iTech
BUILDING THE OPHTHALMIC TECH'S COMMUNITY OF PRACTICE

MATCH YOUR PATIENT WITH THE OPTIMAL IOL

A ROUNDUP OF THE INS AND OUTS OF THIS COMPLEX SUBJECT

By Frank Celia

It can be argued that the most challenging aspect of offering premium intraocular lenses (IOLs) at your practice occurs long before a surgeon enters the operating room. That challenge is patient selection.

The optimal premium IOL patient is someone with both the wherewithal and motivation to part with up to $5,000 to avoid reading glasses but also with the sort of laid-back, Type B personality that can accept a lifetime of compromised vision—traits not always present in the same person.

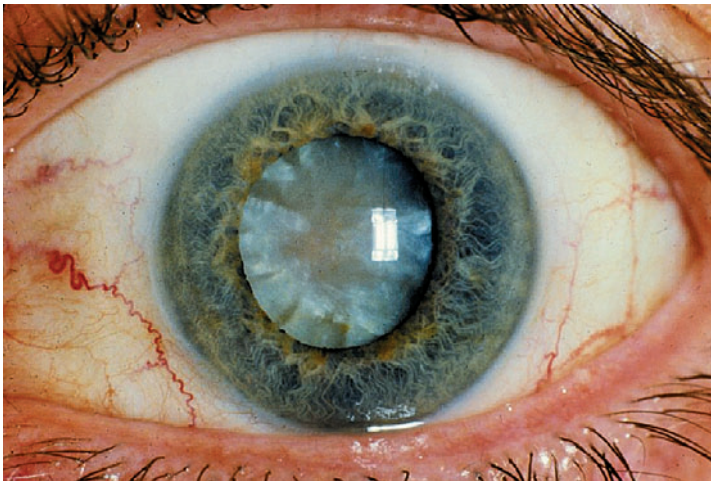
But such patients do exist, and if your practice sees them, support staff can play an important role throughout the selection process. However, doing so means knowing how to discuss the basics of multifocal and accommodative IOLs.

Lens choices

There are three multifocal IOLs approved for use in the U.S. and one accommodative IOL. Taken together, these lenses are often referred to as premium IOLs because they correct for the lack of accommodation that occurs after cataract surgery. Patients pay an out-of-pocket fee for this extra advantage, usually around $2,500 per eye.

- **AcrySof IQ ReSTOR** (Alcon)—**The original version of the AcrySof, approved in 2005, offered a near power of +4.00 D. A newer version, approved in 2008, has a lower near power of +3.00, which offers patients a slight improvement in intermediate vision. This IOL uses diffractive optics to produce its multifocal effect.**
- **ReZoom** (Abbott Medical Optics [AMO])—**This is an enhanced version of AMO's Array multifocal IOL. The design applies refractive optics—different zones within concentric rings focus light differently at varying distances but at the same location on the retina.**

See **IOL** on page 4



Advanced cataract (Photo courtesy National Eye Institute, National Institutes of Health)

INSIDE:

Intravitreal injection

What every assistant needs to know

I inject medications into patients' eyes many times, every single day, and I do it to the same patients as often as every month. I use intravitreal drugs to treat diseases such as wet macular degeneration, macular edema due to retinal vein occlusion, and diabetic macular edema. These options involving needles are clearly better choices than the alternative of going blind. Thankfully, my staff is well educated, and my technique is such that we rarely have complications.

PAGE 11

Introducing an advanced formulation of BROMDAY® (bromfenac ophthalmic solution) 0.09%

