Telemedicine in the face of COVID-19

An eyecare group in a New York City hospital shares its protocol

By Y. Shira Kresch, OD, MS; Suzanne Sherman, OD, FAAO; and Steven E. Brooks, MD

Plato may have said that necessity is the mother of invention but now that COVID-19 has demonized the world, Plato’s words have taken on an international urgency. It has manifested in the rapid innovations we are witnessing, including complex adaptations used to split ventilators between patients, rapid development of antiviral medications and vaccines, expedited clinical trials, the temporary relaxation of regulatory rules, and the redeployment of medical personnel to perform duties outside of their normal scope of practice. The magnitude of the response is matched to the magnitude of the necessity.

Amid this surge of ingenuity, telemedicine has been born in the epicenter of this crisis at the Department of Ophthalmology at Columbia University Medical Center in New York City. We share with you pearls that we have learned which highlight the importance of timely implementation of telemedicine into practice and suggestions for a triage system with a step-wise approach.

Issue Highlights

CONTACT LENSES
Engineer a specialty contact lens practice

GLAUCOMA
Misdiagnosis when clinical findings don’t make sense

OCULAR SURFACE DISEASE
Case review of challenging ocular surface disease

REFRACTIVE
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RETINA
Time in range as an alternative to HbA1c

Optometry’s Apollo 13 moment during COVID-19

For ODs during the COVID-19 pandemic, failure is not an option

“For this moment on, we are improvising a new mission.”

—Ed Harris, as Flight Director Gene Krantz, in the movie Apollo 13

Hopes of landing on the moon vanished. The new mission was to somehow, in the words of a common military slogan, “improvise, adapt, and overcome,” and bring Astronauts Jim Lovell, John Swigert, and Fred Haise home.

The cool heads of the flight crew, their fellow astronauts, Mission Control (MC) staff, and perhaps most importantly their leader, Flight Director Gene Krantz, combined to form a hive mind which buzzed with creativity, focus, and synergy. A small army of NASA engineers and contractors, wearing short-sleeve white shirts,
A DISPOSABLE and adjustable eye patch (MASK-it Eye Patch) is a novel alternative to traditional modalities for monocular occlusion that offers advantages for both patients and practices, said office administrator Barbara Masket.

“The disposable eye patch is hygienic, adjustable, and easy to use,” said Masket, who designed the patch. “It provides patients with a cleaner and more comfortable covering than the reusable and unsanitary ‘pirate patch’ and it saves time spent by technicians between patients and fellow eye exams.”

Masket works at Advanced Vision Care, Los Angeles, where she is involved in evaluating technicians’ skills in performing visual field testing. Her observations about the negatives of the pirate patch used for visual field testing motivated her to come up with a better solution for eye occlusion. Now the need for a hygienic solution is even more evident.

FINDING BETTER SOLUTION

“Typically, the pirate patch is cleaned with alcohol pads before each use, but that introduces cost, adds time to the procedure, and does not eliminate risk for infection transmission,” Masket explained.

“Moreover, eye pads or tissues are applied to the closed eye, under the pirate patch, inducing dark adaptation and compressing the globe, potentially disturbing the ocular surface,” she added.

There is a waiting period to allow the fellow eye to recover from dark adaptation and to allow the ocular surface to recover and to remove any loose eyelashes.

Loosening of lashes is a common problem because many patients doing the visual field testing have glaucoma and are using prostaglandin analogue medications that promote eyelash growth. Furthermore, patients complain that the strap of the pirate patch disturbs their hair and facial make-up.

As she began to develop the concept for a new patch, it became apparent that the product would need to be translucent to prevent dark adaptation, self-adherent, have an adjustable vault to accommodate individual anatomy, and be easy for technicians to use. She envisioned that the product would be faster, cleaner, better and less costly than the traditional pirate patch. Now, however, the need for a cleaner solution to monocular occlusion is self-evident.

APPLYING THE PATCH

The patch replicates the contour of an eyeshield. A partial slit bisecting the larger portion allows the patch to be fashioned into a cone of variable depth and results in a covering that fits all orbital configurations without compressing the lids or lashes.

The disposable eye patch is applied to the face by positioning the tapered portion over the bridge of the nose at the level of the eyebrows and pressing lightly around the circumference.

After the procedure for the first eye is completed, the patch is easily removed and can be placed over the fellow eye. Generally, the patch will adhere properly when reused in this manner, unless a patient has particularly oily skin, Masket said.

In addition to its use as an eye covering for visual field testing, the patch can be used in other applications, such as to occlude the fellow eye in patients undergoing LASIK.

The patches come on a roll in a box that contains 500 units, and like stickers, are simply peeled away from the backing paper.

TAKE-HOME

» The disposable, self-adherent eye patch was designed to be translucent and have an adjustable vault to accommodate individual anatomy, as well as be easy for technicians to use.

» Dark adaptation, which compromises the test results, is eliminated.
As we finalize the May issue, the country slowly looks at plans to reopen state economies and loosen lockdown restrictions from the novel coronavirus pandemic. Optometry, too, is turning its focus to reopening practices to routine clinical care. An expert panel, including Optometry Times® Editorial Advisory Board members, came together in a webinar exploring what optometry will look like after COVID-19. Find this webinar on-demand on our website.

Telemedicine has risen to the forefront for medicine during COVID-19, and ODs have also risen to the challenge. In this issue, Dr. Y. Shira Kresch and her colleagues from Columbia University Irving Medical Center share their approach to telemedicine and offer pearls for success. The ever-eloquent Dr. Michael Brown also examines telemedicine and optometry by positing how the profession could apply Apollo 13’s lessons of courage, creativity, and perseverance during this perilous moment. Editor Emeritus Dr. Ernie Bowling looks for the glimmers of positivity by outlining the hope he sees during the pandemic.

Dr. A. Paul Chous suggests ODs look beyond HbA1c in their treatment of diabetes patients. Dr. Jim Owen provides tips on differentiating CTK from DLK in post-surgical patients. I hope you find much to catch your interest in this issue, and as always, thanks for reading.
FDA lists cataracts as warning on cigarettes

By Benjamin P. Casella, OD, FAAO

Editorial Advisory Board members are optometric thought leaders. They contribute ideas, offer suggestions, advise the editorial staff, and act as industry ambassadors for the journal.

It can be difficult, at times, to remember that other aspects of life go on in spite of this global pandemic. This is especially true in optometry as ODs have gone from seeing hundreds of patients a week to just a few emergencies. The federal government and its agencies press on as well.

One timely example of that is new requirements on cigarette warnings recently issued by the U.S. Food and Drug Administration (FDA).

The final list included 11 warnings, including cancer and other lung disease, heart disease, type 2 diabetes, erectile dysfunction, and...cataracts. The dangers of second-hand smoke are addressed as well. One of the 11 warnings will appear on each cigarette package or advertisement with an image exemplifying the negative impact smoking can have on one’s health.

The link between smoking and cataracts has been reported for decades. It is not advances in science but advances in policy which have led to these recent changes to law about the sale and advertisement of cigarettes. As a person who seeks on a daily basis to prevent eye disease, I applaud them.

In reading the FDA press release, I was reminded of an editorial I authored a year ago on this very topic. I was on a family trip to Amsterdam and walking down a narrow street when something caught my attention (Figure 1). It was a warning about the dangers of smoking on the door of a smoke shop. This was not the only warning sign. There were others, including a picture of a man who was obviously in respiratory distress. The signage also had instructions on seeking help for quitting smoking.

I was impressed at the time, and I commend the FDA in taking this step in an effort to make the public aware that no human tissue is exempt from the adverse effects of smoking. We must take care of our sick and our elderly, but we must also put forth much effort in preventing disease in the future. If we don’t continue to press for preventative steps now, there may not be a bandage big enough in the future.

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CAN AZITHROMYCIN TREAT COVID-19?

Since President Donald Trump’s announcement that this drug may be used for COVID-19 treatment, many are asking why an antibiotic would be used to treat a viral infection. What do ODs need to know about this medication?

OptometryTimes.com/azithromycin

5 LESSONS I LEARNED FROM VISITING ANOTHER DRY EYE PRACTICE

ODs can become so busy running the maze of our own practices that we sometimes forget the benefits that can come from stepping away.

OptometryTimes.com/5Lessons_dryeye

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Hope in the time of COVID-19

By Ernie Bowling, OD, MS, FAAO, FNAP

The coronavirus pandemic is unlike anything we have seen. The virus has spread to every continent on Earth (except Antarctica), and the number of infected continues to swell, along with the death toll.

Information flows at lightning speed, with each day seeming to bring worse news than the day before. The airwaves are “all coronavirus, all the time,” and the uncertainty surrounding the outbreak and the never-before-seen disruption to our daily lives can be overwhelming. The virus has forced the cancellation of major events, postponed sports seasons, and sent many into self- or government-imposed quarantine and self-isolation.

Yet even in most tragedies there are reasons for hope. With all the news seemingly focusing on the bad, even for the optimist hope may be hard to see. But it is there. I want to mention a few.

It could be much, much worse

The most important point to remember is the vast majority of people infected with COVID-19 recover.

Estimates now suggest that 99 percent of people infected with the virus will recover. Some people have no symptoms at all. While tens of thousands of people have died, the overall death rate is about 1 percent (or perhaps even lower once all cases are tested and confirmed), far less than Middle East Respiratory Syndrome (MERS; about 34 percent), SARS-CoV-2 (about 3.4 percent), or Ebola (90 percent)—though higher than the average seasonal flu (0.1 percent). The loss of life related to this infection is horrific and far more cases will be confirmed, but based on the mortality rates alone it could be far worse.

Children seem to be infected less often and have a milder form of the disease. According to the United States Centers for Disease Control and Prevention (CDC), the majority of infections so far have affected adults. And when kids are infected, they tend to have milder disease. This is good news.

However, it’s important to note that children can develop infection. A recent study from China identified more than 70 candidate molecules, including 15 antivirals, human immune system suppressants, and high-risk oncology treatments already approved by the FDA to treat other conditions that could be tested against the virus.

The National Institutes of Health’s ClinicalTrials.gov lists more than 100 clinical investigations focused on COVID-19 from around the world, with sponsors including medical centers, pharmaceutical companies, and national research institutes.

One investigational treatment being considered involves the use of plasma collected from patients previously infected with the virus. In a 2015 study, researchers demonstrated how blood plasma might be effective to significantly reduce mortality rates if administered to those who have contracted severe acute respiratory infections soon after their symptoms first appear. It is possible recovered plasma containing antibodies to the COVID-19 virus might be effective against the infection. Recovered plasma has been studied in outbreaks of other respiratory infections, including the 2009-2010 H1N1 influenza epidemic, the 2003 SARS-CoV-1 epidemic, as well as the 2012 MERS-CoV epidemic.

Coronavirus testing

After a slow roll out, the United States is working overtime to screen thousands for COVID-19. As of April 10, 2020, over 2,373,343 tests had been performed among the CDC and private labs with the number increasing daily. Of that number, over 380 percent (1,912,056) of the tests were negative.

The U.S. Food and Drug Administration (FDA) has granted Emergency Use Authorization (EUA) to two more tests. Tests by Quest Diagnostics and Quidel Corporation got the nod for distribution without prior clearance or approval.

Quest Diagnostics has expanded its COVID-19 testing capacity to 25,000 tests per day, significantly higher than initially forecast. Quest is now performing testing at 12 laboratories in its national network. In addition, Quest now expects to further expand capacity to 30,000 COVID-19 tests per day.

Quidel’s Lyra SARS-CoV-2 Assay has received EUA claims from the FDA to allow testing.

Testing for the disease is of paramount importance. Without testing data on COVID-19, we cannot possibly understand how the pandemic is progressing, and we cannot respond appropriately to the threat. Short of a vaccine, any return to a semblance of normal will involve widespread testing.

COVID-19 treatment

The World Health Organization (WHO) on March 18, 2020, announced a study to compare treatment strategies in a streamlined clinical trial design. For its SOLIDARITY study, the WHO chose the experimental antiviral remdesivir; the anti-malaria medication chloroquine (or hydroxychloroquine); a mixture of the HIV drugs lopinavir and ritonavir; and the human immunodeficiency virus (HIV) drug combination plus interferon-beta, a molecule that regulates inflammation and has lessened disease severity in mammals infected with MERS.

Other trials are also underway; at least 12 potential COVID-19 treatments are being tested, including drugs already in use for HIV and malaria, experimental compounds that work against anumber of viruses in animal experiments, and antihypersensitivity plasma from patients who have recovered from COVID-19.

Doctors and researchers around the world are tackling the problem with an urgency. On March 28, 2020, the FDA provided emergency-use authorization for hydroxychloroquine, a medicine approved for treating malaria, lupus, and rheumatoid arthritis, for people hospitalized with COVID-19. A recent listing identified more than 70 candidate molecules, including 15 antivirals, human immune system suppressants, and high-risk oncology treatments already approved by the FDA to treat other conditions that could be tested against the virus.

The National Institutes of Health’s ClinicalTrials.gov lists more than 100 clinical investigations focused on COVID-19 from around the world, with sponsors including medical centers, pharmaceutical companies, and national research institutes. In time, it is likely we will see direct-acting antivirals tailored to the most vulnerable molecular targets on the COVID-19 virus.

A coronavirus vaccine?

Since the genetic sequence of COVID-19 was first published, all eyes have turned to the prospect of a vaccine because only a vaccine can prevent infection. Scientists are attempting to gain a better understanding of the virus’ genetic makeup, how it infects cells, and how to effectively treat it. The long-term strategy to combat COVID-19 is to develop a vaccine.

The virus belongs to the coronavirus family, so named because microscopically it appears with crownlike projections on its surface.

These projections enable the virus to enter human cells where it can replicate. In developing a vaccine targeting COVID-19, scientists are looking at these projections because the projections are prevalent in coronaviruses seen previously—including the one that caused the SARS outbreak. This similarity among the coronaviruses has given researchers a head start on building vaccines against the proteins in these projections and, using animal models, they have demonstrated they can generate an immune response.

Many companies around the world are working
**Ocular Surface Disease**

**Case review of challenging ocular surface disease**

A comprehensive approach to treatment is critical to help patients with comprehensive disease.

By Ahmad M. Fahmy, OD, FAAO, Dipl. ABO

**Ocular surface inflammation and tear film dysfunction**

and tear film dysfunction can go undetected, undertreated, or untreated for many patients. In most cases, uncontrolled inflammation is the major effect of multiple factors that drive a continuum of negative ocular surface changes. These include desiccation, corneal haze, and neovascularization—and they produce a myriad of symptoms, some of which are understandable and others that are more difficult to link to the clinical picture.

Interrupting this continuum of ocular surface compromise is, of course, more difficult the later along the continuum the intervention begins. Treating the ocular surface disease (OSD) patient early and monitoring response to treatment frequently is an important part of preservation of the ocular surface.

Eyecare practitioners now have multiple, effective treatments and procedures they can employ in order to protect the ocular surface and begin to restore homeostasis. A comprehensive approach to ocular surface disease treatment is critical because patients struggling with symptoms are not likely to make all of the connections between factors which play a significant role in the dysregulation of the lacrimal functional unit. Of special interest in the area of new treatments is clinical research on growth factors and the restorative role they play.

The first paradigm shift in understanding OSD involved the importance of evaporative changes to the ocular surface. Since this pivotal step in understanding of the disease, ODs continue to uncover major inflammatory constituents that promote disease progression. The impact of chronic inflammation on corneal sensation, neuropathic pain, and the mechanisms involved in central sensitization which lead to various levels of pain in OSD is also now better understood.

