superior temporal quadrant secondary to the glaucoma surgery (Figure 5).

A 16-mm Europa scleral lens with back surface toricity and a 200-µm precision lift to vault the elevated conjunctiva was successfully fit. The lens haptic rested evenly on the sclera (Figure 6), allowing comfortable and successful wear, giving the patient 20/25 vision.

The back surface toricity was able to rotationally stabilize the lens so the precision lift was positioned correctly. The lens design was entirely determined using the topography measurement and fitting software.

Conclusion

The art form of diagnostic lens fitting may someday be obsolete. The future of scleral lens fitting is using metrology measurement for the design of customized scleral contact lenses. The sMap3D is leading the way and revolutionizing corneo-scleral measurement and scleral lens design. The advantage of the fitting customized scleral lenses from the sMap3D results in improved efficiency and success. Ultimately, this decreases chair time and increases profits.

REFERENCES:


Dr. Brisco is an integrative optometrist and certified clinical homeopath. She practices in a multi-disciplinary wellness group in Los Angeles. She is the founder of NearSight for which she holds a patent. Dr. Brisco is a fitness and sports enthusiast and loves spending time with her son and maltipoo. She is the chief medical advisor for Natural Ophthalmics.

*drbrisco@hollywoodvision.com*
A 57-year-old male patient with a 20+-year history of systemic hypertension and diabetes presented to the clinic for refractive care.

He was an insulin-dependent diabetic, but he was unsure of his hypertension medication. He reported that his blood sugar levels were between 140 and 200 but that his A1C was unknown.

**Case information**

Best-corrected visual acuity was 20/25 in each eye. He had normal extraocular muscle movements as well as full confrontation fields. The anterior segment examination was unremarkable and applanation tensions were 16 mm Hg in each eye.

The color fundus photograph (CFP) of the right eye is shown in Figure 1. There are a few notable features that include hemorrhages and microaneurysms, cotton-wool spots (CWS) as well as a distinct vascular irregularity superior temporal to the optic disc.

Assessment of the diabetic retinopathy was moderate to severe for this patient’s right eye. Alternatively, this would correspond to approximately Level 35 on the Diabetic Retinopathy Severity Scale algorithm.1

Cross-sectional optical coherence tomography (OCT) of the right eye demonstrates normal central macular thickness and contour (Figure 2). Topographic OCT demonstrated thickening of the macula and corroborated clinical evidence of the CWS within the RNFL profile (Figure 3).

The left eye had similar but more extensive diabetic retinopathy manifestations; however, that is not included in this report.

**Cotton-wool spots lead to tissue loss and RNFL defect**

RNFL defects are associated with glaucomatous optic neuropathy and secondary to optic disc drusen

**TAKE-HOME MESSAGE**

Damaged nerve fibers and accumulated acoplasmic material within the nerve fiber layer cause cotton wool spots, which appear as fluffy white patches on the retina. Optometrists should investigate any findings of a cotton wool spot as they are typically the earliest indicator of diabetic or hypertensive retinopathy.
Follow up
The patient was observed closely over the next four months, at which point he developed cen-
ter-involving macular edema of the left eye.
He was referred to a retina specialist who rec-
ommended treatment with anti-vascular endo-
theial growth factor (VEGF) injections that the
patient refused.
He was followed up in a further three months.
The CFP of the right eye from that visit appears
in Figure 4. Note that the area where the cot-
ton-wool spot had been now has a retinal nerve
fiber layer (RNFL) defect.

Discussion
Ischemia is the pathophysiology behind cot-
ton-wool spots. It is not unreasonable to expect
that a sequela may be tissue loss and consequent
RNFL defect. This has been documented subse-
quently from a case as part of the Beijing Eye
Study.\(^2\)

The appearance of a RNFL defect has been asso-
ciated classically with glaucomatous optic neu-
ropathy as well as secondary to optic disc drusen.
These well-known progenitors of RNFL defects
may have a similar ischemic etiology to the RNFL
defect, in this case. Clinicians should be aware of
this possible sequela from cotton-wool spots and
investigate every incidence.