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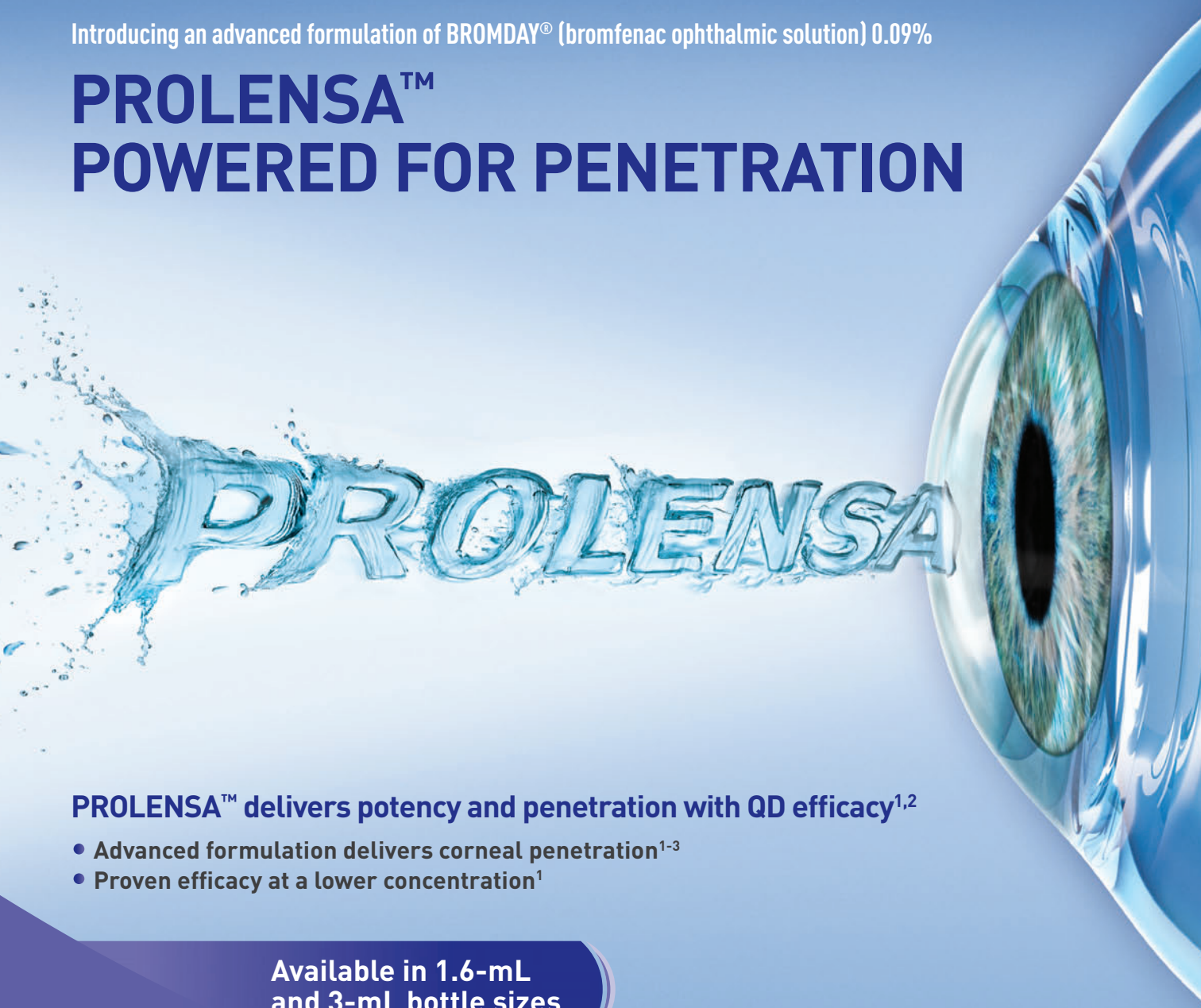

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Indications and Usage
PROLENSA™ (bromfenac ophthalmic solution) 0.07% is a nonsteroidal anti-inflammatory drug (NSAID) indicated for the treatment of postoperative inflammation and reduction of ocular pain in patients who have undergone cataract surgery.

Dosage and Administration
Instill one drop into the affected eye once daily beginning 1 day prior to surgery, continued on the day of surgery, and through the first 14 days post surgery.

Please see brief summary of full Prescribing Information on adjacent page.

References: 1. PROLENSA™ Prescribing Information, April 2013. **2.** Data on file, Bausch & Lomb Incorporated. **3.** Baklayan GA, Patterson HM, Song CK, Gow JA, McNamara TR. 24-hour evaluation of the ocular distribution of ^{14}C-labeled bromfenac following topical instillation into the eyes of New Zealand White rabbits. *J Ocul Pharmacol Ther.* 2008;24(4):392-398.

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Warnings and Precautions
- Sulfite allergic reactions
- Slow or delayed healing
- Potential for cross-sensitivity
- Increased bleeding of ocular tissues
- Corneal effects, including keratitis
- Contact lens wear

Adverse Reactions
The most commonly reported adverse reactions in 3%-8% of patients were anterior chamber inflammation, foreign body sensation, eye pain, photophobia, and blurred vision.

PROLENSA™
(bromfenac ophthalmic solution) 0.07%

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PROLENSA™ (bromfenac ophthalmic solution) 0.07%

Brief Summary

INDICATIONS AND USAGE

PROLENSA (bromfenac ophthalmic solution) 0.07% is indicated for the treatment of postoperative inflammation and reduction of ocular pain in patients who have undergone cataract surgery.

DOSAGE AND ADMINISTRATION

Recommended Dosing

One drop of PROLENSA ophthalmic solution should be applied to the affected eye once daily beginning 1 day prior to cataract surgery, continued on the day of surgery, and through the first 14 days of the postoperative period.

Use with Other Topical Ophthalmic Medications

PROLENSA ophthalmic solution may be administered in conjunction with other topical ophthalmic medications such as alpha-agonists, beta-blockers, carbonic anhydrase inhibitors, cycloplegics, and mydriatics. Drops should be administered at least 5 minutes apart.

CONTRAINDICATIONS

None

WARNINGS AND PRECAUTIONS

Sulfite Allergic Reactions

Contains sodium sulfite, a sulfite that may cause allergic-type reactions including anaphylactic symptoms and life-threatening or less severe asthmatic episodes in certain susceptible people. The overall prevalence of sulfite sensitivity in the general population is unknown and probably low. Sulfite sensitivity is seen more frequently in asthmatic than in non-asthmatic people.

Slow or Delayed Healing

All topical nonsteroidal anti-inflammatory drugs (NSAIDs), including bromfenac, may slow or delay healing. Topical corticosteroids are also known to slow or delay healing. Concomitant use of topical NSAIDs and topical steroids may increase the potential for healing problems.

Potential for Cross-Sensitivity

There is the potential for cross-sensitivity to acetylsalicylic acid, phenylacetic acid derivatives, and other NSAIDs, including bromfenac. Therefore, caution should be used when treating individuals who have previously exhibited sensitivities to these drugs.

Increased Bleeding Time

With some NSAIDs, including bromfenac, there exists the potential for increased bleeding time due to interference with platelet aggregation. There have been reports that ocularly applied NSAIDs may cause increased bleeding of ocular tissues (including hyphemas) in conjunction with ocular surgery.