Clinical research and progress in the treatment of ocular surface disease is critical and serves a great need. The overall prevalence of dry eye disease in the U.S. is 40 million. Longstanding research has revealed the link among OSD, hormonal changes in female patients, and age. It is interesting to note that in addition to these well-known connections, OSD is an important differential in younger patients. Among multiple factors, perhaps the main reason for this development is the simple act of a proper blink. A better understanding of this multifactorial disease (that ODs often refer to by one of its features, “dry eye”) is paving the way for a more comprehensive picture of each case and better patient outcomes.

Below are two cases of patients in my clinic that highlight useful treatments in OSD.

**Case 1: Sjögren’s dry eye**

The patient’s pertinent history includes:

- 36-year-old Caucasian female
- Sjögren’s syndrome dry eye
- Excellent Snellen visual acuity: 20/20 OD, OS
- 8 hours a day of computer work (architect)
- 400 mg hydroxychloroquine (HCQ) p.o.
- No history of chemical injury
- No smoking
- Currently using cyclosporin bid and 40 percent autologous serum qid OU
- Glaucma suspect; need for intermittent use of steroid eyedrops during flare ups

Clinical exam findings:

- 20/25 OD, OS
- Immediate tear break up OD, OS
- Incomplete blink OD, OS
- 2+ eyelid telangiectasia OD, OS
- Punctate epithelial keratopathy (PEK) involving the visual axis OS>OD (Figure 1).
- Conjunctival injection 3+ OS, 2+ OD
- Strong positive InflammaDry (Quidel) OD, OS
- Osmolarity: 330 OD, 339 OS
- Minimal secretion/meibomian glands yielding lipid (MGYL) with cotton-tipped expression OD, OS
- No significant eyelid malposition OD, OS
- Open puncta OD, OS

**Case 1 discussion**

This case presents several challenges and important considerations. Let’s start with one that might have a smaller spotlight on it and therefore can...

**TAKE-HOME MESSAGE**

ODs are now able to provide a higher level of care to patients with significant ocular surface disease along with comorbid ocular and systemic disease. With increased awareness of OSD and more attention to this unmet need, patient outcomes are improving.

- Timely follow-up and compliance with rheumatology

Reason for clinic visit were sharp, irritating pain in the left eye, which oke her up in the middle of the night. She was experiencing significant dryness, redness, and itching and finding it difficult to get through a day of work. The patient was also concerned about long-term impact of Sjögren’s syndrome dry eye (SSDE).

Pertinent past ocular history includes:

- Meibomian gland dysfunction
- Evaporative dry eye and aqueous deficiency
- Blepharitis
- No history of chemical injury
- No smoking
- Currently using cyclosporin bid and 40 percent autologous serum qid OU
- Glaucma suspect; need for intermittent use of steroid eyedrops during flare ups

See Challenging OSD cases on page 8
be more easily missed: retinopathy due to HCQ use in patients with Sjögren’s disease and other inflammatory conditions like rheumatoid arthritis and lupus. 11

Although the majority of the evaluation and management of this patient centers around ocular surface disease, also carefully consider possible retinal toxicity from HCQ use. These patients can maintain excellent central vision in spite of significant HCQ retinopathy due to the concept of “foveal resistance” and preservation of the sub-foveal retina. 12 In this case, the patient did not have maculopathy secondary to HCQ use.

Another important consideration is intraocular pressure (IOP) and optic nerve monitoring. The majority of the patients with an underlying systemic inflammatory condition will need a short-term treatment of steroid eyedrops and/or oral steroid. This is an appropriate treatment for these patients during flare-ups. As these treatment patterns are repeated, it is important to monitor the retinal nerve fiber layer and visual field. 16

The use of steroid eyedrops is often needed to treat SSDE in addition to a foundational treatment that includes one of the currently available cyclosporin offerings such as Restasis (Allergan), Klarit-C (Imprimis), Cequa (Sun), or another option such as Xiidra (lifitegrast, Novartis). I also recommend nutritional supplementation such as HydroEye (Science-Based Health), corneal-preservation measures throughout the day like ultraviolet (UV) protection, and conscious blinking with screen use.

The use of blood-derived eyedrops like autologous serum is a suitable addition to treatment in cases involving inflammatory disease like SSDE, Stevens-Johnson’s syndrome, and ocular cicatricial pemphigoid (OCP). 17-18

In SSDE, basal tear film constituents are lacking to the extent that the integrity of the ocular surface is compromised, resulting in the disruption of the ocular surface epithelium. 19 The addition of autologous serum eyedrops begins to re-establish appropriate levels of biologically active tear components such as essential proteins, growth factors, vitamins, and antioxidants. 17-18 Significant clinical work has demonstrated the importance of these tear components in the regulation of proliferation, differentiation, and maturation of the ocular surface epithelium. 17-18

It is important to note that the concentrations of biologically active tear components are not identical in tears and in serum. 17-18 Yet, given that many of the essential components in tears are also in serum, the use of serum to supplement the tear film in OSD is feasible and serves a regenerative role which helps to restore a healthy ocular surface. 20-22

In my experience, patients with significant PEK, as in this case, also benefit from the regenerative properties of amniotic membrane (AM). After a detailed discussion with the patient, we agreed to use ProKera (BioTissue) in her left eye. On follow up, PEK improved to 1+ in each eye, along with a significant improvement in the patient’s symptoms (Figure 2).

I find that in cases with a flare-up of underlying disease or simply worsening epithelial compromise, utilizing cryopreserved AM helps to restore the corneal epithelium in 4 to 5 days.

During the patient’s next follow-up visit after the Prokera ring was removed, I recommended she give scleral contact lenses a try in an effort to continue to improve comfort. It was a good time to try contact lenses given the improved epithelium and overall inflammatory picture. To my surprise, she now feels better than she has in the last three years and is able to tolerate her scleral contact lenses 8 hours a day.

She continues to instill autologous serum eyedrops through the winter months and uses her contact lens as a reservoir by putting a drop in the contact lens each day. Scleral contact lenses can be a great therapeutic adjunct for these patients.

A key clinical landmark to assess in patients with chronic ocular surface inflammation is the corneal neovascularization (Figure 3). It serves as a transition zone between the avascular cornea and the vascularized conjunctiva marked by unique fibrovascular ridges known as the palisades of Vogt (POV). 20-22

Limbal epithelial stem cells occupying this area play a critical role in preventing conjunctivalisation and propagation of blood and lymphatic vessels into the normally avascular cornea, as well as regeneration of the corneal epithelium. 20-22 Defects in limbal epithelial cells have been linked to corneal neovascularization, persistent epithelial defects, ulceration, lipid keratopathy, pain, and discomfort. 20-22 Progressive limbal stem cell deficiency correlates with degeneration of the POV structures and corneal nerve deficit. 20-22 The protective functions of a healthy stem cell niche have been shown to be augmented by the anti-inflammatory, anti-angiogenic, and regenerative properties of cryopreserved AM. 22

Confocal microscopy imaging of the patient demonstrated abnormalities in corneal morphology. It is likely that her symptoms of intense pain—enough to wake her up in the night—are linked to corneal nerve hyperalgesia.

Case 1 summary

In OSD cases with significant chronic systemic inflammatory disease, consider using anti-inflammatory drops like cyclosporin and lifitegrast and nutritional supplements as a part of a foundational treatment.

Compounded topical medications like blood-derived eyedrops are an excellent adjunct for patients with epithelial compromise, aqueous deficiency, and evaporative dry eye.

Don’t lose track of macular and optic nerve assessment in patients needing steroid drops intermittently and taking HCQ or other systemic medications with a drying effect on the ocular surface.

Cryopreserved AM can offer fast epithelial recovery during a flare-up and worsening punctate epithelial keratopathy.
**Ocular Surface Disease**

Young patients with significant meibomian gland dropout should be offered in-office procedures like intense pulsed light (IPL), thermal pulsation, meibomian gland probing (MGP), meibomian gland expression (MGE), and eyelid debridement every 4 to 6 months. It is important to stress to the patient that in-office treatments are to complement the use of at-home therapies like NuLids (NuSight Medical), and Zocular lid cleansing.

Confocal microscopy imaging can identify corneal nerve abnormalities in patients with chronic inflammatory disease. Epidermal growth factor (EGF) and nerve (NGF) growth factor treatments can play an important role in re-establishing a healthy interaction between the corneal nerves and the corneal epithelium.1-4,17-19

**Case 2: Pseudoexfoliative glaucoma, corneal disease, and OSD**

The patient presented for an urgent visit with ocular pain, dryness, and irritation in the left eye. Pertinent history OS includes:

- 20/100 best corrected Snellen visual acuity OS; has been stable for 3 years
- Severe level pseudoexfoliative glaucoma OS
- IOP target range upper teens OS; IOP 26 mm Hg on Lumigan (bimatoprost, Allergan), Combigan (brimonidine/tartrate/timolol maleate, Allergan, and Azopt (brinzolamide, Novartis)
- History of Descemet’s membrane endothelial keratoplasty (DMEK) exchange for escem’s stripping with endothelial keratoplasty (DSEK) for Fuchs
- Type 2 diabetes; no previous retinopathy
- Intolerant to oral sulfa medications
- Epithelial basement membrane dystrophy

Surgical history OS:

- Kelman phaco-emulsification (KPE), posterior chamber lens (PCL)
- Selective laser trabecuoplasty (SLT) twice
- Trabeculectomy
- Suture lysis three times
- DSEK, IOL exchange (after IOL dislocation), vitrectomy, sutured posterior chamber lens, superficial keratectomy, temporary tarsorrhaphy
- Anterior chamber washout (retained lens material)
- Bleb revision
- Ahmed Shunt with patch graft
- Repeat DSEK, tube shunt revision, superficial keratectomy, superior cataract excision, punch occlusion, temporary tarsorrhaphy
- Tube shunt revision
- Tube explanted
- Micropuncture twice

Clinical exam OS showed:

- Complex surgical history for pseudoexfoliative glaucoma, Fuchs dystrophy, and co-morbid OSD
- Patch graft exposure through conjunctiva (Figure 4)
- Not enough healthy conjunctiva to allow complete revision; tube explanted and conjunctiva allowed to heal over patch graft (without conjunctival revision; Figure 5)
- Thin and chronically inflamed superior conjunctiva
- Diffuse PEK without filaments (Figure 6)
- Meibomian gland truncation and asymmetric tear film lipid layer deficiency
- Eyelid telangiectasia, blepharitis, and keratinization

Treatment consisted of a large-diameter contact lens until the conjunctiva healed over the patch graft. The patient was also treated with non-prescribed lubricating drops, IPL, eyelid debridement/micropulsepharoexfoliation (MBE), MGP, and MGE. This is the foundational treatment as discussed in the previous case. The patient preferred to hold on the use of compounded medications at this point.

**Case 2 discussion**

I chose this case in order to demonstrate that severe OSD presents with significant comorbidity, often also requiring multiple surgical procedures. Patients requiring multiple glaucoma medications will may develop ocular surface dryness, inflammation, epitheliopathy, and decreased goblet cells.20 This challenge has spurred innovation in the delivery of drops and devices that aim to provide adequate pressure-lowering effect while avoiding ocular surface compromise.

The urgent visit presented an obvious need to cover the exposed patch graft and prophylaxis to prevent infection. Once the tube was explanted, the patient’s IOP was ultimately controlled by micropulse photocoagulation.21

There are many challenges to this case, including uncontrolled glaucoma, chronic OSD, and epithelial compromise after multiple surgical procedures. On follow-up with her retinal specialist, another challenge was added: the need for chronic steroid use to control cysotlic macular edema (CME) (Figure 15). Despite multiple vision-threatening challenges, one of the most important things to do for this patient is re-establishing a healthy epithelium because this is directly associated with the quality of the remaining vision in the patient’s left eye. On the last visit, she exhibited some functional vision (20/100). This is remarkable, given her tough course.

In cases like this, trying to understand how to prioritize the treatment plan is critical. Once the immediate challenges of controlling the IOP, closing the corneal epithelial and conjunctival defects, and monitoring until the patch graft was no longer exposed, planning in-office treatments to improve meibomian gland function and reduce eyelid and conjunctival inflammation were an important next step.

The need for long-term Durezol as well as CME from diabetes also presents another challenge for this patient in the form of delayed epithelial healing and possible Durezol keratopathy. After offering the patient compounded blood-derived topical medications as in the first case, she was not able to keep up with the onerous drop routine and preferred to move forward with in-office procedures alone. I asked her to start compounded Healon (1.4% sodium hyaluronate, Johnson & Johnson Vision) qid and will continue to offer autologous serum or similar treatments with regenerative properties to the corneal epithelium.

I find the combination of MBE, IPL, MGP, MGE alternating with MBE, TearCare thermal pulsation (Sight Sciences), and MGE every 4 to 6 months very useful in these situations. I prefer to use TearCare for thermal pulsation on all patients with history of a trabeculectomy in order to preserve the conjunctiva as much as possible. This is an important consideration given this patient’s conjunctival surgical history. Eyelid keratinization and telangiectasia are treated with MBE and IPL. MBE is an important step that can often be missed in these cases.

Taking the time to debride biofilm and keratinized epithelium will aid the provider in allowing more secretion from the meibomian glands to the ocular surface. Maintaining this reduction in biofilm with daily treatment at home is key.

**Case 2 summary**

When multiple comorbidities present along with severe OSD, remember the main things. For example, IOP control and conjunctival and corneal epithelial healing with prophylaxis against possible infection on her urgent visit.

Stabilize the patient with acute problems while formulating a long-term plan to maximize the best remaining visual function. Despite complex history and severe glaucoma, and now CME (which did not require injection), the patient still has functional vision in this left eye. It is worth fighting to preserve.

Understand the main, ongoing challenges to epithelial compromise and OSD. In this case, the need for multiple pressure-lowering drops, complex surgical history including failed bleb, tube explant, repeat corneal transplant, need for Durezol to control CME, delayed healing with diabetes, meibomian gland disease, and blepharitis.

**Conclusion**

ODs are now able to provide a higher-level of care to patients with significant ocular surface disease and comorbid ocular and systemic disease. With increased awareness of OSD and more attention to this unmet need, patient outcomes are improving.

Paring OSD treatment options with each patient is vital to the discussion. ODs learn where to best utilize new technology. Mutually arriving at the right treatment path with the patient after articulating the risks, benefits, alternatives, and limitation of each recommendation is a complex process when faced with complex disease, yet one of the most rewarding things we can offer patients with significant disease.

**REFERENCES**

How to educate patients about dry eye

Follow tips to keep the condition top of mind for patients

By Katherine M. Mastrota, OD, MS, FAAO

Consider these questions. Who are a practice’s dry eye disease (DED)/ocular surface disease (OSD)/dysfunctional tear film patients? How do ODs bring their patients to understand the condition and tip their behavior to proactively managing their ocular surfaces? When does the OSD conversation begin? Who starts the DED discussion? A common barrier to many practitioners is the concern that their practices do not have the patient foundation to make investing in the dry eye space economically profitable. I assure you that in my experience OSD management will profit the patient in many ways that includes clearer, more comfortable vision and enhancing their productivity and overall wellbeing.