REFERENCES
Macular diseases: emerging best practices for diagnosis, management and follow-up protocols

A modern approach to macular disease means previously untreated patients can be helped

By Greg Hill and Marek Biernacinski

Macular and retinal diseases are some of the most common eye conditions optometrists see, and each year advances in associated treatments allow ODs to expand the care they provide. Mohammad Rafieetary, OD, FAAO (moderator); Richard Hamilton, MD; and John Randolph, MD, (presenters) reviewed some of the latest advances in macular and retinal disease management during a lecture at the Retina Scientific Group (SIG) symposium at the American Academy of Optometry 2019 meeting in Orlando.

Inherited retinal diseases and etiologies

Treatment of macular and retinal diseases begins with understanding etiologies. Inherited macular dystrophies are a growing concern for optometrists because many are complex and can manifest symptoms outside of the retina itself.

"It isn’t just the retina; sometimes the vitreous, the retinal pigment epithelium, and the choroid present problems," Dr. Hamilton says.

For managing retinal conditions like inherited retinal disease or retinitis pigmentosa, optometrists need to be clear on which systemic manifestations indicate retinal concerns and which do not. Dr. Hamilton notes that systemic manifestations from infections can lead to a picture of retinitis pigmentosa, for instance.

"Two of the famous masquerade symptoms are syphilis and toxoplasmosis," he says.

But optometrists can rely on specific rules to make these decisions, depending on the condition. For example, Dr. Hamilton states that for retinitis pigmentosa, peripheral vision loss is a key concern.

"Most people with retinitis pigmentosa will manifest with some degree of peripheral vision loss," he says.

While older therapies are limited in what they can do, newer technologies address common challenges. The Angi II Retinal Prosthesis System (Second Sight), for example, sits on the surface of the retina and connects to computerized eyeglasses that allow interfacing between healthy inner retinal layers and patient vision.

Another new therapy is Luxurna (voretigene neparvovec-rzyl, Spark Therapeutics) gene therapy for retinitis pigmentosa. While this therapy works only on specific genes, it has the distinction of being the only approved gene therapy procedure in the United States.

Dystrophy conditions and warning signs

Optometrists are on the front lines for catching macular disease early, and they play an essential role in a patient’s long-term prognosis. But Dr. Randolph notes that there will be some cases that need referrals earlier than later.

"Know when to refer these patients," he says. Of the inherited macular dystrophies, Best Disease and Stargardt’s Disease are the most likely presentations ODs can expect to see.

Optometrists should look out for two things, according to Drs. Hamilton and Randolph.

"The first is progressive atrophy," Dr. Hamilton says. "The second thing that is more acute is choroidal neovascularization."

If patients with macular problems experience rapid vision loss, or the optometrist notices evidence of bleeding or hemorrhaging, patients should be referred to a specialist.

Another concern to watch for is lamellar macular holes. They can be tricky to spot because the stronger eye may compensate for the compromised vision of the weaker eye and the patient may have no idea that anything is happening. The longer these holes go untreated, the more likely they are to swell and create further complications.

"When you encounter these patients, the key thing is you want is to refer them quickly," Dr. Randolph says.

Central serous chorioretinopathy (CSCR)

CSCR is another commonly confused condition. "Classically, we’ve been taught to observe it," Dr. Randolph says, noting that the condition resolves itself in approximately 98 percent of cases.

For cases that do not resolve on their own, several pharmaceutical and laser-based treatments are available, including technology like MicroPulse Laser Therapy (Iridex), which allows providers to safely treat the central fovea.

Plaquenil screening

Optometrists should be aware of changes to Plaquenil (hydroxychloroquine sulfate, Sanofi-Aventis) toxicity screening. Eyecare practitioners have begun to understand that many patients have been overdosed with Plaquenil in the past, and now they require new guidelines on how to administer the drug. Dr. Randolph says.

"It’s a cumulative toxicity," he says. He suggests that optometrists stress this to patients: the longer the drug is taken, the higher the risk of toxicity.

In terms of evaluating candidates, optometrists must think beyond the 10-2 visual field and consider adding ocular coherence tomography (OCT) imaging, fundus autofluorescence, and possibly 30-2 or 24-2 visual field screening to better visualize the retinal pigment epithelium.