It is recommended that PROLENSA ophthalmic solution be used with caution in patients with known bleeding tendencies or who are receiving other medications which may prolong bleeding time.

Keratitis and Corneal Reactions

Use of topical NSAIDs may result in keratitis. In some susceptible patients, continued use of topical NSAIDs may result in epithelial breakdown, corneal thinning, corneal erosion, corneal ulceration or corneal perforation. These events may be sight threatening. Patients with evidence of corneal epithelial breakdown should immediately discontinue use of topical NSAIDs, including bromfenac, and should be closely monitored for corneal health.

Post-marketing experience with topical NSAIDs suggests that patients with complicated ocular surgeries, corneal denervation, corneal epithelial defects, diabetes mellitus, ocular surface diseases (e.g., dry eye syndrome), rheumatoid arthritis, or repeat ocular surgeries within a short period of time may be at increased risk for corneal adverse events which may become sight threatening. Topical NSAIDs should be used with caution in these patients.

Post-marketing experience with topical NSAIDs also suggests that use more than 24 hours prior to surgery or use beyond 14 days post-surgery may increase patient risk for the occurrence and severity of corneal adverse events.

Contact Lens Wear

PROLENSA should not be instilled while wearing contact lenses. Remove contact lenses prior to instillation of PROLENSA. The preservative in PROLENSA, benzalkonium chloride may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of PROLENSA.

ADVERSE REACTIONS

Clinical Trial 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 the clinical trials of another drug and may not reflect the rates observed in clinical practice.

The most commonly reported adverse reactions following use of PROLENSA following cataract surgery include: anterior chamber inflammation, foreign body sensation, eye pain, photophobia and vision blurred. These reactions were reported in 3 to 8% of patients.

USE IN SPECIFIC POPULATIONS

Pregnancy

Treatment of rats at oral doses up to 0.9 mg/kg/day (systemic exposure 90 times the systemic exposure predicted from the recommended human ophthalmic dose [RHOD] assuming the human systemic concentration is at the limit of quantification) and rabbits at oral doses up to 7.5 mg/kg/day (150 times the predicted human systemic exposure) produced no treatment-related malformations in reproduction studies. However, embryo-fetal lethality and maternal toxicity were produced in rats and rabbits at 0.9 mg/kg/day and 7.5 mg/kg/day, respectively. In rats, bromfenac treatment caused delayed parturition at 0.3 mg/kg/day (30 times the predicted human exposure), and caused dystocia, increased neonatal mortality and reduced postnatal growth at 0.9 mg/kg/day.

There are no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Because of the known effects of prostaglandin biosynthesis-inhibiting drugs on the fetal cardiovascular system (closure of ductus arteriosus), the use of PROLENSA ophthalmic solution during late pregnancy should be avoided.

Nursing Mothers

Caution should be exercised when PROLENSA is administered to a nursing woman.

Pediatric Use

Safety and efficacy in pediatric patients below the age of 18 have not been established.

Geriatric Use

There is no evidence that the efficacy or safety profiles for PROLENSA differ in patients 70 years of age and older compared to younger adult patients.

NONCLINICAL TOXICOLOGY

Carcinogenesis, Mutagenesis and Impairment of Fertility

Long-term carcinogenicity studies in rats and mice given oral doses of bromfenac up to 0.6 mg/kg/day (systemic exposure 30 times the systemic exposure predicted from the recommended human ophthalmic dose [RHOD] assuming the human systemic concentration is at the limit of quantification) and 5 mg/kg/day (340 times the predicted human systemic exposure), respectively, revealed no significant increases in tumor incidence.

Bromfenac did not show mutagenic potential in various mutagenicity studies, including the reverse mutation, chromosomal aberration, and micronucleus tests.

Bromfenac did not impair fertility when administered orally to male and female rats at doses up to 0.9 mg/kg/day and 0.3 mg/kg/day, respectively (systemic exposure 90 and 30 times the predicted human exposure, respectively).

PATIENT COUNSELING INFORMATION

Slowed or Delayed Healing

Advise patients of the possibility that slow or delayed healing may occur while using NSAIDs.

Sterility of Dropper Tip

Advise patients to replace bottle cap after using and to not touch dropper tip to any surface, as this may contaminate the contents.

Advise patients that a single bottle of PROLENSA, be used to treat only one eye.

Concomitant Use of Contact Lenses

Advise patients to remove contact lenses prior to instillation of PROLENSA. The preservative in PROLENSA, benzalkonium chloride, may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of PROLENSA.

Concomitant Topical Ocular Therapy

If more than one topical ophthalmic medication is being used, the medicines should be administered at least 5 minutes apart

Rx Only

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Under license from:
Senju Pharmaceuticals Co., Ltd.
Osaka, Japan 541-0046

IOL

Continued from page 1

- **Tecnis** (AMO)—**Approved in 2009, this lens employs diffractive optics to produce the multifocal effect. It is the first and only FDA-approved wavefront designed optic that corrects for small spherical aberrations, according to the company.**

A big design difference among these lenses is whether diffractive or refractive optics are used to produce the multifocal effect. Diffractive optics was the first-generation technology. It involves splitting incoming light into two different focal points, one for near objects and one for distance. This essentially creates a bifocal IOL. Generally, diffractive optics are known for producing excellent near vision but unremarkable intermediate vision.