Which patients to help
Many current patients in ODs’ practices can benefit from an OSD specialty. These patients include, but are not limited to:

- All patients with diabetes
- Glaucoma patients on topical or oral therapy
- Post-surgical patients (cataract, especially femto-assisted, glaucoma, pterygium, retina, plastics)
- Patients with sleep apnea or continuous positive airway pressure (CPAP) device users
- Patients with allergy, asthma, or atopic skin disease or dermatologic disease (especially rosacea)
- Patients who receive in-office intraocular injections (anti-vascular endothelial growth factor [VEGF])
- Patients with pseudoexfoliation
- Female patients in menopausal/peri-menopausal age range and those on hormone therapy
- Patients with arthritis or other autoimmune disease
- Patients who see another specialty provider for any chronic disease
- Patients with blepharitis, meibomian gland dysfunction (MGD), corneal basement membrane dystrophy (BMD)
- Patients with any corneal disease
- Patients with recurrent “conjunctivitis” or patients who have had true conjunctivitis of any etiology
- Patients whose school or job demands include excessive computer or digital device use
- Patients who wear makeup
- Patients who wear contact lenses
- Patients who work for airlines, hospitals, hotels, in environmentally-controlled buildings (any building with dry heat or air conditioning)
- Patients who live in old buildings with older heating, air conditioning or ventilation
- Patients who have homes or offices with carpeting
- Patients who live in the top 20 states for high allergen count
- Patients who cut grass, work around or use chemicals on a daily basis, or travel frequently
- Patients with Parkinson’s disease
- Incomplete blinkers
- Patients with mid-facial decent
- Patients with poor diets
- Geriatric patients
- Pediatric patients

It is clear from the length and breadth of the list of potential OSD patients that practically every patient ODs encounter is at risk for OSD or shows signs/reports symptoms characteristic of OSD.

I am a firm believer that we all have some level of dry eye disease—we are only on different places in the path to symptomatic and life-altering disease.

Starting the conversation
Where and with whom does the OSD conversation begin? Akin to learning anything, spaced repetition (a learning technique that incorporates increasing intervals of time between subsequent review of previously learned material in order to exploit the psychological spacing effect) can help.

This technique is a powerful way to help patients absorb and appreciate the existence and complexity of DED and how it can impact their lives. Spaced repetition is simple but highly effective. It produces long-term, durable retention of knowledge important in delivering a novel eye health information to patients and empowers patients to become proactive in their eye health management.1

Thus, this learning starts as soon as the patient crosses the threshold of a practice and is reinforced with every team member contact. Every team member should be fluent in and able to explain in consistent messaging the basics of OSD, the importance of diagnosing and treating OSD, and the benefits of proactive OSD management.

Patient learning journey
A practice has many opportunities to teach patients about OSD. Consider these potential instances to keep ocular surface health top of mind for patients:

- OSD information on website and social media pages: infographics, interactive patient engagement exercises, patient self-directed OSD risk assessments
- First office contact messaging regarding tear health/ocular aesthetics at time of appointment booking and/or online appointment confirmation email
- In-office real estate for DED-related products prompts patient curiosity and opens avenues of conversation with staff who greet and triage patients
- Instant education via direct links for access to office- or vendor-generated information or traditional printed or video data
- Check-in process that defines the goals of the eye exam, including tear film assessment
- Comprehensive patient medical history and profile that incorporates symptoms, environmental, surgical, physical, habitual, psychological factors to build dry eye risk profile
- Doctor contact with narrated discussion of tear film and ocular surface evaluation and point-of-care testing
- Slit lamp photos or instrument acquired data for doctor-patient discussion; print tear film assessment data, if available, and offer to patient for at-home review
- Case disposition with now-familiar terms with the patient, assimilated by space repetition, to manage OSD. Spaced repetition obviates the effect of cramming OSD data at the end of case disposition, mitigates the “forgetting curve” (or decline of memory retention in time), and helps patient recall
- Patient released to staff member for procedure or product review
- Follow-up email, if available, for patient questions or concerns

The benefits of attention to metered patient education and treatment for ocular surface disease will ensure successful ocular surgery, including injections, with better pre-operative data and infection risk reduction. Aesthetics will be improved. Contact lenses will be worn longer. ODs will have happier patients.

Offer lid hygiene products, omega supplements, and occlusion products (eye masks, specialty eye wear, CPAP eye protection) in the office. Go forth, educate, and treat.

REFERENCE

Take-Home Message
Almost every patient ODs see is at risk for ocular surface disease or shows signs or symptoms. Frequent mentions keep the condition top of mind for patients. From first contact to exam room discussion, a practice has many opportunities to teach patients about ocular surface disease.
Indication
Xiidra® (lifitegrast ophthalmic solution) 5% is indicated for the treatment of signs and symptoms of dry eye disease (DED).

Important Safety Information
Xiidra is contraindicated in patients with known hypersensitivity to lifitegrast or to any of the other ingredients.

In clinical trials, the most common adverse reactions reported in 5-25% of patients were instillation site irritation, dysgeusia and reduced visual acuity. Other adverse reactions reported in 1% to 5% of the patients were blurred vision, conjunctival hyperemia, eye irritation, headache, increased lacrimation, eye discharge, eye discomfort, eye pruritus and sinusitis.

To avoid the potential for eye injury or contamination of the solution, patients should not touch the tip of the single-use container to their eye or to any surface.

Contact lenses should be removed prior to the administration of Xiidra and may be reinserted 15 minutes following administration.

Safety and efficacy in pediatric patients below the age of 17 years have not been established.

References:

There’s no FDA-approved therapeutic equivalent.2,4
Check out patient resources, insurance coverage, and more at Xiidra-ECP.com

For additional safety information, see accompanying Brief Summary of Safety Information on the adjacent page and Full Prescribing Information on Xiidra-ECP.com.
XIIIDRA® (lifitegrast ophthalmic solution), for topical ophthalmic use

**BRIEF SUMMARY:** Please see package insert for full prescribing information.

1. **INDICATIONS AND USAGE**
   - Lifitegrast ophthalmic solution (XIIIDRA®) is indicated for the treatment of signs and symptoms of dry eye disease (DED).

2. **CONTRAINDICATIONS**
   - XIIIDRA® is contraindicated in patients with known hypersensitivity to lifitegrast or to any of the other ingredients in the formulation [see Adverse Reactions (6.2)].

3. **ADVERSE REACTIONS**
   - The following serious adverse reactions are described elsewhere in the labeling:
     - Hypersensitivity [see Contraindications (4)]

4. **CLINICAL TRIALS EXPERIENCE**
   - Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.
   - In five clinical studies of DED conducted with lifitegrast ophthalmic solution, 1401 patients received at least one dose of lifitegrast (1287 of which received lifitegrast 5%). The majority of patients (84%) had <3 months of treatment exposure. One hundred-seventy patients were exposed to lifitegrast for approximately 12 months. The majority of the treated patients were female (77%). The most common adverse reactions reported in 5%-25% of patients were:
     - blurred vision, conjunctival hyperemia, eye irritation, headache, irritation of the conjunctival sac, photophobia, pruritus, tearing, and vision complaints.

5. **POSTMARKETING EXPERIENCE**
   - The following adverse reactions have been identified during post-approval use of XIIIDRA®. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.
   - Rare cases of hypersensitivity, including anaphylactic reaction, bronchospasm, respiratory distress, pharyngeal edema, swollen tongue, and urticaria have been reported. Eye swelling and rash have been reported [see Contraindications (4)].

6. **USE IN SPECIFIC POPULATIONS**
   - **Pregnancy**
     - Risk Summary
       - There are no available data on XIIIDRA use in pregnant women to inform any drug-associated risks. Intravenous (IV) administration of lifitegrast to pregnant rats, from pre-mating through gestation Day 17, did not produce teratogenicity at clinically relevant systemic exposures. Intravenous administration of lifitegrast to pregnant rabbits during organogenesis produced an increased incidence of omphalocele at the lowest dose tested, 3 mg/kg/day (400-fold the human plasma exposure at the RHOD, based on the area under the curve [AUC]). Since human systemic exposure to lifitegrast following ocular administration of XIIIDRA at the RHOD is low, the applicability of animal findings to the risk of XIIIDRA use in humans during pregnancy is unclear (see Clinical Pharmacology (12.3) in the full prescribing information).
   - **Lactation**
     - Data
       - Animal Data
         - Lifitegrast administered daily by IV injection to rats from pre-mating through gestation Day 17, caused an increase in mean pre-implantation loss and an increased incidence of several minor skeletal anomalies at 35 mg/kg/day, representing five 400-fold the human plasma exposure at the RHOD of XIIIDRA, based on AUC. No teratogenicity was observed in the rat at 10 mg/kg/day (460-fold the human plasma exposure at the RHOD, based on AUC). In the rabbit, an increased incidence of omphalocele was observed at the lowest dose tested, 3 mg/kg/day (400-fold the human plasma exposure at the RHOD, based on AUC), when administration of IV injection daily from gestation Days 7 through 19. A fetal no observed adverse effect level (NOAEL) was not identified in the rabbit.
   - **Pediatric Use**
     - Safety and efficacy in pediatric patients below the age of 17 years have not been established.
   - **Geriatric Use**
     - No overall differences in safety or effectiveness have been observed between elderly and younger adult patients.

Manufactured for:
Novartis Pharmaceuticals Corporation
One Health Plaza
East Hanover, NJ 07936

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26. Dr. Falbmy is adjunct faculty assistant professor of the Illinois College of Optometry and Southern California College of Optometry.
Telemedicine in the face of COVID-19

Continued from page 1

to encourage success.

Telemedicine in eye care
was until now more of a con-
cept than a fully developed
reality, a topic of interest that
was discussed at professional
meetings for many years, a
possible wave of the future.
In the midst of the COVID-19
pandemic, telemedicine is no
longer a futuristic concept.

Telemedicine is our new
reality. And it has become
a reality overnight fraught
with new levels of connec-
tion between physicians and
patients, legal responsibilities
in obtaining consent and sub-
mitting proper documenta-
tion, and, lastly, learning new
billing languages of the vir-
tual world.

Although seemingly
daunting, spending time on a
plan of action that takes into
account known hurdles prior
to implementation can make
the difference between a suc-
cessful and failed attempt.

And in this situation, one in
which our patients need our
help, our staff needs protec-
tion, and our offices need to
stay afloat, failure is not an
option.

Our approach to
telemedicine

A strong telemedicine initia-
tive was started in our depart-
ment during the first week
of March as a way to con-
tinue delivering care while
simultaneously implementing
practices that prevented the
spread of the COVID-19 virus.

By the first week of April
it had become the dominant
form of patient contact in our
department.

Our telemedicine example was initially geared
to allow for an effective triage system for new
and established patients and involved the col-
laboration of scheduling personnel, techni-
cians, practice administrators, optometrists, and
ophthalmologists.

With the luxury of an electronic medical records
(EMR) system with a built-in Health Insurance
Portability and Accountability Act (HIPAA)-com-
pliant platform to enable immediate use, provid-
ers completed required on-boarding and immedi-
ately began scheduling visits.

The temporary relaxation of privacy require-
ments from national leadership allowed us to use
audiovisual communication platforms, including
FaceTime, Skype, Google Hangout, and others that
would not normally be approved for patient vis-
its. These policies—needed to cope with the emer-
gency conditions we confronted—improved our
ability to extend care to patients with varying lev-
els of “tech-savviness.”

Further developments included the use of com-
mercially available apps such as…. for patients to
measure their own visual acuity, color vision, and
the Amsler grid. Improvised techniques were devel-
oped to check for afferent pupil defects, confron-
tation visual fields, defects in extraocular move-
ment, and strabisms.

These approaches enabled us to implement effec-
tive triage and recommend basic management.

Patients with vision-related concerns that were
deemed to be urgent or were inadequately eval-
uable by these means were scheduled for in-per-
son visits.

Triage pearls

Over the past month, we have learned a consider-
able amount about the process and what our cur-
rent state of telemedicine can offer. When deciding
to bring telemedicine into your practice there are
a few pearls to take into consideration. To start,
the primary focus should be an effective triage
system. See Figure 1.

The time is now

= Get organized with a designated team
= Create a telemedicine triage protocol
= Delegate specific tasks
= Develop office protocols for key operations,
including scheduling, patient instruction,
allotted times for tele-visits, and billing
= Schedule regular meetings to review the pro-
cess. Iron out kinks at the end of each day
for the first week, then every other day, and
move toward having a weekly meeting

Decide on a platform to perform tele-visits

= Some EMR systems have HIPAA-compliant
software that can be used for this purpose. If
not, additional software may have to be pur-
chased. Although regulations surrounding
HIPAA have been relaxed during the COVID-
19 state of emergency, it is best to have appro-
priately compliant software to future-proof
telemedicine needs and train staff from the
beginning. Even in the current environment,
patient privacy still matters

Patient consent is necessary

= Patients must be informed that the session will
constitute an actual examination and be billed
as such. Consult with liability carrier for the

TAKE-HOME MESSAGE

When the American
Optometric Association advised optometrists to
postpone all routine eye care visits on March 19, 2020,
many ODs turned to telehealth. Virtual visits have many
advantages, like keeping patients safe from coronavirus
exposure, improved access to care, and reduced health
care costs. It is essential to have a written plan when
incorporating telemedicine, before implementation.

Understand the limitations

= Current technologies will not allow detailed
examination of the anterior or posterior seg-
ment of the eye
= It is not possible to measure intraocular pres-
sure (IOP)
= Patient-reported measures, like visual acu-
ity, may not be highly reliable
= Refraction is not possible
= Some patients are more tech-savvy than
others
= Patients with low vision will need special
assistance on their end
= Some patients will need to be seen in the
office, and these patients and visits should
not be overlooked. Stand-alone televisits are
inappropriate for these patients and should
be handled as such

Learn the billing codes

= The billing compliance requirements, at least
for now, are different than those needed for
in-person examination
= Review codes with billing team

Perform internal auditing

= Conduct an audit at least after the first week
of televisit piloting and learn how to improve.
Best practice is to audits for the entire first
month of telehealth.

Get the most out of a televisit

Consider implementing these suggestions in order
for both the doctor and the patient to gain as much
as benefit as possible from a telehealth visit.

Instructions for patients prior to televisits should
include:

= Necessary software downloaded with edu-
cation from staff about usability and test for
functionality
= Instruction to download additional helpful
apps, if possible. This may include a visual acu-
ity chart, Amsler grid, color vision plates, etc.
= Instruction for pertinent ocular and medi-
cal histories to be readily available to review
with physician during the visit or to email
prior to the visit
= Submission of photos through a secure
platform

See Telemedicine on page 15
Elevate standard of care with artificial intelligence

AI technology promises to improve access, outcomes, and efficiency

By Amy Black Hellem

Artificial intelligence (AI) is taking the consumer world by storm, so it is no surprise that healthcare innovators are following suit. To the profession’s credit, eye care is leading the way as the first specialty to receive U.S. Food and Drug Administration (FDA) clearance for an autonomous screening tool.1 Recognizing the promise it holds, the U.S. government’s investment in research and development in AI-related technologies was roughly $1.1 billion in 2015 and is expected to substantially increase. 2

Still, some wonder if there is a potential dark side to AI in medicine. AI in other business sectors was also feared early on and was regarded as a potentially job thief and a robber of human touch. However, having experienced some of its simpler benefits over the years—think Amazon Alexa, Google Maps, and more—many have learned to embrace AI technology for its capacity to elevate the human experience rather than fear it based on its imagined propensity to erase humanity.

Indeed, it is important to note that the general goal of AI is not to replace the care provider but rather to augment the ability of humans to provide health-care.1 The implications of this cannot be understated because there is a synergistic effect when clinicians and AI work together, producing better results than either alone.1,3

Here, we will explore how AI helps overcome age-old healthcare conundrums, moving us into a future where access, outcomes, and efficiency are improved so dramatically that it may necessitate a re-evaluation of practice guidelines and standards of care.

Categories of AI solutions

AI can support three distinct needs. It can automate processes, gain insight through data analysis, and engage with users. 4 To that end, there are likewise three different types of AI:

1 PROCESS AUTOMATION AI. In a Harvard Business Review study of 152 projects, the most common type of AI (47 percent) was the automation of digital and physical tasks using robotic process automation (RPA) technologies. 5 RPA was also found to be the easiest to implement, bringing a quick and high return on investment. An example of this in eye care is AdaptDx Pro guided by Theia, an AI-driven onboard technician that coaches patients through a definitive diagnostic test for age-related macular degeneration (AMD). 6 (See box)

2 COGNITIVE INSIGHT AI. The second most common type of AI project in the study (38 percent) uses algorithms to detect patterns in volumes of data and interpret their meaning. 7 This type of machine learning has also garnered significant attention in eye care and has led to the development of a software program designed to perform screening for diabetic retinopathy. The technology, known as IDx-DR (IDx Technologies), underwent the FDA’s Automatic Class III or De Novo premarket pathway and achieved Breakthrough Device designation. 8 (See box)

3 COGNITIVE ENGAGEMENT AI. This type of AI remains immature and was the least common type represented in the study at only 16 percent. 9 One of the more common applications of cognitive engagement is the use of chatbots and other automated surrogates that rely on customer input to perform tasks such as answering frequently asked questions.