Dr. Randolph also recommends monitoring these patients over time and increasing appointment frequency as the patient continues to take the drug.

Overview of macular degeneration

Although presentations of age-related macular degeneration’s (AMD) vary, technology is improving and opening options to catching the disease early.

When evaluating dry macular degeneration, Dr. Randolph notes that drusen size is one of the most important factors.

"The bigger the drusen, the higher the likelihood it is going to cause trouble," he says.

In terms of evaluating the more dangerous wet macular degeneration, new technologies like the ForeseeHome AMD Monitoring Program (Notal Vision) can catch symptoms early—outpacing even the Amsler grid.

"This machine will pick up wet AMD far before the patient even notices any changes on the grid," Dr. Randolph says.

So while treatments and screening assessments for macular and retinal complications are improving, optometrists are still the first line of defense in catching emerging problems.

"If you are not sure, always refer," Dr. Randolph says.

Greg Hill is a medical freelance writer based in Atlanta. Marek Biernacinski is a freelance writer based in Las Vegas.
Go beyond fish oil with astaxanthin in krill oil

This carotenoid helps with dry eye, glaucoma, AMD, eye fatigue, and more

By Stuart Richer, OD, PhD

Astaxanthin is the oceanic carotenoid that makes flamingos pink and salmon red. Astaxanthin is found in krill, the small crustaceans eaten by Antarctic whales.

Krill oil (KO), a popular nutritional supplement, contains astaxanthin, lecithin, and marine omega-3 fatty acids. Similar to more widely studied fish oil, KO also contains the long-chain fatty acids docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). These “good” fats are essential for basic eye and brain function.

However, KO also contains the phospholipid phosphatidyl ethanolamine (lecithin). The phospholipid bound nature of fatty acids found in KO improves omega-3 fatty acid absorption and bioavailability. This type of natural oil that contains astaxanthin is useful in our modern environment of high fat diets and an aging population.1

Astaxanthin and the eye

At least 4 mg to 6 mg astaxanthin are important for eye health. This is the amount found in one and a half servings of Sockeye salmon or three servings of Coho salmon, the other prime sources of DHA and EPA. Fortunately for our natural resources, astaxanthin is now commercially prepared in abundance from the haematococcus pluvialis algae under controlled aquiculture conditions of light and temperature.

Astaxanthin has a chemical structure that fully spans cellular membranes with potent antioxidant and anti-inflammatory properties. By peroxyl scavenging measures, it is a far stronger antioxidant than zeaxanthin, canthaxanthin, lutein, B-carotene, and alpha-tocopherol. Astaxanthin crosses both the blood-retinal and blood-brain barriers. Astaxanthin is also an important component of mitochondrial membranes, improving cellular energetics in a variety of diseases.2 There are now more than 60 human clinical trials for a variety of health benefits, including the eye. Ranges of 4 to 12 mg doses have been used in research studies.

The millennial carotenoid

Research from Asia suggests that astaxanthin can reduce eye fatigue, alleviate eyestrain and assist eyes to resist and recover from screen time. It does this by improving accommodative speed, accommodative amplitude, near point of focus and depth perception.

One study showed a 21.7 percent increase in accommodation amplitude after only four weeks of astaxanthin ingestion (AstaReal) at 5 mg/day (p<0.01).2 Mechanistically, astaxanthin also promotes improved circulation and nourishment of anterior and posterior segment eye tissue, as well as improvement in mitochondrial function, while alleviating oxidative stress.

Specifically, astaxanthin increases ciliary muscle recovery and endurance, improves capillary blood flow and other rheology parameters, and inhibits inflammation via the NF-kB pathway.3 Millennials as well as older computer users often suffer from dry eye. One study showed that at 6 mg per day, in 22 patients ages ranging from 45 years to 65 years, those with dry eye disease experienced a 15 percent subjective improvement in lacrimation, a 19 percent improvement in redness and a 46 percent improvement in pain in 1 month.4 It appears this is accomplished in part by increasing aquaporin 5 (water transporter) expression that plays a role in tear production as well as saliva and pulmonary physiology.1,4

Protection against other conditions

In glaucoma, astaxanthin has been shown to localize to the ciliary body, increase antioxidant capacity of aqueous humor, reduce pro-inflammatory factors in the trabecular meshwork, and increase ocular blood flow, apparently without lowering IOP.5

In uveitis animal models (rats and mice), research has shown a reduction in the NF-kB mediated inflammatory response and reduced lipopolysaccharide-induced accumulation of protein, NO, TNF-α, and PGE2.6 Thus this marine carotenoid could play an important role in uveitis as well as glaucoma.