Refractive optics is the newer technology. All incoming light through these lenses reaches the retina at one focal point. Refractive optics are known for producing excellent intermediate vision but unremarkable near vision. Both types of lenses produce the same level of distance vision.

In the past, avoiding reading glasses meant improving near vision. However, in today's world "reading" frequently involves sitting in front of a screen, such as tablet, phone, or laptop, and that requires intermediate vision. So surgeons will often choose lens types based on the patient's lifestyle or job. Also, some surgeons mix and match lenses, implanting a diffractive lens in one eye and a refractive in the fellow eye.

It's worth noting that visual outcomes rely on many other factors besides refractive vs. diffractive optics. These factors include the chosen near addition, the quality of the biometry, the surgical centration of the lens, and the patient's uncorrected refraction.

The other FDA-approved premium lens, Crystalens (Bausch + Lomb), is not a multifocal lens but a monofocal one that works by shifting its position in the eye in response to the patient's muscle movements. The theory is that so-called accommodative lenses like this one produce better contrast sensitivity and fewer side effects, such as glare and halos. However, they may also provide less range of focus than multifocals, therefore increasing the need for reading glasses.

Patient selection

The fact of the matter is all current options for IOL presbyopia correction involve some level of compromised vision. It is hoped that in the future accommodative IOLs with dual or flexible optic design may provide vision with minimal side effects, but that day has yet to arrive. Patients must understand that they will be sacrificing a little bit of distance vision and may encounter nighttime halos and glare in exchange for reduced spectacle dependence.

It is generally agreed that the best patients for premium IOLs are those with hyperopia. The next best are those with high myopia, –6.00 D or greater. Emmetropic patients may be poor candidates for premium lenses because they have so little experience with compromised vision.

Patients must be made to understand that they still may need to wear spectacles on certain occasions. Additionally, some post-operative correction, such as LASIK, limbal relaxing incisions, or piggyback IOLs, may be also necessary. Even the best surgeons have an enhancement rate of about 15%, studies show. Potential candidates should also know that even without postoperative correction, adapting to IOL vision may take up to several months.

The patient should be highly motivated and willing to accept some unmet expectations. Surgeons often look for Type B personalities rather than demanding Type As. Anyone who does a lot of driving at night—truck drivers, for example—is likely a poor candidate for premium IOLs.

Paying for lenses

As a final note, staff should know that paying extra for a medical service already covered by Medicare is a special exception that the CMS made for premium IOLs only. This was a regulatory decision made several years ago that does not apply to any other medical service. Charging extra for other government-funded procedures, known as balance billing, is forbidden by the 1965 legislation creating Medicare. If patients ask to pay extra for other covered services, be sure to dissuade them, or else risk seeing your practice on the local evening news.◗

Premium IOL options

Multifocal IOLs

- **AcrySof IQ ReSTOR** (Alcon)
- **ReZoom** (Abbott Medical Optics [AMO])
- **Tecnis** (AMO)

Accommodative IOL

- **Crystalens** (Bausch + Lomb).

Frank Celia is a freelance healthcare writer based in the Philadelphia area. Reach him at frankcelia@aol.com.


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H202...WHAT'S BEHIND THE BUBBLES?

IF LOYALTY BREEDS COMPLIANCE, THEN PEROXIDE-BASED LENS CARE HAS SOME STAUNCHLY COMPLIANT USERS

By Cystal Brimer, OD

Patients have a lot of options when it comes to contact lens care. In fact, the choices can be quite overwhelming if patients have been given no direction before heading to the aisle. Many offices hand out and recommend peroxide-based solutions, though the basis for patient selection may differ from office to office. Some doctors use peroxide-based cleaning systems as their first choice for every patient, while others reserve these systems for "problem patients." Because peroxide is so effective at removing lens deposition and debris, peroxide systems can add wear time and tolerability for patients who suffer from allergies, build up, or even dryness.

Several things are evident about peroxide users. First, this population is extremely loyal. Once patients consistently use peroxide-based lens care, they rarely return to a multi-purpose solution. Years ago, during a manufacturing shortage, people successfully sold Clear Care (Alcon) on eBay for more than $200 per bottle. Peroxide users are also more compliant. They understand how the system is used and typically don't top off or reuse solution, as patients often do with a multi-purpose solution. This is evidenced by market research showing that a peroxide user buys nearly 50% more solution compared with a patient using a multi-purpose solution.[1] They buy more ounces per year, which translates to better compliance.

But the question is why? Perhaps the patient sees the bubbles when using fresh solution and understands there is a particular cleaning action that no longer occurs when they reuse or top off. Or perhaps we, as doctors and staff, spend more deliberate and focused time educating patients on how to use the peroxide system correctly, rather than shrinking in fear that misuse will lead to an unpleasant and potentially scary experience for the patient.

How does it differ from brown-bottle peroxide?

Hydrogen peroxide is a strong oxidizing solution known for its disinfecting qualities. Some patients may assume that a peroxide-based system is simply brown-bottle peroxide repackaged. Not only is there a difference in the quality of peroxide used, but it also must be neutralized to a gentle saline. This can be done using a tablet or a disc. The value and success of a peroxide system boils down to a few key components that vary from brand to brand: the quality of the starting peroxide, it's ability to clean the lens, and the effectiveness of the neutralization to obtain a comfortable end point.

Currently, there are three brands of peroxide systems and several generics available to the consumer. Clear Care occupies the majority of the market share, but the generic segment has grown quickly.