Ideally, future technology may combine elements from all three types of AI into truly comprehensive solutions to modern healthcare challenges.

Why we need AI

The traditional representation of the U.S. healthcare economy is based on the iron triangle, which is comprised of three interdependent arms: access, cost, and quality. 1,4 According to this widely accepted theory, improving any one of the three iron triangle vertices may lead to degradation of the other two.7 For example, improving access to care requires resources behind it, which means raising the cost or lowering quality. Improving quality means raising costs or reducing access. Economists, policy-makers, payors, providers, and healthcare administrators have grappled with this conundrum for generations and may be finding ways to break free thanks to AI.

In 2016, the world was treated to an inside look at how this might work and why AI might ultimately decimate the iron triangle. CBS aired an episode of “60 Minutes” in which Watson, a sophisticated IBM supercomputer, was introduced. Watson has the capacity to process all the books in the American Library of Congress—and that’s just the beginning.3 In about a week’s time, Watson read 25 million published medical papers and had the ability to continuously scan the web for the latest medical research and clinical trials. Next, doctors made Watson a medical school resident and fed it 1000 actual cases from cancer patients. Remarkably, in over 99 percent of the cases, Watson identified the same treatment options as a panel of experts. However, Watson went a step further and, in about 30 percent of the cases, also identified a potential but viable treatment that was not previously considered by the panel.

Today, Watson is part of University of North Carolina’s standard of care, according to Ned Sharpless, MD, who was director of the University’s Lineberger Comprehensive Cancer Center. As Dr.
Telemedicine
Continued from page 13

During the visit:
- Obtain and document verbal consent
- Patient should sit in well-lit room
- Patient should have family member or friend available for assistance during the visit, if appropriate
- Headphones recommended during visit with patient so the doctor’s hands are free to demonstrate various things to patients

After the visit:
- Document all that transpired immediately, including start and end times of the visit
- Include review notes, impression and plan, photo-documentation, interpretation and report, and billing codes
- Create list of all patients seen via televisits to review later with billing staff
- Schedule follow-up as necessary

Summary
Amid the COVID-19 pandemic, telemedicine has emerged as an essential technology for all healthcare professionals. In our experience, we have learned it is essential to have a written plan for how to incorporate telemedicine into daily practice prior to implementation.

Utilize resources such as the American Optometric Association (AOA), American Academy of Optometry (AAOptom), and American Academy of Ophthalmology (AAOphth) to aid in formulating documentation and triage protocols.

It is important to learn from each other’s experiences as ODs continue to expand the use of telemedicine in to deliver eye care, especially in times like this, when in-person visits are severely limited.

Amy Black Hellem has served as editor-in-chief of two healthcare publications and has published more than 100 articles worldwide. Her current research efforts focus on standards of care in the United States and the process by which medical innovation translates to meaningful adoption. She is a consultant for MacuLogix.

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Table: AI can automate processes, gain insight through data analysis, and engage with users.

<table>
<thead>
<tr>
<th>Task</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process automation</td>
<td>47%</td>
</tr>
<tr>
<td>Cognitive insight</td>
<td>38%</td>
</tr>
<tr>
<td>Cognitive engagement</td>
<td>16%</td>
</tr>
</tbody>
</table>

Impaired dark adaptation, the earliest biomarker of AMD, can be measured with a dark adaptometer and can significantly lessen reliance on risk assessment by delivering an objective output (rod intercept time) that can lead to a definitive AMD diagnosis with 90 percent accuracy. It was first commercialized in 2014 and has since been used by more than 1,000 eyecare professionals. However, space limitations and technician time presented hurdles to mass adoption.

To overcome these obstacles, scientists developed a wearable headset and an artificial intelligence-driven onboard technician named Theia. Called AdaptDx Pro, this next-generation dark adaptometer requires no table-top space, external computer, or dark room—making it easier to fit testing into any practice workflow. Theia guides patients through the full test, offering comforting reassurance along the way. Theia also adapts her feedback and instructions to the patient based on the system’s ability to monitor pupil movement and fixation.
WARNINGS AND PRECAUTIONS (cont’d)

• Acute increases in intraocular pressure have been seen within 60 minutes of intravitreal injection, including with EYLEA. Sustained increases in intraocular pressure have also been reported after repeated intravitreal dosing with VEGF inhibitors. Intraocular pressure and the perfusion of the optic nerve head should be monitored and managed appropriately.

• There is a potential risk of arterial thromboembolic events (ATEs) following intravitreal use of VEGF inhibitors, including EYLEA. ATEs are defined as nonfatal stroke, nonfatal myocardial infarction, or vascular death (including deaths of unknown cause). The incidence of reported thromboembolic events in wet AMD studies during the first year was 1.8% (32 out of 1824) in the combined group of patients treated with EYLEA compared with 1.5% (9 out of 595) in patients treated with ranibizumab; through 96 weeks, the incidence was 3.3% (60 out of 1824) in the EYLEA group compared with 3.2% (19 out of 595) in the ranibizumab group. The incidence in the DME studies from baseline to week 52 was 3.3% (19 out of 578) in the combined group of patients treated with EYLEA compared with 2.8% (8 out of 287) in the control group; from baseline to week 100, the incidence was 6.4% (37 out of 578) in the combined group of patients treated with EYLEA compared with 4.2% (12 out of 287) in the control group. There were no reported thromboembolic events in the patients treated with EYLEA in the first six months of the RVO studies.

ADVERSE REACTIONS

• Serious adverse reactions related to the injection procedure have occurred in <0.1% of intravitreal injections with EYLEA including endophthalmitis and retinal detachment.

• The most common adverse reactions (≥5%) reported in patients receiving EYLEA were conjunctival hemorrhage, eye pain, cataract, vitreous detachment, vitreous floaters, and intraocular pressure increased.

Please see Brief Summary of Prescribing Information on the following pages.
Intravitreal injections, including those with EYLEA, have been associated with endophthalmitis and retinal detachment. Proper aseptic injection technique must always be used when administering EYLEA.

**WARNINGS AND PRECAUTIONS (cont’d)**

- Acute increases in intraocular pressure have been seen within 60 minutes of intravitreal injection, including dosing with VEGF inhibitors. Intraocular pressure and the perfusion of the optic nerve head should be monitored and managed appropriately.

- There is a potential risk of arterial thromboembolic events (ATEs) following intravitreal use of VEGF inhibitors, including EYLEA. ATEs are defined as nonfatal stroke, nonfatal myocardial infarction, or vascular death (including deaths of unknown cause). The incidence of reported thromboembolic events in wet AMD studies during the first year was 1.8% (32 out of 1824) in the combined group of patients treated with EYLEA compared with 1.5% (9 out of 595) in patients treated with ranibizumab; through 96 weeks, the incidence was 3.3% (60 out of 1824) in the EYLEA group compared with 3.2% (19 out of 595) in the ranibizumab group. The incidence in the DME studies from baseline to week 52 was 3.3% (19 out of 578) in the combined group of patients treated with EYLEA compared with 2.8% (8 out of 287) in the control group; from baseline to week 100, the incidence was 6.4% (37 out of 578) in the combined group of patients treated with EYLEA compared with 4.2% (12 out of 287) in the control group. There were no reported thromboembolic events in the patients treated with EYLEA in the first six months of the RVO studies.

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*Please see Brief Summary of Prescribing Information on the following pages.*
BRIEF SUMMARY—Please see the EYLEA full Prescribing Information available on HCPEYLEAUS for additional product information.

1 INDICATIONS AND USAGE
EYLEA is a vascular endothelial growth factor (VEGF) inhibitor indicated for the treatment of
Neovascular (Wet) Age-Related Macular Degeneration (AMD); Macular Edema Following Retinal Vein Occlusion (RVOS); Diabetic Macular Edema (DME); Diabetic Retinopathy (DR).

4 CONTRAINDICATIONS
4.1 Ocular or Pericircular Infections
EYLEA is contraindicated in patients with ocular or pericircular infections.

4.2 Active Intravitreal Infection
EYLEA is contraindicated in patients with active intravitreal infection.

4.3 Hypersensitivity
EYLEA is contraindicated in patients with known hypersensitivity to aflibercept or any of the excipients in EYLEA. Hypersensitivity reactions may manifest as rash, pruritus, urticaria, severe anaphylactic/anaphylactoid reactions, or severe intravitreal inflammation.

5 WARNING AND PRECAUTIONS
5.1 Endothelialitis and Retinal Detachments.
Intravitreal injections, including those with EYLEA, have been associated with endothelialitis and retinal detachments [see Adverse Reactions (6.1)]. Proper aseptic injection technique must always be used when administering EYLEA. Patients should be instructed to report any signs of suspicion of endothelialitis or retinal detachment without delay and should be managed appropriately [see Patient Counseling Information (57)].

5.2 Increase in Intraocular Pressure
Acute increases in intraocular pressure have been seen within 60 minutes of intravitreal injection, including with EYLEA [see Adverse Reactions (6.1)]. Sustained increases in intraocular pressure have also been reported after repeated intravitreal dosing with vascular endothelial growth factor (VEGF) inhibitors. Intraocular pressure and the perfusion of the optic nerve head should be monitored and managed appropriately.

5.3 Thromboembolic Events.
There is a potential risk of arterial thromboembolic events (ATEs) following intravitreal use of VEGF inhibitors, including EYLEA. ATEs are defined as acute arterial, non-bacterial thrombotic, or vascular death (including death of unknown cause). The incidence of reported thromboembolic events in wet AMD studies during the first year was 1.8% (12 out of 664) in the control group compared with 4.2% (26 out of 607) in the aflibercept group through week 96. The incidence was 3.1% (60 out of 1924) in the EYLEA group compared with 5.7% (8 out of 139) in the ranibizumab group. The incidence in the DME studies from baseline to week 52 was 1.5% (19 out of 1258) in the combined group of patients treated with EYLEA compared with 4.8% (6 out of 127) in the control group. There were no reported thromboembolic events in the patients treated with EYLEA in the first 6 months of the RVO studies.

ADVERSE REACTIONS
The following potentially serious adverse reactions are described elsewhere in the labeling:

• Hypersensitivity [see Contraindications (4.1)]
• Endothelialitis and retinal detachments [see Warnings and Precautions (5.1)]
• Increase in intraocular pressure [see Warnings and Precautions (5.2)]
• Thromboembolic events [see Warnings and Precautions (5.3)]
• Increased in intraocular pressure [see Adverse Reactions (6.1)].

6 CLINICAL TRIALS EXPERIENCE.
Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in other clinical trials of the same or another drug and may not reflect the rates observed in practice.

A total of 28,283 patients treated with EYLEA constituted the safety population in phase 8 studies. Among those, 21,279 patients were treated with the recommended dose of 2 mg. Serious adverse reactions related to the injection procedure have occurred in <1% of patients treated with EYLEA including endophthalmitis and retinal detachment. The most common adverse reactions (2%) reported in patients receiving EYLEA were conjunctival hemorrhage, eye pain, vitreous hemorrhage, choroidal detachment, injection site reactions, increased intracranial pressure and bone fractures.

7 IMMUNOPHARMACOLOGY.
As with all therapeutic proteins, there is a potential for an immune response in patients treated with EYLEA. The immunogenicity of aflibercept was assessed in in vitro assays in human and monkey systems. The immunogenicity data reflect the percentage of patient's test results that were considered positive for antibodies to EYLEA in immunoassays. The detection of an immune response is highly dependent on the sensitivity and specificity of the assays used, sample handling, timing of sample collection, concomitant medications, and underlying disease state.

8 USE IN SPECIFIC POPULATIONS.
8.1 Pregnancy
Risk Summary
EYLEA has not been studied in pregnant women. Aflibercept produced adverse embryofetal effects in rabbits, including external, visceral, and skeletal malformations. A fetal No Observed Adverse Effect Level (NOAEL) was not identified. At the lowest dose shown to produce adverse embryofetal effects, systemic exposures (based on AUC, for free drug) were approximately 5 times higher than AUCs observed in humans for a single intravitreal injection of aflibercept at the recommended clinical dose [see Animal Data].

In embryofetal development studies, aflibercept was not always predictably active at pregnancy doses, and it is not known whether EYLEA can cause fetal harm when administered to a pregnant woman. Based on the anti-VEGF mechanism of action for aflibercept, treatment with EYLEA may pose a risk to human embryofetal development. EYLEA should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

All pregnancies have a background risk of birth defect, loss, or other adverse outcomes. The background risk of major birth defects and miscarriage for the indicated population is unknown. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2%–4% and 15%–25%, respectively.

Data
Animal Data
In the embryofetal development studies, aflibercept produced adverse embryofetal effects when administered every three days during organogenesis to pregnant rabbits at intravenous doses of 0.5 mg/kg per day, or by six days during organogenesis at subcutaneous doses of 0.5 mg/kg per day. Adverse embryofetal effects included increased incidences of postimplantation loss and fetal malformations, including anasarca, umbilical hernia, diaphragmatic hernia, gastroschisis, cleft palate, cleft lip, cloacal, intestinal atresia, spina bifida, meningocele, anasarca, heart and major vessel defects, and skeletal malformations (fused vertebrae, sternebrae, and ribs; supernumerary vertebral arches and ribs; incomplete ossification). The maternal No Observed Adverse Effect Level (NOAEL) in these studies was 3 mg/kg.

8.2 Lactation
Risk Summary
The risk for transferring aflibercept in human milk has not been established. EYLEA is contraindicated in women who are breastfeeding.

Adverse embryofetal effects included increased incidences of postimplantation loss and fetal malformations, including anasarca, umbilical hernia, diaphragmatic hernia, gastroschisis, cleft palate, cleft lip, cloacal, intestinal atresia, spina bifida, meningocele, anasarca, heart and major vessel defects, and skeletal malformations (fused vertebrae, sternebrae, and ribs; supernumerary vertebral arches and ribs; incomplete ossification). The maternal No Observed Adverse Effect Level (NOAEL) in these studies was 3 mg/kg. Aflibercept produced fetal malformations at all doses assessed in rabbits and the fetal NOAEL was not identified. At the lowest dose shown to produce adverse embryofetal effects in rabbits (3 mg/kg), systemic exposure (AUC) of aflibercept was approximately 4 times higher than systemic exposure (AUC) observed in humans after a single intravitreal dose of 2 mg.

8.3 Females and Males of Reproductive Potential
Contraception
The use of contraceptive measures is recommended in women of childbearing potential who are treated with EYLEA.

There is no data regarding the effects of aflibercept on human fertility. Aflibercept adversely affected female and male reproductive systems in cynomolgus monkeys when administered by intravenous injection at a dose approximately 1500 times higher than the systemic level observed humans with an intravitreal dose of 2 mg. A No Observed Adverse Effect Level (NOAEL) was not identified. These findings were reversible within 20 weeks after cessation of treatment.

6.4 Pediatric Use.
The safety and effectiveness of EYLEA in pediatric patients have not been established.

6.5 Geriatric Use.
In the clinical studies, approximately 76% (2049/2701) of patients randomized to treatment with EYLEA were ≥65 years of age and approximately 46% (1250/2701) were ≥75 years of age. No significant differences in efficacy or safety were seen with increasing age in these studies.