Cataract surgery is a common procedure in the U.S. Pre-operative patients taking 6 mg per day of astaxanthin exhibited significantly lower aqueous flare intensity three days after surgery compared to controls, suggesting reduced post-surgical inflammation (p<0.01).7 Finally, age-related macular degeneration pathophysiology results in reduced retinal pigment epithelium mitochondrial number and size, increased mitochondrial DNA lesions, and reduced mitochondrial DNA repair capacity.8,9

Plus, astaxanthin complements both lutein and zeaxanthin.1,10

For the pre-AMD patient, astaxanthin:

- Protects mitochondria from oxidative stress
- Reduces UVB-induced oxidative stress
- Promotes mitochondrial biogenesis
- Promotes higher mitochondrial energy output
- Promotes antioxidants from oxidation
- Promotes retinal blood flow
- Has anti-inflammatory properties (NFkB)

REFERENCES

New perspectives, technologies affect glaucoma therapy

Look beyond intraocular pressure for better diagnosis and treatment strategies

By Greg Hill and Marek Biernacinski

As eye care’s way of thinking about glaucoma is outdated? While each year brings with it the promise of new technology aimed at fighting the disease, perhaps the most promising future outlook comes from a new perspective.

John Berdahl, MD, and Justin Schweitzer, OD, FAAO, both of Sioux Falls, SD, shared this perspective while discussing glaucoma advancements during a presentation at Vision Expo West 2019 in Las Vegas.

A new perspective on glaucoma

The mechanisms behind glaucoma are not well understood. While glaucoma is often thought to be driven by intraocular pressure (IOP), Dr. Berdahl says it should actually be thought of as a two-pressure disease made up of IOP and intracranial pressure.

It is known that intraocular pressure affects the optic nerve head, but less understood is the role that cerebrospinal fluid plays in glaucoma progression. Dr. Berdahl says this variable is key. “The absolute pressure inside the eyeball doesn’t matter. It’s the pressure relative to the cerebrospinal fluid pressure that does,” he says.

The challenge of measuring glaucoma

The challenge with IOP is there is variability in it,” Dr. Schweitzer says.

It is difficult to get consistent IOP measurements. Because of this, ODs run the risk of missing things when basing decisions on IOP alone, Dr. Schweitzer says.

But given that IOP is the only modifiable risk factor, eyecare practitioners should investigate alternatives.

Dr. Schweitzer and Berdahl suggest ODs leverage corneal hysteresis data to support decisions. CH measures the eye’s ability to absorb force, Dr. Schweitzer says. Thus, a higher corneal hysteresis indicates better eye resilience or a optic nerve head that is a better “shock absorber,” lessening the likelihood of glaucoma progression.

“I look at this more as a risk profile parameter,” he says. “The data has shown that low corneal hysteresis is consistently and independently associated with progression, and now, even conversion in glaucoma.”

New technology, medical therapies

Apart from new perspectives on glaucoma, emerging treatment technology is around the corner.

Pharmaceuticals can help manage glaucoma, but patient adherence is a known barrier to long-term maintenance. According to a 2005 study by Nordstrom and his group, nearly 90 percent of patients were not adhering to the dosing regimen. Dr. Schweitzer says.

In response, researchers are looking at drug delivery methods that don’t rely on daily installation.

Allergan’s Bimatoprost SR, designed to be placed in the eye and deliver the drug continuously for six months, is one possible course.

“Long-term, it looks to be safe and effective,” Dr. Schweitzer says.

Other emerging options include travoprost-based intracocular implants and punctum plugs. Each option is designed to deliver regular doses without the need for patient intervention.

These medical advancements promise to help patients improve adherence to their programs, and help optometrists better understand the underlying mechanisms of the disease.