Clear Care (Alcon) is a one-step system representing more than 80% of the peroxide systems purchased in the U.S.[2] The difference between Clear Care and the other two brands is that Clear Care contains a surfactant. The high-grade peroxide cleans, the surfactant loosens debris and

See **Peroxide** on page 8

Dr. Brimer has a private practice in Wilmington, NC, and has special interestes in contact lenses and dry eye.

Getty Images/iStock Vectors/gyener (bubbles); Thinkstock/iStockphoto

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AdenoPlus™ is the first in-office immunoassay that aids in the rapid differential diagnosis of acute conjunctivitis.

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Reference: 1. FDA Section 510k number (K110722) for RPS Adeno Detector Plus™; March 15, 2011.

For information about incorporating diagnostic evidence into your practice or to order AdenoPlus™, call **1.855.MY.NICOX** (1.855.696.4269).

Peroxide

Continued from page 6

deposits, and the bubbles lift them away. The addition of the surfactant not only keeps soil from adhering to the lens, but also helps provide an environment that repels proteins from the surface. It also aids in making the lens more wettable and comfortable for the patient. Its platinum disc is effective for up to 100 uses; however, a single bottle has enough ounces for approximately 30 uses. This ensures that the disc continues to perform consistently for the entire month, leaving only a very small amount of residual peroxide after the soak, typically undetectable to the patient.

Oxysept (AMO) utilizes tablet neutralization, resulting in a slower neutralization process. Therefore, the lens has a longer exposure time to the more concentrated peroxide, which may be beneficial. AMO recommends the patient use a daily cleaner and saline rinse in addition to the Oxysept peroxide system. The company also recommends adding a weekly enzymatic cleaner. This multi-step, multi-product process may be expensive for the patient and may affect compliance.

AOSept (Alcon) is a disc-neutralized, peroxide-based system. It also requires a separate daily cleaner and saline rinse. Historically, the case and disc were purchased separately, but now they are packaged together with the AOSept solution. The ability of a disc to neutralize peroxide decreases with usage. Therefore, patients had to remember to replace the disc in a timely manner or suffer irritation from the un-neutralized peroxide. AOSept is scheduled to be completely phased out by the end of this year.

All the same?

Is there a difference in peroxide-based generics? It comes down to three factors:

- **Quality of peroxide used**
- **Presence or absence of an effective cleaning surfactant**
- **The system's ability to fully neutralize the peroxide.**

Patient resource

Consider sending your contact lens patients to PourThatOut.com, an online consumer resource created by Alcon. The site offers dos and don'ts, myths and facts, and eyecare professional discussion guide. It guides patients who want to learn more about how to incorporate proper lens care hygiene into their daily lens care routine.

What about generic peroxide systems?

Generic peroxide systems have recently been introduced to the market. Doctors and staff are often well equipped with information to steer patients away from private-label multi-purpose solutions, but is there a difference in peroxide-based generics? It comes down to the same three elements: the quality of peroxide used, the presence or absence of an effective cleaning surfactant, and the system's ability to fully neutralize the peroxide. The first two are straightforward, but the third is a little more complicated.

When a disc is used for neutralization (AOSept, Clear Care, and generics), the design of the case plays an important role. Clear Care and AOSept use the same design, incorporating a high-quality platinum disc attached to the lid/lens holder. This is important because as soon as the peroxide comes into contact with the disc, neutralization begins. In fact, a majority of this process is completed within the first several minutes after contact. If the disc is stationary in the bottom of the case, as in generics, the solution may be in contact with the disc for several minutes before the patient removes lenses out and secures them into the basket. By the time the lenses are in position, the strength of the disinfectant may be somewhat diminished. Also, if the disc is stationary in the bottom of the case, dirt may accumulate on the disc and increase the disinfection burden on the peroxide. Finally, the quality of the disc affects comfort. Studies dating back to the 1980s show that any residual (un-neutralized) peroxide exceeding 100 parts per million (ppm) can potentially cause irritation to the patient.[3,4] Normal saline contains about 60 ppm. The Clear Care/AOSept disc is very effective at neutralizing to less than 60 ppm, but we do not know the amount of residual peroxide left with private-label systems, nor the longevity of the disc. As with any private-label product, companies continually compete for the job, so the manufacturer (solution formulation and case) may change, despite identical labeling to the patient.

Is it safe?

There is no reason to steer patients away from peroxide-based

See **Peroxide** on page 14

HOW WE MANAGE ACUTE CONJUNCTIVITIS

MD, tech weigh in on a team-based red eye protocol to manage acute conjunctivitis.

By Penny Asbell, MD

At the Cornea Service and Refractive Surgery Center in New York, my colleagues and I approach the management of acute conjunctivitis as a team effort. We have adopted a strategy that is beneficial for our patients and doctors and easy for our technicians to follow, with minimal training.

In an effort to efficiently manage time, our practice has increased the role technicians play to include managing acute conjunctivitis. By implementing a red-eye protocol dedicated to effective management of acute conjunctivitis, our technicians are now able to screen patients and perform the AdenoPlus (Nicox Inc.), a rapid, point-of-care test that aids in the differential diagnosis for acute conjunctivitis. Now, if a patient presents with a red eye, a technician initiates the protocol by obtaining the patient's history, triaging him to an exam room as quickly as possible, and administering the AdenoPlus test. The results are available before the doctor enters the room.