17 PATIENT COUNSELING INFORMATION
The following data reflect exposure to EYLEA in 278 patients with DME treated with the 2- mg dose in 2 double-masked, controlled clinical studies (VIVID and VISTA) from baseline to week 52 and from week 52 to week 100.

Table 3: Most Common Adverse Reactions (≥5%) in DME Studies

<table>
<thead>
<tr>
<th>Reaction</th>
<th>EYLEA (N=578)</th>
<th>EYLEA (N=578)</th>
<th>EYLEA (N=578)</th>
<th>EYLEA (N=578)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjunctival hemorrhage</td>
<td>26%</td>
<td>37%</td>
<td>25%</td>
<td>37%</td>
</tr>
<tr>
<td>Intraocular pressure</td>
<td>21%</td>
<td>10%</td>
<td>21%</td>
<td>10%</td>
</tr>
<tr>
<td>Vitreous hemorrhage</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Intravitreal hemorrhage</td>
<td>3%</td>
<td>5%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Increased IOP</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Injection site pain</td>
<td>3%</td>
<td>6%</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Ocular hyperemia</td>
<td>4%</td>
<td>1%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>Conjunctival edema</td>
<td>6%</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Retinal pigment epithelium</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>2%</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Cataract</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Conjunctival edema</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>2%</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Less common adverse reactions reported in ≥1% of patients treated with EYLEA were hypersensitivity, retinal tear, hypotension, and endophthalmitis.

Patients may experience temporary visual disturbances after an intravitreal injection with EYLEA and the associated eye examinations. If patients develop any increase in swelling of the eye or change in vision, advise patients to seek immediate care from an ophthalmologist [see Warnings and Precautions (5.3)].

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How to differentiate CTK from DLK in post-surgical patients

Quick diagnosis leads to better outcomes and reduces long-steroid usage

By Jim Owen, OD, MBA, FAAO

Laser vision correction has progressed in many ways since its U.S. Food and Drug Administration (FDA) approval. The outcomes are improved, and the complications are reduced. Technology has made improvements in the ability to identify good candidates, and in the hands of a skilled surgeon patients are as happy as ever. Therefore, it is interesting when ODs see complications that they do not completely understand, such as central toxic keratitis (CTK). The good news is that incidence is rare with studies estimating its occurrence from 0.0076 percent to 0.016 percent.1

About CTK
Central toxic keratitis has occurred in laser-assisted in situ keratomileusis (LASIK), photorefractive keratectomy (PRK), corneal collagen cross-linking (CXL), and even contact lenses patients, but LASIK is the most common surgery leading to the condition.4

Interestingly, CTK has not been observed in enhancement procedures—the thinking is the condition may be intrinsic to each individual. It is an acute, self-limited, non-inflammatory reaction of the central cornea. It usually appears on Day 3 to Day 9 after surgery but is often preceded by diffuse lamellar keratitis (DLK) on Day 1.5

Diagnosis
Differential diagnosis includes Grade 3 to Grade 4 DLK, pressure-induced stromal keratitis (PISK), and infectious keratitis. CTK often results in opacification of the central corneal along with a significant hyperopic shift in the patient’s refraction.6 Confounding early diagnosis of CTK is the fact that it is often preceded by DLK on postop Day 1 and Day 2, and the two have overlapping features.4

DLK is defined by infiltrative white cells at the interface of the LASIK flap. These infiltrative cells are diffuse in the central or peripheral flap interface and respond to increased topical steroids. DLK will typically resolve in 5 to 8 days and only rarely has any impact on the final refractive outcome.7

A clinical pearl of treating DLK in 2020 is identifying the specific steroid being used (anecdotally my colleagues and I have found generic prednisolone acetate has been less effective), make certain the patient is shaking the bottle vigorously prior to instilling the drop, and if I am still concerned, switch the patient to difluprednate ophthalnic emulsion (Durezol, Novartis). I have found that most Grade 1 and Grade 2 DLK patients are improved the following day by increasing the steroid from qid to q2h. If the patient is not improved the next day, contact the operating surgeon.

Several features delineate CTK from infectious keratitis. While central opacification and edema associated with the conditions can be similar, CTK eyes are white and quiet. There is no injection nor an anterior chamber reaction that often accompanies infectious keratitis. Inflammatory cells often surround the central opacification in infectious keratitis in a “fluffy” pattern that are not seen in CTK.

The cause of CTK is currently unknown. Theories include patients having a hypersensitivity to materials within the tear film that, when exposed to the excimer laser, results in apoptosis of keratocytes. There is a toxic reaction when these “substances” go through photoactivation by the laser. The keratocyte apoptosis has been documented by confocal microscopy and can affect the stroma on the posterior of the flap as well as in the corneal bed.

The rate of apoptosis appears to be greatest early in the condition based on optical coherence tomography (OCT) images and pachymetry. Corneal thickness gradually returns because a proliferation of keratocytes and fibroblasts aid in reconstructing the stromal matrix. Therefore, treatment of CTK is controversial because steroids slow the proliferation of keratocytes and inflammatory mediators.

Diagnosis and treatment
CTK is preceded by or assumed to be DLK upon initial diagnosis. Conventional treatment for DLK is increasing the topical steroid, usually from qid to q2h.8 The patient should be seen the following day. When the condition worsens, the next step for DLK is lifting the flap and rinsing the interface with steroid. While the two conditions can appear similar under the slit lamp, often the Grade 3 to Grade 4 DLK patient will experience a foreign body sensation or ocular pain.9

Unfortunately, the diagnosis of CTK is made after the attempts of treating DLK have failed. Increased steroids, lifting the flap, and rinsing the stromal bed can have deleterious effects on the CTK patient. Steroids slow the proliferation of keratocytes and lifting the flap can increase the amount of tissue loss on the anterior stromal bed. This results in an increase in hyperopia and a thinning of the cornea. Current thinking supports the use of steroids and lifting the flap because their adverse effects on CTK patients are less than the results of not treating an advanced DLK patient.

Recovery from CTK is 6 to 18 months with the central cornea gradually clearing and the anterior curvature steepening as the cornea thickens. This results in a reduction of hyperopia over time. Both oral doxycycline and topical vitamin E have been used to treat CTK, but neither has been studied.

CTK is a non-inflammatory self-limiting condition that can be a result of PRK or LASIK as well as other non-refractive procedures. Making the diagnosis that this condition is not DLK as soon as possible at minimal reduces the risk of long-term topical steroid use and may improve the long-term outcome of the patient. Of course, collaborating with operating surgeon is best for everyone.

References
Contact Lenses

Engineer a specialty contact lens practice

Contact lens experts detail how to help more patients see better and deliver life-altering care

By Susan A. Resnick OD, FAAO, FSLS, and Priya Patel, OD

S oftware engineers use the terms “front end” and “back end” to differentiate between the final user interface (front end) and the coded data (back end). The hardware contains the physical tools and infrastructure enabling the program to be processed and displayed. We can apply these same concepts to engineering a specialty contact lens (CL) practice.

Defining specialty CL practice

When we refer to a specialty CL practice, we are describing a practice that seeks to excel in and promote CLs as an exclusive niche, both clinically and financially. The clinical focus may be all encompassing or more narrow. A practitioner may choose CLs as a sub-specialty and focus, for example, on presbyopia or pediatric CLs. Likewise, a clinic may serve a population of medically needy irregular cornea patients. The definition does not imply that all lenses must be complex or custom designed. For example, a successful CL specialist might limit her fitting to soft CLs and still successfully serve a wide variety of patient needs.

Why fit specialty CLs?

ODs are aware of the increasing influence (both positive and negative) of disruptors in the market. These include online spectacles, online exams, and alternative sourcing of CL products. Direct-to-consumer subscription services are available as well. Many of these disruptors seek to bypass professional optometric services.

Developing a Specialty Contact Lens Practice of Excellence ensures a loyal patient base, one which is, by necessity, less price sensitive. In the end, CL specialists not only help patients see better and deliver life-altering care, but we derive continued intellectual stimulation and re-energize ourselves and our staff with the professional rewards.

The back end

ODs need “data” to drive the specialty CL practice. First, develop an understanding of clinical indications for specialty CLs. Keep in mind that specialty lens fitting does not apply only to irregular corneas. Even “normal” corneas may benefit from custom-designed or extended-range soft CLs.

While the industry has seen a great expansion of available parameters in non-custom soft lenses, including daily disposables, CL fitters often see cases in which patients’ Rx needs fall outside these ranges. Even normal corneas cannot all be squeezed into conventional brands. Remember that sagittal depth comes into play with soft lens fitting, and horizontal visible iris diameter (HVID) is a better predictor of lens fit than central corneal curvature.

When choosing CL modality for correcting asymmetry, it is important to distinguish between corneal toricity and internal (residual) cylinder. When designing toric gas permeable (GP) lenses, corneal cylinder exceeding 3.00 D will require a back surface toric or bitoric CL, and visually significant refractive cylinder in the presence of a spherical refractive will require a front surface toric design.

Aspheric multifocal CLs, whether GP or soft, are the design of choice for most presbyopes, except for patients having no intermediate needs and high visual demand for a fixed near distance.

Overnight keratoorthokeratology (ortho-K) and myopia management are two fast-growing categories and represent opportunities for developing specialty services. The recent launch of an U.S. Food and Drug Administration (FDA-approved daily disposable center-distance multifocal design (MiSight, CooperVision) adds to previously available choices of off-label applications of an extended depth-of-field daily disposable, monthly replacement bifocals, and custom-designed planned replacement soft lenses. Overnight ortho-K offers the benefit of myopia control as well as the freedom from daytime visual correction and a reversible alternative to refractive surgery.

Medically necessary CLs aid in visual rehabilitation and provide critical surface protection for patients suffering from a wide range of anterior segment pathology, including corneal ectasia, post-surgical irregularity, corneal scarring, and a compromised tear film secondary to auto-immune disease. A practice’s “database” for this sub-specialty should include a lens selection strategy. Consider this proposed contact lens classification scheme:

- Corneal GP, custom soft, hybrid lenses for low to moderate irregularity with centered corneal apex
- Intralimbal or hybrid lenses for post-penetrating keratoplasty, post-filter surgery, mild pellucid marginal degeneration
- Hybrid or scleral lenses for greater corneal irregularity, greater lid sensitivity, challenging environments and lifestyle

The next level of the data set is fitting analytics. This includes diagnostic (“trial” fitting) and empirical (topography-based modules) analysis. With increased prescription of scleral lenses as well as overnight ortho-K lenses, the trend over the past several years has been toward empirical fitting. This has been supported by increased availability of topographic and surface profiling instruments that offer CL design software modules. Some are brand specific, and others are brand agnostic.

Empirical fitting “gets you there faster” by limiting the number of trial lenses and fitting sets, and allows fitters to visualize changes without multiple on-eye trials. It also reduces potential re-orders.

For blink-independent designs such as ortho-K, scleral CLs and, to a large degree, intralimbal designs, empirical fitting is very reliable. Empirical fitting software also facilitates rapid calculations for back surface toric corneal GP lenses.

Diagnostic skills, however, still must be relied upon for evaluation of suitability for dispensing as well as for troubleshooting. Trial lens assessment is helpful when fitting corneal GP lenses and custom soft designs to gauge patient tolerance and evaluate lens centration and movement with the blink.

Here is a recommended fitting set inventory:

- One well-configured spherical corneal GP fitting set in a 9.5 mm diameter
- For presbyopic GP fitting, a low-eccentricity back surface aspheric design that can incorporate additional add power on the front surface to accommodate most needs
- For mild corneal irregularity in post-refractive surgery or corneal transplant patients, one larger-diameter design (i.e., 10.4 mm) offering a reverse geometry profile is beneficial
- Hybrid fitting sets are available for both regular and irregular cornea patients
- Custom soft keratoconic fitting sets

The hardware

A solid foundation of specialty CL practice infrastructure includes clinical equipment and supplies, staff training protocols, and administrative procedures and tools.

Equipment considerations can be divided into basic tools and advanced technology. Necessary equipment is largely already found in a well-outfitted primary-care exam lane but should also include a topographer, V-gauge, loupes, a Burton lamp, and scleral lens inserters and removers. Advanced instrumentation to consider are a radioscopy, lens modification unit, anterior segment optical coherence tomographer (OCT), scleral profilometer, and confocal and or specular microscopes.

Must-have accessories include CL cases, disinfecting and storage solutions, lens cleaners, removers and inserters, and table mirrors.
Delegating all procedures that can be performed outside of the exam room is the key to achieving the most proficient and profitable CL practice. Staff training protocols should develop conceptual, technical, and patient-communication skills. This includes:

- Proficiency and accuracy with instrumentation; ability to explain the why of testing
- Insertion and removal (I&R)
- Lens verification
- GP lens modification
- Patient training
- Topography and tomography: Knowledge of which maps are relevant to condition
- Follow-up examinations: Understanding how to handle patient complaints and assess compliance with care products and I&R techniques
- Phone triage: Knowledge of what constitutes an urgency or emergency, how to appropriately advise patients or direct their questions

Process and protocol

The third cornerstone of your well-engineered specialty CL practice is comprised of the fee structure, the appointment template, lens ordering procedures, tracking and return protocols, and the written patient communications templates.

Your fee structure can be either “global” or “à la carte,” but in either case should yield proper return on investment for all materials and time spent with the patient inclusive of fitting, training, lenses, supplies, and follow-up care. Be sure to account for shipping and handling costs when setting your fees.

Regarding patient scheduling, here are tips for optimizing practice efficiency and profitability:

- Differentiate between comprehensive primary care exam and CL consultation regarding exam procedures and the corresponding fees
- Differentiate between CL consultation and the actual diagnostic evaluation
- If possible, do not use chair time for procedures that can be handled by a technician
- Work in other patients during all “fits”
- Schedule catch-up time or time to work in new patients or dispensing visits on any given day

Finally, draft and store templates for patient forms such as advance beneficiary notice (ABN), financial agreement, scleral lens consent form (Figure 1), myopia management/ortho-K consent forms and letter of medical necessity (Figure 2). (See article on website for downloadable figures.)

The front end

Through creative and resourceful front-end engineering, utilizing all forms of communication and media, ODs can convey their expertise, effectively educate current and potential new patients, and successfully build patient referrals.

Let’s break down these marketing efforts into internal marketing and external marketing.

Internal marketing

The most direct and personalized approach is to start right in the exam room with the patient in the chair. Providing a newly fitted or refitted patient with comprehensive oral and written instructions is paramount to patient success and will ensure affirmation of the OD’s superior care and expertise.

Here is a short checklist of patient management best practices:

- Prefitting: Summarize findings after comprehensive diagnostic evaluation; describe two alternatives; explain the “first” choice; outline process
- Dispensing: Reassure patient that it is not “one and done;” establish time guidelines; be sure all questions and concerns are addressed; mention after-hours “support”
- Follow-up: Pre-appoint visits; post-dispensing call; update spectacles; perform any “posted” tests; order spare lenses

Semi-annual or annual progress visits, even with a successful fit and happy patient, should never be merely “routine.” Remember the “humble brag” goes a long way. Remind patients of how complex their cases were and how pleased you are at the outcome. Try to bring up one or two new developments you are looking forward to discussing or providing to them in the future.

Additional important touch points include the reception desk and the waiting area. This can come in the form of office brochures (Figure 3) and copies of articles in publications written by the doctors. The literature should cover a range of topics related to specialty lenses, from myopia management to scleral lenses, and serve as excellent conversation starters in the exam room. These brochures go on to list indications, fitting process, and basic handling. Patients are a prime source of family and friend referrals and an ideal demographic to offer an update to newer technology.

External marketing

Consumers are constantly bombarded with a stream of digital marketing sent directly to their handheld devices. In order to succeed with building an online presence, employing efficient strategies can capture the next new patient and keep current patients invested in the practice’s services.