“If [eyecare practitioners] can get to a spot where we know what our target pressure is, and if we can get to a spot where we have therapy that doesn’t have meaningful side effects, and we can just dial that pressure in, we can treat glaucoma,” Dr. Berdahl says.

Updating testing methodologies

Optical coherence tomography (OCT) and visual field are primary ways to assess glaucoma, and Dr. Schweitzer says that advancements are here.

“The goal is diagnosing or identifying patients who are at a higher risk for glaucoma,” he says.

Among the advancements is the growing use of OCT angiography, offering trend analyses that can help optometrists track glaucoma progression.

Upgraded versions of visual field are here as well, including Swedish Interactive Threshold Algorithm (SITA) Faster—a test that is 30.4 percent faster than the SITA Fast standard, without any data loss.

“You’re getting the same amount of data as Fast, and it’s faster,” Dr. Schweitzer says.

Dr. Schweitzer also discusses a new type of objective visual field testing that measures both eyes simultaneously. This could be helpful for gathering data on patients who don’t tolerate normal visual fields, he says.

Another tool available to ODs is the Correcting Application Tonometry Surface (CATS). This tool measures IOP similar to Goldmann tonometry but with a concave prism approach, minimizing biomechanical properties of the cornea and tear film, resulting in more accurate results than Goldmann.

Dr. Berdahl and Schweitzer say.

As understanding of glaucoma continues to evolve, these new technologies will be crucial to improving patient outcomes. And as imaging modalities become more robust, eyecare practitioners will gain a better sense of what glaucoma is, says Dr. Berdahl.

These medical advancements promise to help patients improve adherence to their programs.

Take-home message

Advances in glaucoma diagnostics and management continue to evolve at a rapid pace. In order to continue to care for glaucoma patients at a high level it is imperative that innovation continues in the glaucoma space. Understanding the challenges in diagnostics and treatment, such as new perspectives and emerging technologies, is the first step in that direction. As understanding of glaucoma continues to evolve, these new technologies will be crucial to improving patient outcomes.

Reference

I didn’t realize STARS were little dots that twinkled

—Misty L, RPE65 gene therapy recipient

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I often recall fondly how one of my mentors, Mitch Dul, OD, FAAO, told me that patients can have “as many diseases as they please.” We know this to be the case because we see it every day. We go to continuing education conferences where we see nice tidy cases and think, “I got this! This is easy!” Then, we get back to the office on Monday morning and are inundated with a slew of patients with lurking variables in their eyes and visual systems.

Go beyond the optic nerve

I take comfort in the fact that I know I’m not alone, and a paper published in the *Korean Journal of Ophthalmology* in October 2019 does well to hammer home the fact that, with respect to glaucoma, clinicians must take into account the rest of the eye—and a paper published in the *Go beyond the optic nerve*.

This retrospective study consisted of a cohort of established glaucoma patients with newly diagnosed epiretinal membranes (ERM): 28 eyes of 28 patients (16 males, 12 females). Of this cohort, 22 patients had primary open-angle glaucoma, three had pseudoexfoliative glaucoma, two had uveitic glaucoma, and one had chronic angle-closure glaucoma. Ages ranged from 44 to 73 years with a mean age of 61 years.

Subjects had SD-OCT studies before and after the onset of ERMs. Humphrey visual fields had also been obtained prior to and after ERM onset. Axial length and central corneal thickness values were also taken into consideration, with a mean axial length of 23.5 mm and a mean central corneal thickness of 542.9 µm. Mean spherical equivalent refractive error was 1.40 D of myopia.

The onset of an ERM lead to a mean increase in the average RNFL thickness of 4 µm. The temporal RNFL sector (as one may expect) demonstrated the most significant increase (a mean of 14.4 µm). Such an expectation would be due to the location of the ERM, typically situated temporal to the optic nerve head. The central macular thickness values increased at an average of just over 33 µm after the onset of ERM as compared to before. There was a slight but significant decrease in mean deviation of just under 1 dB in the visual fields.

Study implications

The authors of this paper separate out three distinct and significant arenas for which this study has important implications.