The test results have been in line with our clinical diagnostic skills and the results of our macrobiology and virology laboratory. The key advantage of doctors and technicians working together to confirm the presence of adenovirus is ensuring that we do not unnecessarily contaminate the office, other patients, and even staff. The contagious nature of the adenovirus is not new to us; however, its rapid diagnosis is. The technician is able to essentially screen patients to control contagion. We want to protect our patients who are coming in and out of surgery and have more sensitive eyes.

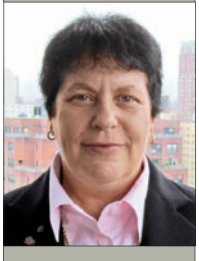
Further, the morbidity associated with the adenovirus is severe conjunctivitis, red eye, swollen lids, pseudomembranes, inflammatory tissues on the surface of the eye, and subepithelial infiltrates in the cornea that can persist. If the test is positive for adenovirus, the technician first puts a flag outside of the room, which alerts the staff that the room has been contaminated. We then communicate to the patient the contagious nature of the virus, that it is likely to spread to the second eye, the serious risk of passing it on to others, and how the patient can limit the spread to others. If the test is negative, then we can explore the possibility of a different viral infection, which typically does not cause such a severe acute conjunctivitis and isn't as contagious. Giving the patient an accurate diagnosis, either way, allows us to better discuss treatment options than we could if we did not definitively know the patient's condition.

Patients respond positively to our method for managing acute conjunctivitis because they leave our office receiving exactly what they came in for: a diagnosis. Uncertainty adds stress to anyone with a medical problem. Having a diagnosis and the facts behind it gives patients a sense of security and trust within our practice.

It is important to let patients know with confidence that a diagnosis has been reached because there is no FDA-approved drug for treating adenoviral conjunctivitis. We explain that to patients and discuss steroids as an option, which may help or worsen the infection. We may also consider a topical antiviral, such as ganciclovir (Zirgan; Bausch + Lomb), which is FDA approved for treating ocular herpes infections but is an off-label, non–FDA-approved option for treating ocular adenoviral infections. There is limited data suggesting it may be helpful with adenoviral infections.[1-5]

If a technician performs the diagnostic test and a viral infection is ruled out, a doctor can then move forward with determining whether the patient has bacterial or allergic conjunctivitis. Nearly all allergic conjunctivitis cases have itchiness as a symptom. If the patient isn't experiencing itchiness, it is unlikely that that he has an allergic reaction. Also, patients with allergies generally experience other allergic reactions, such as asthma and skin problems, which suggest they are prone to allergic conjunctivitis. If the patient's eyelid skin is swollen or has fine wrinkles, that is an indication

See **Conjunctivitis** on page 10



Dr. Asbell is professor of ophthalmology at Mount Sinai School of Medicine and has a financial relationship with Rapid Pathogen Screening (RPS), developer of AdenoPlus.

Conjunctivitis

Continued from page 9

of an allergic reaction because we don't typically see wrinkles with a bacterial or viral infection. Signs that a patient has a bacterial infection include a thick discharge vs. a watery discharge, which is common with viral infections. Also, bacterial infections are typically unilateral (in one eye), whereas viral infections are almost always bilateral (in both eyes).

Medications for bacterial conjunctivitis depend on associated risk factors, such contact lens wear, corneal involvement, or abrasion that could lead to an infection. In this case, we may prescribe fluoroquinolones, which have good broad-spectrum activity. We sometimes prescribe trimethoprim, which has been proven to be effective against methicillin-resistant *Staphylococcus aureus* (MRSA).[6-7]

For allergic conjunctivitis, we design the treatment plan based on what type of allergy the patient is dealing with. If the patient is allergic to environmental findings, such as pollen, we prescribe an antihistamine/mast-cell stabilizer. We also prescribe artificial tears as a lubricant to wash out allergens or substances that might be causing the reaction. We suggest that patients store the tears in the refrigerator because the cold temperature can be soothing and decrease itchiness and irritation related to the allergic response. If the patient has erythema and swelling of the lids, he or she may have contact dermatitis. Therefore, it is important that the technician take a careful history from the patient because this also aids in determining the treatment.

Ms. Hernandez assists Dr. Asbell.

Patients respond well to both technicians' and doctors' involvement in care and treatment. We recommend implementation of a dedicated red eye protocol for any practice because it improves the standard of care for acute conjunctivitis management. ◗

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See **Conjunctivitis** on page 14

Time management for managing patient care

By Wanda Hernandez

The extent of my role in in a red eye protocol for conjunctivitis lies in its execution.

When the practice first implemented the protocol, it was on a trial basis, and it was managed completely by the our doctors. There had come a point where it was taking too long for our doctors to get around to the patients to administer the diagnostic test. To save time, I started jumping in and administering the diagnostic test. From there, the other technicians followed suit.

Now, on a day-to-day basis, techs are administering this critical part of our practice's red eye protocol. It takes just seconds to obtain a tear sample from a patient and only 10 minutes before results are available. The learning curve for technicians performing the diagnostic test relates to obtaining enough of a tear sample and, although instructions state to use a dab-and-drag motion in 6 to 8 locations on the lower eyelid to collect a sample, it is important for technicians to realize that the area is sensitive.

Our previous protocol required patients to wait to see the doctor before even being given a diagnosis. Following that interval, patients next had a 3-day wait before receiving lab results to confirm adenoviral conjunctivitis.