Reach within the practice’s internal patient base is limited, so taking the marketing approach online may cast a wider net. Most social media platforms such Twitter, Facebook, and Instagram are free to post on. Sponsoring posts to targeted groups, such as “emerging presbyopes” or “mothers in your neighborhood,” is a cost-effective way to utilize the marketing budget. Numerous platform management tools, such as Hootsuite and Buffer, will streamline the tedious task of multiple daily posts onto various channels. A main key of gaining a social media presence is persistence in posting, instead of a “set it and leave it” approach. Facebook Boost or sponsored posts are a cost-containing option in comparison to print ads. Digital Facebook advertising works within a budget to set parameters to reach a specific age range, gender, and ZIP code. Newspaper ads and alternative print ads are often much more expensive and require weekly repetition to truly gain traction.

One of the first impressions of the office is the practice website. It is imperative to make sure it is mobile-device friendly (optimized for mobile). In order to achieve search engine optimization (SEO), ensuring that the site appears high on the list of results through a search engine, list all available services. The addition of a blog or newsletter added automatically in accordance pages can improve the ranking of the page in search engine results. This can include industry and professional journal publications.

Google Reviews are a strong basis of internet referrals. Once the front desk staff confirms updated email address and mobile number for patients, they receive a direct link to write a review after completing their exams. The reviews then show up to the office-locale–specific Google pages, linking real patients and their experiences in their own words with the office information directly alongside it.

Finally, referral sources from within the community are a tried-and-tested option to building a specialty contact lens practice. During calmer periods, meet with corneal specialists, pediatric ophthalmologists, cataract surgeons, pediatricians, and optometrists in various settings. Instead of setting up an appointment and taking up valuable time otherwise spent with their patients, call ahead to ensure the specific doctor is in that day. Stopping in during patient hours allows time for a brief encounter with the office manager and the doctor between patients regarding the services you can offer. Often, bringing literature such as the brochures mentioned in this article, as well as referral pads and business cards, will serve to remind the doctor when the next CL patient comes around.

After a canvassing visit, we send a letter to summarize our discussion and reiterate our promise to send the patient back for all other services.

REFERENCES

on a vaccine, developing different ways to stimulate the immune system. As of 8 April 2020, the global COVID-19 vaccine landscape includes 115 vaccine candidates, of which 78 are active. Of those 78, 73 are in exploratory or preclinical stages. The most advanced candidates have recently moved into clinical development.

Biotech companies like Moderna Therapeutics have been able to rapidly generate new vaccine designs against COVID-19 by taking a piece of the genetic code for these surface proteins and fusing it with nanoparticles that can be injected into the body. Moderna has shipped the first batches of its COVID-19 vaccine. The vaccine was created just 42 days after the genetic sequence of the virus was released by Chinese researchers in mid-January. The first vials were sent to the National Institute of Allergy and Infectious Diseases (NIAID) in Bethesda, MD, where the vaccine will be reared for human testing.

Imperial College London is designing a similar vaccine using coronavirus RNA. Pennsylvania biotech company Inovio is generating strands of DNA it hopes will stimulate an immune response.

**Financial help on the way**

One certain fact is this pandemic has wrought havoc on the U.S. economy. The CDC recommendation that all routine health care be suspended has brought most optometric practices as well as most service industries to a screeching halt. The U.S. government has funded several stimulus bills to help ease the economic burden. Will stimulus loans or grants replace the income lost due to the pandemic? No. But it is help. And any and all help is appreciated.

Newly approved legislation provides paid sick leave and paid family and medical leave for some American workers, free testing for people without insurance, and added funding to states for Medicaid.

**The Internet and telemedicine**

Perhaps the longest-lasting effect of the coronavirus pandemic will be the widespread use of telemedicine. As the COVID-19 virus stresses the healthcare system, telemedicine is stepping into the spotlight and allowing healthcare providers and caregivers to better respond to patients.

Telehealth is emerging as an effective and sustainable solution for precaution, prevention, and treatment to stem the spread of COVID-19. Many chronic patients have scheduled teleconsultations from their home, avoiding face-to-face clinic visits and hence minimizing their risks of exposure.

**Social distancing**

To slow the spread of COVID-19 through communities, the CDC has encouraged Americans to practice “social distancing” measures. Experts point to lessons from history indicating these measures work, including those from the 1918 Spanish influenza pandemic. That does not make it any easier. Unless you are a dedicated introvert, you may be going stir crazy by now.

Fortunately, help is available—the Internet. The Internet allows us to practice social distancing yet also preserve at least some social connections. People in quarantine or self-isolation can seek care, visit friends, “see” family and doctors virtually, and provide updates on their conditions. I have a newfound, I know I would go crazy without FaceTime to see the little guy.

**Conclusion**

This coronavirus epidemic is a worldwide problem—one that will likely become even bigger in the coming weeks and months. For those infected, as well as those trying to avoid infection, these are difficult times. But amid all the doom and gloom, there are reasons to remain hopeful.

As Thomas Paine wrote in *The American Crisis*, “These are the times that try men’s souls.” While Paine was describing a coming battle with a human enemy, we are at this moment in history in a conflict with an unseen, unforgiving foe. Yet we are a resilient people. The greatest minds and resources necessary to combat the virus have been made available. There is nothing the American people cannot overcome. This too shall pass.

**REFERENCES**


**In Focus**

**Hope amid COVID-19**

Continued from page 6
A mentor once taught me that 95 percent of treatment is making the right diagnosis. Once the proper diagnosis is made, the treatment can easily be obtained by referring to a vast wealth of publications and internet sources or referring the patient to the proper specialist.

An “atypical” case of misdiagnosis is presented here. The patient, now middle-aged, had a misdiagnosed eye disease that almost resulted in unnecessary surgery.

Case presentation
A 67-year-old black female with a history of uncontrolled primary open-angle glaucoma (POAG), greater in the left eye, presented for a follow-up examination. She was on maximum medications and had undergone selective laser trabeculoplasty in both eyes and a trabeculectomy in the left eye. She was urged at multiple visits over the past year to undergo trabeculectomy in the right eye as well. The concern was that the patient’s glaucoma was progressing based on the visual field loss despite medical and surgical interventions and despite the fact that intraocular pressures (IOP) were maintained in the mid-teens.

The patient had severe (dense) arcuate superior field loss OU (Figure 1 left and middle). At her last follow-up visit, it was noted that the optical coherence tomography (OCT) of the retinal nerve fiber layer (RNFL) findings did not correlate with the visual field findings (Figure 1 far right). Regardless, the patient was referred for a trabeculectomy consult in the right eye.

The patient returned two months later for the trabeculectomy consult with the glaucoma specialist who agreed that the visual fields did not fully correlate to the OCT or to the optic nerve head appearance. It was thought that the dense superior arcuate visual field loss in both eyes may have been due to extensive peripapillary atrophy. No additional treatment was advised, and the patient was referred for a retinal evaluation to determine possible retinal etiology of the progressing arcuate superior field defects in both eyes.

Examination of the retina revealed subtle retinal pigmentary changes in the inferior arcuate region in both eyes (Figure 2). Fundus autofluorescence (AF), on the other hand, revealed more obvious bilateral, symmetric inferior arcuate areas of hypo-AF in both eyes surrounded by hyper-AF abnormalities (Figure 3).

Diagnosis
Based on the AF appearance, the patient was diagnosed with sector retinitis pigmentosa (RP), a type of regional retinal degeneration in which the patient is asymptomatic because a small portion of the retinas are affected and the visual field loss is superior. Superior field loss is often unnoticed by patients compared to inferior field loss.

Discussion
This case underlines the importance of ascertaining that the structural findings (in this case RNFL thinning) match the functional findings (visual field loss). Closer examination of the RNFL thinning pattern reveals superior thinning OU and inferior thinning only OS. Yet the visual field defects are symmetric and dense. The superior arcuate visual field defects can be explained on the basis of the inferior arcuate retinal defects caused by the sectoral RP.

The combination of two diseases which can both...
cause visual field loss makes the glaucoma more challenging to treat. In another reported case, a patient was misdiagnosed as having POAG on the basis of the arcuate field loss when in fact the patient had RP.\(^1\)

One must determine, if possible, which disease is responsible for the progressing field loss. There are two ways of differentiating the etiology of the progressive field loss.

First, visual field loss in photoreceptor degenerative diseases like RP is symmetric and very dense because early retinal thinning affects the outer retina. Glaucomatous field loss, on the other hand, is usually relative in the early and moderate stages of the disease and asymmetric.

Second, the RNFL in RP is usually thicker than normal and is not affected until the end stage of the disease. On the other hand, glaucoma affects the RNFL early in the disease.

Also important to note: The ganglion cell analysis (GCA) will be abnormal in retinal degenerative diseases. The reason for this is not well understood, but if one is following glaucoma in a patient with a hereditary retinal degeneration like RP, it is important to know that the GCA will be abnormal in both diseases and cannot be used to differentiate the two.

In summary, misdiagnosis can delay treatment or can result in inappropriate treatment. In our haste to diagnose patients, errors can be made that have the potential to result in further harm to the patient. Clinicians need to be alert when diagnosing "atypical" presentations of disease without further investigation or when results from various tests don’t make sense.

Acknowledgement: The author would like to thank Kim Poirier-Schmidt, OD, for sharing this case.

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**Figure 2.** Color photos reveal subtle RPE defects in the inferior arcades in both eyes.

**Figure 3.** Fundus AF reveals symmetric inferior arcuate areas of hypo-AF surrounded by a rim of hyperAF; mirror images consistent with hereditary retinal disease that correlate with the visual field defects.

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For decades, glycosylated hemoglobin (HbA1c) has been the “gold” standard laboratory metric for the quality of blood glucose control in patients with diabetes. It is also among the best markers for development and worsening of microvascular complications, including diabetic retinopathy.

More recently, with the advent and wide-scale adoption of continuous glucose monitoring (CGM) devices, multiple shortcomings of HbA1c measurement have become apparent to both patients and providers alike.

These shortcomings include poor/inadequate correlation with average blood glucose levels, and under-estimation of the degree and impact of high and low blood glucose levels on patients’ quality of life and risk of bad outcomes.

Here, I will review key differences between HbA1c and glucose time-in-range (TIR) derived from frequent self-measurement of blood glucose (SMBC) and CGM systems. My hope is to better prepare ODs to more accurately gauge patients’ diabetes control and risk of vision loss based on the latest evidence.

Glucose ranges

Glycosylated hemoglobin is not a faithful measurement of “average” blood sugar control. Work by Beck et al has shown that for any given HbA1c value, a wide range of mean blood sugar levels correspond to that value.

For example, for an HbA1c of 7 percent evaluated in a sample of 387 subjects, the mean glucose ranged from 135 mg/dl to 185 mg/dl among patients assessed via calibrated, continuous glucose monitoring (CGM) systems with measurements taken every 5 minutes for a mean of 66 days. This wide range demonstrates a significant discord between A1c and the clinically measured average among diabetes patients.

To put a finer point on it, Beck’s dataset shows that a patient with an HbA1c of 9 percent might, in reality, have a better mean blood glucose level than a patient with an HbA1c of 7 percent. Similar findings were shown in a larger dataset of 545 adult, type 1 diabetes patients.

Continuous monitoring

CGM systems employ a subcutaneous filament sensor in the abdomen or arm to continuously measure interstitial glucose levels and corresponding blood glucose levels on a 24/7 basis over 7 to 10 days. Measurements are automatically relayed via a transmitter to a receiver that patients view, which also includes graphic display of glucose values over time (8 to 24 hours), rate of glucose change, and audible/vibration warnings when glucose is high or low when the rate of change is excessive.

A variation on CGM is flash glucose monitoring, which requires patients to manually scan a sensor placed on the upper arm as frequently as desired to reveal instantaneous (flash) glucose measurements over a 14-day period.

Both types of glucose sensors facilitate easy measurement of glucose time-in-range (TIR), which refers to the percentage of time a patient’s blood glucose levels are within a pre-specified range, typically 70 to 180 mg/dl, over a specified time interval, ranging from 2 to 90 days (see Figure 1).

Analysis of 7-point, daily spot glucose data gathered from 1,440 subjects in the landmark Diabetes Control and Complications Trial (DCCT) showed that a 10 percent increase in TIR reduced the risk of diabetic retinopathy development by 61 percent and early kidney disease by 40 percent independently of HbA1c (see Figure 2).

Analysis of CGM data from 3,262 type 2 diabetes subjects revealed similar risk reduction for all stages of diabetic retinopathy after all adjustments, including HbA1c, underscoring the value of TIR as an additional metric to consider in study outcomes and clinical assessment of individual patient risk for the onset and progression of diabetic retinopathy.

Moreover, TIR is an immediately visible, understandable, and malleable value in patients’ day-to-day efforts at achieving good glucose control. The International Consensus Panel on Time In Range recently released recommendations that most patients with type 1 and type 2 diabetes strive for a TIR >70 percent.

Importantly, CGM algorithms also calculate the percentage of time patient glucose levels are “above range” (>180 mg/dl), “below range,” (<70 mg/dl) and “very low” (<55 mg/dl). These metrics facilitate corrective measures by patients and physicians alike, giving insight into daily, temporal fluctuations in blood glucose levels that cannot be assessed by HbA1c.

Moreover, variations in patient hemoglobin status (anemia, polycythemia, chronic kidney disease, and genetic hemoglobinopathies) may render
Masquerading maculopathy: The importance of correct diagnosis

Case shows need to investigate further to provide patients with the correct treatment

By Sherry J. Bass, OD, FAAO, FCOVD, Dipl ABO

Patients who are misdiagnosed not only lose the opportunity of knowing what they really have but are also deprived of the proper treatment and/or knowledge of other systemic findings associated with their diagnosis. More seriously, they may be forced to undergo unnecessary treatments that have no chance of treating their disorders.

Presented here is an “atypical” case of misdiagnosis where the patient was proactive. The patient was told she had an atypical case of age-related macular degeneration. She did not like the word “atypical” and investigated further.

Case: Atypical AMD or not

A 56-year-old white female presented for a second opinion. Another eye care practitioner had diagnosed her in her 40s with atypical age-related macular degeneration (AMD). She was concerned about the word “atypical.”

Having heard how macular degeneration can lead to legal blindness, she wanted to know if she was going to progress. In addition, her mother died in her 50s but was already using low-vision aids for her “macular degeneration” due to poor vision. Health history was notable for type 2 diabetes and patients with diabetes about glucose time-in-range, counsel them about its significance to diabetic retinopathy and encourage TIR goals consistent with ocular risk reduction.

TAKE-HOME MESSAGE

In the case discussed here, a maculopathy caused by a mitochondrial point mutation was misdiagnosed as “atypical” age-related macular degeneration, although it can also be confused with other macular dystrophies, such as Stargardt disease. Careful consideration of the factors discussed can help not only give patients the treatment they need but avoid giving them treatment that they don’t.

REFERENCES

high cholesterol. Her mother also had diabetes.

Best-corrected visual acuities were 20/25 OD and 20/25 OS. External examination of the eyes revealed normal pupils, clear corneas and lenses, full eye movements in all fields of gaze, and intraocular pressures (IOP) of 18 mm Hg in each eye.

Retinal exam revealed normal optic nerve heads with 0.25 cup-to-disc ratios, normal vasculature, and normal peripheral fundus grounds.

Examination of the maculas, however, were noted for symmetric paramacular rings of circular or nummular areas of geographic atrophy of the retinal pigment epithelium (RPE) and scattered areas of pigment migration (Figure 1). Fundus autofluorescent (AF) imaging revealed symmetric paramacular circular areas of hypo-AF with scattered areas of hyper-AF (Figure 2). Optical coherence tomography (OCT) through the macula revealed distinct areas of outer retinal thinning and RPE atrophy corresponding to the atrophic circular lesions in both eyes (Figure 3).