The first aspect has to do with glaucoma diagnosis and its potential delay. The onset (or progression) of an ERM can confound RNFL analysis, as measured by SD-OCT technology, thus having the potential to lull the clinician into thinking that RNFL loss is not occurring and that glaucoma is not present (Figure 1). This may be especially important in early so-called “pre-perimetric” glaucoma in which a patient’s visual field is not yet affected enough to become manifest on a visual field study.

Secondly, detection of glaucoma progression, at least progression as measured by decrease in RNFL thickness, may be delayed as a progressive ERM begins to throw off SD-OCT results by masquerading as part of the RNFL. Progression means that anti-glaucoma therapy is not achieving its goal.

Lastly, if an ERM becomes significant, it can be surgically removed. In patients who have undergone a vitrectomy and membrane peel, their post-surgical inner retinas will have laid down as compared to their pre-surgical inner retinas. This surgical outcome may lead a clinician to think that the RNFL itself has decreased in thickness from the presence and progression of glaucoma.

ERM effect on diagnosis

This was a small study, and, being retrospective in nature, not all data was collected at set intervals. However, this study does well to point out the fact that ERM can affect the diagnosis of glaucoma and the monitoring for its progression in a clinically significant way.

SD-OCT technology is getting more similar to in vivo histology as the years ago on, but ODs cannot lose sight of the fact that we have to actually look at patients with our own eyes in order to have the full picture.

As I write this, my mind is drawn to other potential lurking variables with respect to glaucoma, such as endothelial corneal dystrophy affecting pachymetry and cataract or stroke affecting visual field assessment. As much evidence as we can gather is desirable in hopes of thwarting confounders and taking good, accurate care of our patients.

**TAKE-HOME MESSAGE** While glaucoma is often thought to be driven by intraocular pressure (IOP), it should actually be thought of as a two-pressure disease made up of IOP and intracranial pressure. Plus, new technologies are on the horizon.
Emilio Pucci debuts spring/summer 2020 eyewear collection

The new Emilio Pucci spring/summer 2020 eyewear collection stands out with its use of characteristic motifs and colors, reinterpreted in an innovative light. Contemporary shapes inspired by graphic flair, enameled milling, and metals paired with different colors and materials create a unique and sophisticated allure throughout the collection.

MODEL EP5134

This round, slightly cat-eye acetate shape stands out for the colorful flowers on the top portion of the frame front and on the temples.

MODEL EP5139

The softened cat-eye shape of this metal style features colored enamel accents on the front and on the temples, which are engraved with the brand’s logo.
FYSH unveils its 2020 sun collection

Bright colors, unique patterns, and innovative design elements define FYSH’s new sunwear collection for 2020. The collection includes a mix of the latest eyewear trends, incorporating acetates, metal detailing, and hues that reflect the Pantone trends for the season.

**STYLE F-2043**

sports a bold vintage look and features patterned Italian Mazzucchelli acetate rims, a dropped bridge, and thin metal temples. This style is available in brown stripe gold, ocean turquoise, and sunset gold.

**Style F-2044** combines metal with acetate to create a striking take on a modified square shape. Outlined by a thin metal rim, this style has a translucent Mazzucchelli patterned acetate and faux double bridge. Available in sapphire rose, brown aqua, and gray caramel.

**Style F-2046** is a retro-inspired square shape with a thin profile. This style stands out for its subtle two-tone translucent glitter acetate available in feminine hues of pecan shimmer, gray shimmer, and purple shimmer.

**Style F-2054** is a square shape in soft, feminine hues of translucent acetate and faux double bridge design. This style includes tinted lenses and is available in color combinations of rose, seafoam silver, and havana gold.
**InDispensable**

**Style F-2045** Classic aviator style gets a new take in these frames with translucent colorful acetate outlined by the metal rim in metallic hues. The tinted lenses add the finishing touch in color combinations of brown gold, seafoam gold, and blush rose gold.

**Style F-2049** takes a classic round shape and transforms it with winged corners to create a cat eye look. The subtle colorful glitter acetate extends along the outer edge and is outlined by the thin metal frame. This style is available in leopard gold, seafoam gold, and sand gold.

**Style F-2050** creates a retro Hollywood look. The marble-patterned acetate along the brows extends onto the outer rims and is outlined by a thin metal to accentuate the sharp corners. A faux double bridge design completes the look. This style is available in black gold, plum gold, and sand marble.