Now patients are very grateful to receive more immediate diagnoses and well-rounded treatment. From the practice side, there is a consensus among technicians that we feel more involved in the patient care process and a better sense of job fulfillment because we are executing the test. The protocol is centered on executing the diagnostic test so, essentially, the process is in our hands. While the patient waits to see the doctor, the techs can answer any questions the patient may have. In turn, doctors are able to better manage their time and provide an accurate and directed treatment plan.

Together, we as technicians are helping doctors improve the standard of care for managing acute conjunctivitis.

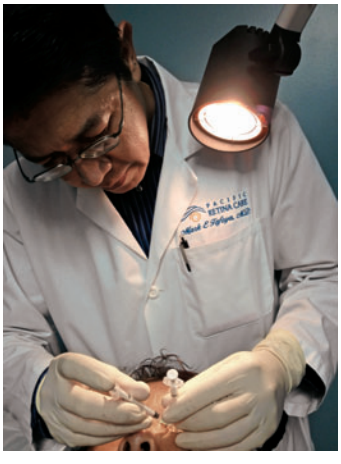
WHAT EVERY ASSISTANT NEEDS TO KNOW ABOUT INTRAVITREAL INJECTION

Understanding the whys and wherefores enables techs and doctors to work together effectively

By Mark E. Tafoya, OD, MD

It seems most people hate the thought of needles. So just imagine the average patient's reaction when you present a scenario in which a needle is injected into the eyeball. I do this to my patients many times, every single day, and I do it to the same patients as often as every month.

I currently use intravitreal Avastin (bevacizumab, Genentech), Lucentis (ranibizumab, Genentech), and Triesence (triamcinolone acetonide suspension, Alcon) to treat diseases such as wet macular degeneration, macular edema due to retinal vein occlusion, and diabetic macular edema. Newcomers Eylea (afilbercept, Regeneron) and Jetrea (ocriplasmin, ThromboGenics) have recently been introduced to the market. Eylea is a VEGF blocker, like Avastin, Lucentis, and Macugen (pegaptanib, Valeant). Its distinction is that after the first 3 monthly injections, the surgeon can decrease to inject every 2 months. Jetrea is the first enzymatic vitreolysis. Like the other drugs mentioned, Jetrea is administered by intravitreal injection. It may replace surgical intervention for some patients. Can you imagine that? An injection taking the place of surgery? I may add these medications to my armamentarium as well.



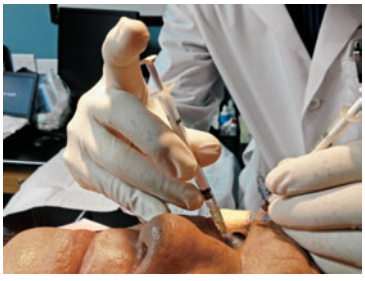
Dr. Tafoya preparing to inject a patient.

All of these options involving needles are clearly better choices than the alternative of going blind. I've been practicing for more than a decade and have seen remarkably positive outcomes of intravitreal injections, with few complications. Thankfully, my staff is well educated, and my technique is such that we rarely have complications.

Following are some tips I'd like to share on administering intravitreal injections successfully.

Sterile technique is key

Intravitreal injections are administered in our office rather than in an operating room. We originally intended to have a minor procedure room specifically used for cryotherapy and intravitreal injection. However, due to volume and patient flow, we decided to try using our exam rooms instead, and it's working out well. We have three identical exam rooms and two Mayo trays that are used for injections and for angiography. Just like in the operating room, we are very careful to prevent infection. (Endophthalmitis, a serious infection inside the eye, is a risk with any ocular procedure.) I was an injecting physician for the MARINA Trial, one of the initial national studies on Lucentis. I use some of what I learned during that time in treating my patients today. Keeping complications at a minimum is important to me.



Dr. Tafoya performing an intravitreal injection on a patient.

I am very careful to wash my hands between every patient encounter, and I require my staff to do the same. The staff also wipes down all equipment between uses and wipes down the counters at the end of the day. We do not allow food in exam rooms or on any countertops. Nonsterile in-

See **Injection** on page 14

Dr. Tafoya is in private practice in Waipahu, HI.

ANATOMY OF A DRY EYE WORK UP

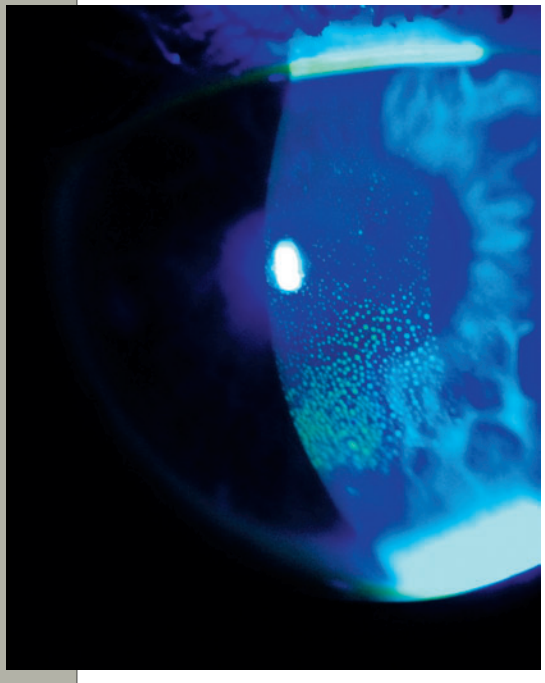
A primer for technicians challenged with new levels of job responsibilities

By Frank Celia

As the aging demographics of the United States continue to manifest in overflowing offices, ERs, and ORs across the nation, healthcare employees can expect to see growing numbers of tasks being handed over to support staff by busy practitioners.