**Discussion**

It is easy to understand why this patient was originally diagnosed with "atypical" AMD. However, several characteristics need to be considered before making this diagnosis. First, she was diagnosed in her 40s, and AMD is a degenerative disease typically affecting individuals aged 50+ years. Second, fundus appearance was very symmetric, which is suggestive of a hereditary disease or macular dystrophy. Third, the AF images demonstrated hyper-AF areas, which are indicative of lipofuscin deposition, yet the patient had no drusen in either eye.

Maculopathy in this patient is typical of a disease caused by an A3243G mitochondrial point mutation. This mutation occurs on the mitochondrial DNA in the cytoplasm of the cells, not the nuclear DNA, and is inherited through the mother. It is associated with a variety of systemic abnormalities and is a specific type of maculopathy that can be mistaken for AMD and other macular dystrophies.

This mutation was originally reported to be associated with “mitochondrial encephalopathy, lactic acidosis, and stroke-like” episodes, known as MELAS, but has since been associated with maternally inherited diabetes, as in this patient, deafness, cardiomyopathy, chronic progressive external ophthalmoplegia (CPEO), a pure myopathy, gastrointestinal dysmotility, and renal failure. Short stature has also been reported.

The so-called “mutation load” (the number of cells affected by the mutation) is directly associated with the severity of the disease manifestations. The maculopathy can vary but generally results in a circumferential distribution of parafoveal atrophy, with speckled areas of hyper-AF surrounding the areas of atrophy, as seen in this patient.

In addition to AMD, this maculopathy can be confused with other macular dystrophies, such as Stargardt disease. It is the widespread speckled AF, which cannot be predicted on the basis of fundoscopy, that is a feature of this maculopathy and differentiates it from other forms of macular dystrophy and degenerations.

The patient was advised to obtain genetics tests to confirm this mutation and hearing tests, although she denied hearing loss. She was also told to consult her primary-care practitioner for other systemic manifestations of this condition.

**REFERENCE**

Case study: Vascular abnormality diagnosed as arteriovenous malformations of the iris

Determining diagnosis, prognosis, and whether referral for more specialized care is needed

By Benjamin P. Casella, OD, FAAO

Vascular abnormalities of the iris and ciliary body can take on an impressive appearance, or they can be very subtle and easily missed. In addition, they can present a diagnostic quandary if they are difficult to visualize or extend or arise from the posterior segment side of the iris.

A patient presented recently with a vascular abnormality which caused me to pause and investigate further in order to sort out a diagnosis, prognosis, and the need (or lack thereof) for a referral for more specialized care.

Case presentation

A 59-year-old Caucasian female was referred for a comprehensive eye examination as per a recent diagnosis of type 2 diabetes mellitus. She had no complaints and wore reading glasses as needed. Medical history was remarkable for systemic hypertension, type 2 diabetes mellitus, and high cholesterol. Her medications included hydrochlorothiazide and a generic statin.

She was newly diagnosed with diabetes; she was not yet prescribed anything for glucose control and was working on dietary changes. Family history was remarkable for diabetes, systemic hypertension, and cataracts. She also had an uncle who was remarkable for diabetes, systemic hypertension, type 2 diabetes mellitus, and high cholesterol. Her medications included hydrochlorothiazide and a generic statin.

She was diagnosed with diabetes; she was not yet prescribed anything for glucose control and was working on dietary changes. Family history was remarkable for diabetes, systemic hypertension, and cataracts. She also had an uncle who was blind in one eye, but she did not know why.

Entering unaided distance visual acuities were 20/25 in the right eye and 20/201 in the left eye. Pupil function was normal in each eye, and extraocular muscle function was unremarkable for each eye. Confrontation visual field assessment showed frankly full visual fields for each eye, and intraocular pressure (IOP) assessment by means of rebound tonometry was 17 mm Hg in the right eye and 19 mm Hg in the left eye. The patient was found to have a low amount of astigmatism in each eye with best-corrected visual acuities of 20/20 in each eye.

Anterior segment examination of the right eye showed unremarkable lids and lashes, open anterior chamber angles, a clear cornea, quiet conjunctivae, and a quiet anterior chamber with an iris of normal architecture. Examination of the left anterior chamber was essentially the same except for a prominent vascular abnormality of the iris at the inferior temporal aspect of the limbus (Figure 1).

The examination of this abnormality under high magnification via slit lamp yielded no additional information. I also viewed the patient’s anterior chamber angles by means of gonioscopy, and no other abnormalities were noted. The abnormal blood vessel did not appear to extend further into the angle when viewed in this fashion. There were no signs of vascular compromise, such as hemorrhaging.

The patient did not recall being told of any iris abnormalities in the past, and her last eye exam was reportedly about 5 or 6 years prior.

The patient was dilated with 1% tropicamide and 2.5% phenylephrine. While the patient was dilating, I researched this finding by consulting my Atlas of Eye Disease and performing a search of the world’s peer-reviewed literature.

Posterior segment examination showed healthy and dry retinas with healthy and perfused optic nerves. The patient was phakic with a trace amount of nuclear sclerosis in each eye. A three-mirror contact lens was used to better visualize the peripheral retina to the ora serrata in the left eye, and no abnormalities were seen. By this method, the posterior aspect of the iris was unremarkable to the extent to which it was seen.

Spectral domain optical coherence tomography (OCT) studies of the left iris and angle showed no other corresponding abnormality. As it approached the angle, the iris was flat on each side.

In addition, B-scan ultrasound was unremarkable. Anterior segment photography of the abnormality was saved in the patient’s record, and this will be repeated at a follow-up visit.

Diagnosis

Based on the clinical presentation and lack of associated abnormal findings, the patient was diagnosed with an arteriovenous (AV) malformation of the left iris. The exact origin of this malformation was frankly unclear, but the iris was the only tissue with which it was in overt correspondence.

AV malformations of the iris appear to be relatively benign findings, with the affected blood vessels exhibiting essentially normal function.1 There are also no apparent systemic associations.1

The patient was advised to call immediately if she experienced a sudden loss of vision and/or eye pain, which could be a sign of a hemorrhage into the anterior chamber—although the risk for such is likely very low. She was invited to return in 4 to 6 months for a follow-up examination and will be examined annually after that if all findings are stable.

Conclusion

Evaluation of such an abnormality of the iris warrants dilation of the pupil, thorough retinal examination, and visualization of the posterior side of the iris to check for related findings to include a malignancy of the iris or adjacent tissue.

A careful examination of the conjunctival vasculature is also warranted, in keeping with the notion that the abnormal iris vasculature may not be the primary site of the abnormality in question.

REFERENCE

Enhance your vision for the future over the course of four invigorating days packed with clinically relevant CE and the latest cutting edge research. Discover the latest products and technology in the spacious exhibit hall to help improve patient care and take your practice to the next level. Network with the best and brightest in optometry from around the world and enjoy numerous exciting social events. Get your groove on in the vibrant city of Nashville while you explore its popular attractions and diverse blend of music. Come find your inspiration for excellence at Academy 2020 Nashville.
You may not realize it, but as of 2020 there is now only one way to increase Medicare reimbursement rates, barring Congressional intervention. Let’s review how we got here and what can be done.

In a rare instance of bipartisan support, Congress overwhelmingly passed the Medicare and CHIP Reauthorization Act (MACRA) in 2015, which effectively ended the flawed Sustainable Growth Rate formula (SGR) for determining Medicare’s physician reimbursement schedule. The SGR for years had repeatedly forced Congress’s intervention to prevent draconian cuts to the Medicare physician fee schedule, with providers often asked to hold claims until the legislative fix was passed or submit claims for reimbursement at reduced rates, then track and wait for the claims to be adjusted once the legislation was approved.

No one practicing at the time was sad to see the SGR go. MACRA also provided for an annual Medicare physician fee schedule increase of 0.5 percent (SGR go). MACRA also provided for an annual Medicare reimbursement at reduced rates, then track and wait for the claims to be adjusted once the legislation was approved.

No one practicing at the time was sad to see the SGR go. MACRA also provided for an annual Medicare physician fee schedule increase of 0.5 percent (SGR go). MACRA also provided for an annual Medicare reimbursement at reduced rates, then track and wait for the claims to be adjusted once the legislation was approved.

Quality Payment Program (QPP)
You probably also now know that MACRA forced the Center for Medicare & Medicaid Services (CMS) to enact regulations to create a new physician payment system, called the Quality Payment Program (QPP). QPP has two options through which all Medicare providers may be paid (Figure 1):

1. The Merit-Based Incentive Payment System (MIPS), which is the default program for all providers
2. Alternative Payment Models (APMs), which have very specific eligibility criteria, of which very few specialty providers, ODs, are currently able to participate.

Because the majority of optometrists are ineligible for APMs, let’s look at MIPS in more detail.

MIPS
If this is your first year participating as a Medicare provider, or if you don’t meet the MIPS low volume threshold, then you don’t have to participate in MIPS (i.e. your reimbursements default to the published Medicare physician fee schedule). What is this “low volume threshold”? During the two different 12-month periods CMS evaluates for eligibility, care providers are subject to mandatory MIPS reporting requirements when they meet the following low volume threshold (Table 1).

1. Billing more than $90,000 in Medicare Part B allowable charges
2. Seeing more than 200 unique Medicare Part B patients
3. Performing more than 200 Medicare professional services

Put another way, ODs are exempt from MIPS reporting when they do not exceed all three criteria (i.e. if you bill ≤$90K in Medicare allowables; OR see ≤200 unique Medicare patients; OR perform ≤200 professional services to Medicare beneficiaries, then you fail to trigger the low volume threshold and are exempt from MIPS reporting).

However, if all three low volume thresholds are exceeded but ODs don’t report data in MIPS, ODs are guaranteed to receive the maximum negative payment adjustment (9 percent penalty on all Medicare reimbursements received in a future year).

Be mindful that professional services include exam codes, diagnostic codes, and therapeutic codes. So, if you see a Medicare patient for an initial visit, perform a refraction, diagnose her as a glaucoma suspect and take baseline optic nerve head photos, then bring her back for a follow-up exam several months later to include a baseline optical coherence tomography (OCT) of the optic nerve and a baseline visual field, that would total five professional services (i.e. the two exam visit codes plus the three diagnostic codes for the photos, OCT, and visual field; recall refraction is not a recognized professional service in Medicare, so it would not count in this example).

The easiest way to determine if you are MIPS eligible or MIPS exempt, is to visit https://qpp.cms.gov/participation-lookup and enter your National Provider Identification number (NPI) in the participation lookup window. A report will be generated which states your MIPS status.

ODs who are exempt from MIPS should still pay attention.

First, recall that MACRA authorized a small annual increase to the Medicare physician fee schedule through 2019. As a result, Congress does not currently have plans to change the Medicare physician fee schedule any further beyond last year’s increase, so the only way to get a “raise” from Medicare is to participate in MIPS (or in advanced APMs) and score high enough to earn a bonus payment. If you are exempt from MIPS and don’t or can’t opt-in to participate, then you default to the basic Medicare physician fee schedule for all services you provide with no further increases.

TAKE-HOME MESSAGE Under the new incentive based payment system (MIPS), eligible professionals should receive annual payment increases or decreases based on certain performance measures.

1. Billing more than $90,000 in Medicare Part B allowable charges
2. Seeing more than 200 unique Medicare Part B patients
3. Performing more than 200 Medicare professional services

to your fee schedule. CMS will allow providers to opt-in to MIPS who meet at least one low volume threshold (the bottom row of Table 1).

Second, when CMS released its original 962-page QPP proposal in April 2016, the low volume threshold was set at $10K in Medicare Part B allowable charges. In the 2,398-page final QPP regulations posted in October 2016, CMS decided to make the initial transition to QPP as easy as possible, then increase its scope and complexity over time. It seems CMS may have tipped its hand, possibly signaling its intent for a very low threshold in the future. If so, that would draw many more ODs into MIPS, providing incentive to collect MIPS data now to practice before risking a penalty, make adjustments as needed, and see their scores. ODs may voluntarily report data without risk of payment adjustments, or if their scores are good enough to earn a bonus and they are eligible to opt-in, they may choose to do so.

**TABLE 1  MIPS low volume threshold & eligibility criteria.**

<table>
<thead>
<tr>
<th>Medicare Part B Allowable Charges in Prior Year, $</th>
<th>Number of Medicare Part B Patients Examined in Prior Year</th>
<th>Nr. of Professional Services Provided to Medicare Patients in Prior Year</th>
<th>MIPS Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤$90K</td>
<td>≥200</td>
<td>≥200</td>
<td>Excluded from MIPS &amp; nothing to do</td>
</tr>
<tr>
<td>≤$90K</td>
<td>≥200</td>
<td>&gt;200</td>
<td>Not required to report (no action required) OR may voluntarily report MIPS data &amp; be scored</td>
</tr>
<tr>
<td>≤$90K</td>
<td>&gt;200</td>
<td>&gt;200</td>
<td>Not required to report (no action required) OR may voluntarily report MIPS data &amp; be scored</td>
</tr>
<tr>
<td>&gt;$90K</td>
<td>&gt;200</td>
<td>&gt;200</td>
<td>This is the Low Volume Threshold &amp; those who meet all 3 criteria are REQUIRED TO REPORT DATA</td>
</tr>
</tbody>
</table>

**MIPS Scores**

Speaking of MIPS scores, CMS generates one for every provider from self-reported claims submissions, EHR reports, and/or from registry if they participate in one such as the American Optometric Association’s (AOA) MORE registry, which is free to AOA members. This MIPS score is based on points earned in four weighted categories (Figure 2): quality (45 percent), promoting interoperability (25 percent), cost (15 percent), and improvement activities (15 percent). If no information is submitted, a provider’s MIPS score is 0.

**Threshold Performance Score (TPS)**

Currently CMS also arbitrarily sets a minimum score, known as the Threshold Performance Score (TPS), to which every provider’s MIPS score is compared. Providers scoring below the TPS receive a penalty on all future Medicare payments. Those scoring in the lowest 25th percentile of all eligible providers participate in MIPS in 2018. Because MIPS is required by law to be budget neutral, CMS forecasts how much will be collected in penalties, then uses the penalties from poor performers to fund all bonuses for the high performers via a tiered and pro-rated formula. Because so many providers have scored so well to-date, the bonus amounts have been very small, with the bigger benefit being penalty avoidance.

While the TPS was initially set very low to ease the transition into MIPS, it has been gradually increased every year (Figure 6), and by year six of the program, the law requires the TPS to be set to either the mean or the median MIPS score of all providers from the year before.

Unless the law is changed, optometrists can easily see the impact on the number of providers falling below the TPS and thus incurring a penalty in the near future (not to mention if the low volume threshold is lowered, forcing new “MIPS rookies” to compete against “seasoned MIPS veterans”).

**cmsreports**

98% OF ELIGIBLE PROVIDERS PARTICIPATED IN MIPS IN 2018
Optometry’s Apollo 13 moment during COVID-19

Continued from page 1

skinny black ties, and wielding pencils and slide rules like weapons of wars, crafted and fashioned from thin air, each more improbable than the last. Together they reached the boundaries of their knowledge and training and blew past them to perform feats of daring-do that defied the gravity of human limitations.

One jerry-rigged jewel stood out: a life-saving carbon dioxide (CO2) scrubber, fashioned only from materials available to the astronauts onboard, including, naturally, duct tape and cardboard. The device, dubbed “the mailbox,” enabled the different-shaped CO2 filters from the CM and LM to work in tandem, essentially fitting the proverbial “square peg fit in a round hole.”

I was in second grade when the events of Apollo 13 occurred in April 1970 and barely remember it. Still, when the full import of the COVID-19 pandemic hit me on the evening of March 15, I thought of Apollo 13 and how we could apply the same lessons of courage, creativity, resiliency and perseverance in humanity’s latest “darkest hour.”