**Style F-2051** is a classic round in pink tortoise acetate rims finished with a subtle metal edging. Tinted monochromatic lenses add the finishing touch. Available in black gold, pink havana rose gold, and ivory gold.
Pam Satjawatcharaphong, OD, FAAO, FSLS  Assistant clinical professor at UC Berkeley School of Optometry  President of Scleral Lens Education Society

Scleral contact lenses, academia & mentoring students, sushi, skydiving

How did you benefit from a residency? The type of lenses we fit in residency you typically don’t get a whole lot of it in school. Doing a residency gives you the high volume of patients that are required to get very skilled at working with these lenses. My residency got me solidified in wanting to teach. I really liked teaching while I was in residency, and the opportunity came up to teach back at Berkeley. So that’s how I ended up here.

What three important principles do you follow when mentoring OD students? The chief mentor actually refers to the resident. But when I talk to students or residents, I really encourage them to be active learners, to not just go with the flow. I tell them, “If you go back and review what you have learned, it will stick with you longer than if you just go through the motions.” Part of it is also trying to be a good role model. I want to make sure that the way I communicate with patients, how they see me communicate, and give consultations to patients is something that they would want to bring into their own practice. Even if you are in a busy private practice, figuring out ways to really connect with those patients is important, and I hope they’re learning that.

What’s something your colleagues don’t know about you? I didn’t know what major or what profession I wanted. I leaned toward health care and after exploring the various types, I landed in optometry from our pre-optometry group on campus. I wanted to take a gap year before I made my final decision, much to my mother’s dismay. I arranged to go to Thailand, and I was going to work in eye hospitals as a volunteer. I got there thinking I am going to see optometrists and ophthalmologists. Optometry didn’t really exist in Thailand at the time. What I found were only ophthalmologists. These are government hospitals, and people were being bussed in from rural areas. Like, hundreds and hundreds of people taking the whole day off to be seen for 5 minutes. They are very quick exams, and patients are waiting all day. Doctors were doing anything from refraction to contact lens checks, but then they also did surgery. That made a big impression on me. I thought this could be so much more efficient if primary eye care was built into this medical model. That is what solidified my desire to join a primary eyecare field like optometry back here in the States.

What’s your guilty pleasure food? Sushi. I love Japanese food so much. I took a three and half week trip to Japan a couple of years ago and it was one of the most fun trips I’ve ever had. I like going to get nigiri, which is fish on rice prepared by the chef. They call it omakase style where it is the chef’s choice based on whatever is freshest or best to be served that day.

What do you love most about what you do? With specialty contact lenses, the most common condition is keratoconus. Those tend to be patients in their teens to twenties. Not having clear vision at that age can really impact them. Being able to put lenses on in office and all of a sudden they get to see what they haven’t seen in a long time is really rewarding. I had a young lady come in; she had never worn contact lenses before, her mom has keratoconus and she has it as well. It was a challenge to get lenses on her. But once we got them on, she was like, “Oh my gosh, Mom, I can see your face again.” I know that sounds a little cheesy, but it really made my day.

Where do you see yourself in 10 years? Oh, I’ll still be at the school. [Laughs] As long as they’ll have me. I’m a career academic. I see myself in the shoes of one of those people who mentor younger academics just starting out, just like my mentors do for me now. I hope to pay it forward for new people.

What’s the craziest thing you’ve ever done? I decided a couple of years ago I was going to go skydiving. They joke around with you to make you feel more comfortable. A guy says, “Are you so-and-so’s friend? Just want to let you know she’s in the ICU. She’s fine.” We look at each other, and he’s like, “Just kidding!” As we walk out to the airfield the owner says, “We can’t take off. There was a plane crash.” The guys behind us go, “He’s just messing with you.” The owner says, “ Seriously, there was a plane crash.” He points in the distance, and we see smoke. So, we were grounded. We had a flight home that evening. I get a text message from the owner later saying they were up and running again if we wanted to jump. Our flight was delayed three hours, so we caught the last jump of the day. Statistically what are the chances for two plane crashes in the same place on the same day?

—Vernon Trollinger
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