There is one vital difference between the pair of dire straits. Apollo 13 was blindsided by a random stroke of bad luck fueled by a small design flaw that had been overlooked. We, on the other hand, knew what was coming because we could see our peril approaching from thousands of miles away.

Optometry, we have a problem!

It didn’t take the sound of an oxygen tank exploding for me to know that optometry had a problem on the evening of March 15—just a little “ding.” It was a text from our current fourth-year University of Alabama at Birmingham (UAB) extern: “UAB has suspended all non-emergent and routine care and pulled students off rotations and externships.”

I checked my inbox for confirmation. I found it, but I had to read it several times before I believed it and the full impact hit home.

For a health system with the size and influence of UAB to pull the plug on all non-emergent and elective procedures and appointments, including routine dental and ophthalmic outpatient care, there had to have been a disruptive and seismic healthcare event, especially considering the small number of COVID-19 cases in Alabama, at the time. I knew they were not acting in isolation and there would soon be a tsunami of major healthcare systems and academic medical centers across the country acting in concert.

Given the close affiliation of our Veterans Affairs (VA) Medical Center in Birmingham with UAB, I surmised we would soon follow the same course. I called a co-worker and discussed the possibility. We brainstormed on how to start changing the shape and function of our clinics to conform to a mandate that would surely be coming down soon from the C-suite.

Less than 48 hours later, we had our orders to pare back our clinics to only urgent/emergent care and implemented them. Most institution-based ODs followed a similar path. In integrated, hierarchical healthcare systems, employees do what their leadership tells them.

For independent ODs, however, it took a few more days of debate, along with guidance from the American Academy of Ophthalmology (AAO), the Centers for Disease Control (CDC), the American Optometric Association (AOA), numerous state optometry boards, and in some cases, orders from state governors, before a consensus developed and the realization hit home that routine eye care, as we knew it, would cease for the time being.

It was interesting to watch the debate on various optometry social media platforms. It was a confusing time, and many were understandably shaken and confused.

There were those who said, “We can’t close our practices—beADoctor!” Others argued that “being a doctor” meant taking public health warnings seriously and dutifully performing our role in minimizing virus transmission.

It was apparent to the latter group, and eventually most others, that “non-essential” health professions and specialties requiring close doctor-patient working distance like optometry, dentistry, and ophthalmology, were at risk of droplet transmission.

Optometry does many things well, but in general, we are not experienced in or accustomed to stringent infection control measures.

Despite our best efforts, it is hard to completely disinfect all equipment and exam rooms in between patients, as well as the eyeglass frames patients handle and try on. The risk of coronavirus transmission through tears and ocular secretions was small with the appropriate personal protective equipment (PPE), but a possibility, nonetheless.

Most of us ODs like to avoid gloves and masks if possible—they are barriers between us and patients that might make us look less friendly and approachable (two of our many strengths!). Besides, aren’t those for other “messier” health professions and specialties?

I believe we found the right balance: recognizing the need to improvise means attending to the basic vision and ocular health needs of patients who were quarantined or sheltered in place while reserving in-patient exams for urgent cases and patients with more fragile ocular disease for whom a prolonged exam delay would mean increased risk to their sight.

Optometrists took a step back, realized the proper role of support they could play in the COVID-19 pandemic, and powered down, despite, in many cases, grave financial risk to themselves, their employees, and their families.

Our profession, with its longstanding tradition of independence and autonomy—and the infighting that can sometimes accompany it—was, in the span of 48 hours, essentially marching lockstep in a responsible and medically ethical direction.

It was the most remarkable scene I had witnessed in 30 years of practice. We showed, like the crew of Apollo 13, that we were made of “the right stuff.”

We gotta turn everything off, now!

Per the cinematic retelling of the story, this was the urgent warning from a young engineer to Flight Director Kranitz and his team as they debated how to get the crew back to Earth safely. None of it would matter, he said, if the crew didn’t preserve every amp of energy they could, down to the bare essential functions needed to survive.

First, they had to power down the control module designed to carry three astronauts to the moon and back and move to the lunar module (LM), now a “life boat,” whose designed purpose was to carry a pair of crew members to the moon and back to the CM over two days.

Could the three survive in the LM with minimal life support? Would they be able to steer the LM toward Earth while executing the “long burn” of the LM’s descent engine needed to give them the necessary course bearing and boost to go the distance?

Even if they were able to accomplish those improbable feats, would they be able to power up the CM in time to reenter the earth’s atmosphere (all the while preserving those precious amps), and would the CM have the structural integrity after the initial explosion to survive the searing heat of reentry?

No one knew the answers to those questions because no one had ever considered such an outrageously “impossible” scenario to begin with.

Many ODs find themselves in a similar perilous position in the midst of the COVID-19 pandemic; trying to figure out ways for their practices, employees, and families to financially survive this unforeseen period, and at the same time, practice the methods of safe hygiene, infection control, social distancing, and self care needed to prevent themselves and all their contacts from becoming another COVID-19 statistic.

With all due respect, sir, I believe this is going to be our finest hour

Actor Ed Harris delivers this stirring line after over-hearing a couple of NASA officials already envisioning failure and how the public will perceive and judge NASA in its wake. His characterization of Flight Director Kranitz was of a man who would tolerate no doomsaying and instead rose above panic and groupthink by leaning into solutions and choosing to believe his “mission impossible” would succeed.

Similarly, I have already seen encouraging signs that ODs are up to the task of mapping out their own paths through this dangerous odyssey. We have a seminal opportunity to unify, band together, and forge a stronger yet more flexible profession in the flames of the COVID-19 pandemic, regardless of practice mode and philosophy.

Even in the midst of the painful process of furloughing employees, many independent ODs have sought to ease the shock by extending benefits, and in some cases even salaries, for as long as possible, and helped guide their staffs through the process of obtaining unemployment benefits and financial assistance from the various federal COVID-19 relief packages recently passed by Congress.

ODs, their professional organizations, practice management consultants, ophthalmic industry part-
ners, staff, and patients have become more transparent with each other and opened new, improved lines of communication.

Examples of this are:
- The AOIs quickly convened town hall on coding and practicing telemedicine offered to its members during the first week of the shutdown as well as its ongoing assistance in guiding members through federal COVID-19 financial relief packages
- The two-night town hall hosted by Gary Gerber, OD, and his radio show “The Power Hour,” which brought together industry partners to encourage ODs and provide sound advice on how to survive and prepare for restarting private practices post-pandemic
- The dissemination of critical information and opportunities to commiserate, encourage, and brainstorm with colleagues facilitated by social media platforms such as Facebook and ODwire

Many ODs are being forced by circumstance to improvise and reimagine how to deliver care during this trial by fire and after it is over.

Few independent ODs have ever had to triage before because their resources have usually exceeded demand. But with most practices closed to routine care and available only for urgent/emergent care, ODs are learning how to balance public health mandates to decrease in-person visits with their patients’ ongoing optical and ocular health needs.

A vital key in this process has been the sudden interest in and adoption of ocular telehealth and other means of digital care and product delivery.

Many in our profession have been resistant to telemedicine, tightly gripping the rigid status quo notion that the “standard of care” must always entail the “full works” at an in-person exam.

There is another possibility, however: a standard that flexes and adapts to the unique circumstances of patients, differences in access to care, and sudden disruptive societal shifts like pandemics to ensure the critical needs of the moment are met and other, less urgent conditions are addressed in an appropriate timeframe and manner.

Our medical colleagues in various specialties, including ophthalmology, have not hesitated to move forward in the practice of telemedicine. Also, ODs in federal and other institutional settings have been using telemedicine for years, including telemental screening for diabetic retinopathy, ocular diseases, and other forms of ocular telehealth, both synchronous (live televidereferencing) and asynchronous (store and forward), to help patients receive appropriate care.

Telemedicine can not and will likely never be able to deliver every service and treatment that a patient may need, but it is a valid and proven means of triaging and managing immediate concerns in a responsible manner and identifying conditions and treatments that should be delivered at in-person exams. Telemedicine can increase quality eye-care access when demand is greater than resources and in critical times like during a pandemic when we must limit in-person care.1

As telemedicine becomes increasingly necessary, ODs must gain confidence in remote diagnostic and treatment decisions previously made only after in-person exams.

Regardless of in-person or online exams, data is inherently “incomplete,” a fact ODs who have practiced the “medical model” for years will acknowledge. What matters most in both cases is the use of sound clinical judgement to ensure that immediate problems and potential ophthalmic conditions are identified and the right level of care is delivered, at the right time, by the right practitioner.

These austere times force us to stretch beyond our previous comfort zones, reconsider previous ways of thinking, and try novel methods of care delivery. If you feel you are taking on “too much risk” by using telemedicine, consider the providers who are working on the front line of the pandemic with limited data, making life and death decisions on the fly. The risks of responsibly used for telemedicine to deliver eye care are less than the risks of not using telemedicine at a time like this.

I’m encouraged to see so many ODs in these first few weeks of crisis embracing and utilizing telemedicine platforms, perhaps for the first time. Ocular telehealth will continue to evolve in its protocols and technology, further improving accuracy and correlation with face-to-face exams.2 Its impact will extend far beyond the time when herd immunity and an inevitable COVID-19 vaccine ends the current pandemic.

A successful failure
Apollo 13 was branded “a successful failure” in that it failed in its mission objectives and nearly resulted in catastrophic loss of life but ultimately achieved the most important criterion of success— bringing the crew home safely.

It is impossible to know, at this time, where our present perilous moment will lead us. It is safe to say, though, much of what we have grown accustomed to in our practices has changed forever.

Some creative, entrepreneurial spirits will have the energy and perseverance to “jump start” their private practices, rise from the ashes, and become stronger than ever before.

There will always be room in optometry for hardy souls to carve out their own paths, offering specialty care and a level of service that is rarely matched by other practices more tailored to the average needs of patients.

Others, understandably, will seek the stability and shelter of employment. Among many mid- to late-career ODs, the current trend of selling to private equity companies and continuing to practice as employees may accelerate due to the anticipated devaluation of private practices. For better or worse, vertical integration will increase.

The emotional scars of COVID-19 on the public will never completely fade. Our patients will emerge from this time with a heightened awareness of infectious disease transmission, and they will demand proof we are following best practices of social distancing and sanitation from the start of the patient care experience to the finish, beginning with the waiting room, continuing with exam areas and equipment, and into the dispensary.

They will expect the option of remote and small footprint “low” to “no-touch” services and products, a niche that ocular telehealth and online ordering and delivery can help fill. “Curbside delivery” of ophthalmic products may even evolve into “curbside consult” care like “drive-thru” fever clinics that have popped up recently. Patients will return for eye care when this is over, but they may prefer not to be forced to come into a physical office every time they need assistance. ODs will need to factor these expectations into business restarts.

There is a constant we can count on, however: people will need to see their best in an increasingly complex and challenging world, and ODs are the professionals best suited to deliver the services and products that will safeguard vision and improve it.

There is no choice but to “work the problem” of the COVID-19 pandemic and keep moving forward. We must “fit a square peg in a round hole,” and as Apollo 13 Flight Director Krantz put it, “Failure is not an option.”

REFERENCES

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Being a military spouse, procuring corneas, dry eye, and beignets

Why contact lenses and dry eye?
I love everything dry eye, and I try to learn whatever I can about it. My patients complain mostly about redness, sensitivity, irritation, and I like to keep my patients happy. I know they want to wear their contact lenses and wear eye makeup, so I have done a lot of research into the best way for them to continue doing those things.

What were the challenges as a military spouse with moving and job changes?
My husband is active duty military, and it has kept us moving from town to town. My career has ebbed and changed, probably more than the average OD. I used to think of it as a detriment to my career, and now I think of it as a blessing because I have had so many different experiences. I have had a broader range of experiences. It has made me realize what I really like to do in optometry. Now that it’s been 18 years since I graduated, I feel like I have a very strong sense of my passion.

What is something your colleagues don’t know about you?
When I was in college I worked in an eye bank. I was the eye bank technician who procured the corneas, which meant that I frequented the morgues. I used to go out at all hours of the day and night to procure these corneas that were to be transplanted. Now I work for a corneal surgeon who does the transplants. It’s really cool to see the other side of it. I did that for years, even when I was in optometry school I worked for an eye bank. It’s a good way to pay the bills. [Laughs]

What’s your guilty pleasure food?
Definitely a beignet. I eat them only once a year. I live in Louisiana, so I try to try learn whatever I can about it. My patients complain mostly about redness, sensitivity, irritation, and I like to keep my patients happy. I know they want to wear their contact lenses and wear eye makeup, so I have done a lot of research into the best way for them to continue doing those things.

Why a write book about dry eye, and are you working on a second?
Every time we go to a new city, I get a job and within three years we are moving again. Right around the two-year mark I start having patients who want to schedule with me and discuss their families with me. I finally get to feel like, “OK, I’m their eye doctor.” Then we move, and I start all over again. I wrote the book to reach more patients with the idea that dry eye is something that can be controlled. I wanted to build a community online where it didn’t matter where I was living. I have thought about a second book. A colleague suggested that we should write a book together, so that might happen in 2020. That book will be geared specifically for women, addressing cosmetic concerns that women have around dry eye.

Where do you see yourself in 10 years?
I see myself still practicing, of course. I want to have a stand-alone dry eye clinic where people could come in and have treatments, ones to make their eyes more beautiful. I would like to build out my online courses to include a course specifically on dry eye. I would see myself doing more online work and in-clinic. I don’t want to stop seeing patients; you lose your edge.

Do you have any regrets?
I don’t know. Let’s say not jumping into the dry eye world quicker.

What’s something about optometry you’d like to change?
I currently live in Louisiana, and we have one of the best optometric laws in the country where we can do lasers and write prescriptions for medications that you swallow. I did my residency in New York state, at that point optometrists couldn’t use punctal plugs. Ten years later, in 2011, I moved back to New York state and we stayed until 2013. You could then use punctal plugs, but I still couldn’t write a prescription for doxycycline. I would like to see optometry have reciprocity between states because I have six different state licenses from moving from state to state. I have to keep those up if I think I am going to move back. I also have to take an exam every time I move. It would be nice if there were more common laws about what ODs could do nationwide and not so specific state to state. It’s frustrating, especially if I move back to a state. Here in Louisiana I can do laser surgery for glaucoma. In California, I have to be certified as a glaucoma specialist. It would be nice to have a bigger standard.

What’s the craziest thing you’ve ever done?
I broke my arm once while running. I was in Syracuse, NY, and it was the most beautiful day of the year. It was gorgeous outside, and I slipped on a wet leaf. I Supermanned, I caught air, and I came, splat, flat down. I broke my arm. [Laughs] I wasn’t even running in the ice and snow or anything cool. It was a gorgeous day outside and I just tripped on a leaf. [Laughs] I’m a little accident prone, which is why I don’t bicycle, roller skate, or ski.

—Vernon Trollinger

What’s been the reaction to your website from patients and other ODs?
So far, so good. I haven’t had any complaints yet that I am giving away the farm or that I am not treating patients properly. I think the more patients know about dry eye, the more awareness is out there. Then the better all of us will do in our offices. I think awareness will drive more patients into our clinics.

Why offer dry eye treatment plans through your website?
When I’m getting ready to move, some of my patients say, “You can’t leave. Who am I going to see?” I refer them to a colleague who I know will take good care of them. Once you build a relationship with patients, they are loyal to you. Now they can reach out to me through my website. I have patients email me every day to tell me things about their eyes or their families because we have built relationships over the years.

What’s the reaction to your website from patients and other ODs?

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The year 2020 is an important milestone for eyecare practitioners.

Coming soon in Ophthalmology Times® and Optometry Times®—insights and information on 2020 and beyond.
We will get through this together with a renewed commitment to helping people See Brilliantly.