One area in which ophthalmic support staff can be very effective is in the screening and diagnosis of dry eye patients. Much of the work-up consists of asking patients routine questions to help build a history. The clinical tests involved are mostly within the skills sets of ophthalmic technicians. Following are highlights of some common events from an average dry eye work-up.

It is important to know that there is no agreed-upon or gold standard for diagnosing dry eye. It is a professional diagnosis based on combining information from the history and the physical exam, and usually by performing one or more objective tests. Many technicians play an important role in collecting raw data of this kind, and then presenting it to the practitioner for diagnosis.



Fluorescein staining as viewed with with a blue filter on a dry eye patient.

Tear break-up time

One of the simplest clinical tests for dry eye is the measurement of tear film break-up time (TBUT). This means the time lapse between the instillation of fluorescein and the first appearance of dry spots on the cornea. TBUT should be measured before instillation of any anesthetic eye drops. Moisten a fluorescein strip with saline and apply it to the inferior cul-de-sac. Ask the patient to blink several times, then examine the tear film using a broad beam slit lamp with a cobalt blue filter, which will highlight the first dry spots on the cornea. A TBUT of less than 10 seconds is considered abnormal and at risk for dry eye.

Epithelial staining

At some point every patient suspected of dry eye will undergo one of the three epithelial staining techniques: rose bengal, lissamine green, or fluorescein. The goal is to highlight under a slit-lamp examination areas of the cornea or conjunctiva damaged by long-term exposure to dry eye conditions. This physical damage and the staining patterns can be important diagnostic factors.

Sodium fluorescein is a water-soluble dye that does not penetrate healthy epithelial cells but fills intercellular spaces when cell junctions are disrupted. Certain fluorescein staining patterns may correlate with specific conditions.

Interior staining might indicate blepharoconjunctivitis or trichiasis, while intrapalpebral (lying in between the eyelids) might indicate dry eye, photokeratopathy, corneal/epithelial exposure, or inadequate blink.

Rose bengal and lissamine green stain not only dead or devitalized cells but also healthy cells that are protected by an in-

Staining to confirm dry eye

To help diagnose patients with suspected aqueous tear deficiency, ocular surface dye staining may be performed using:

- **Rose bengal**
- **Lissamine green**
- **Fluorescein**

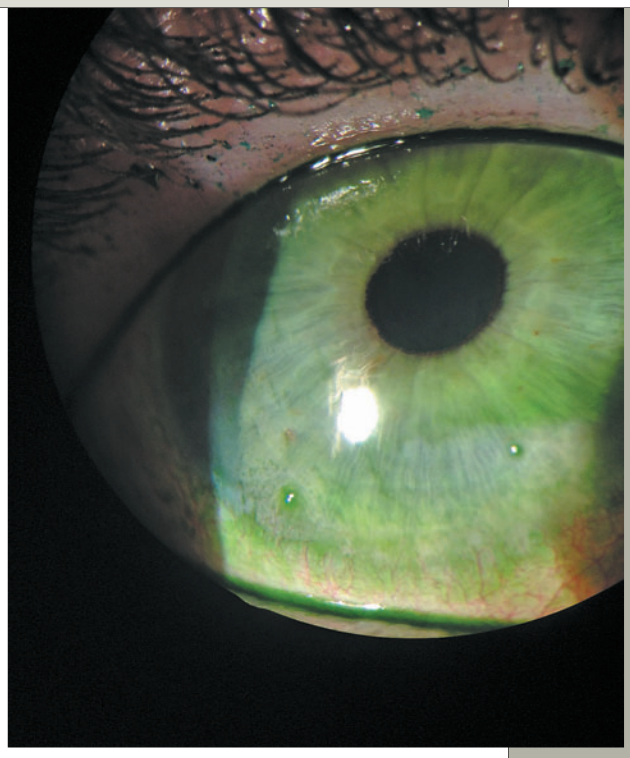
adequate mucin coating. A linear pattern of inferior conjunctiva and corneal staining by rose bengal is often seen in meibomian gland dysfunction. Early or mild cases of dry eye are generally thought to be better detected by rose bengal than with fluorescein. Of the three stains, lissamine green causes patients the least discomfort, but is less sensitive and therefore more difficult to read under a slit lamp examination, according to experts.

Schirmer testing

Schirmer testing determines whether the eye is producing enough aqueous tears to keep its surface moist. A small strip of filter paper is inserted into the lower eyelid (conjunctival sac). The eye is closed, then the paper strip is removed and the amount of moisture on the strip is measured. Depending on the practitioner, the exact procedure may differ. For example, a topical anesthetic may be added to the eye before inserting the paper test strips.

In a 5-minute period, less than 5 mm of wetting is considered abnormal. Five to 10 mm is normal. A younger patient might wet as much as 15 mm of a strip.

The condition most often associated with the Schirmer test is Sjögren's syndrome, a systemic immune dysfunction characterized by aqueous tear deficiency and dry mouth. Many of these patients may also have rheumatoid arthritis. In addition to an abnormally low Schirmer test result, other indicators of possible Sjögren's syndrome include objective evidence of low salivary flow, biopsy proven lymphocytic infiltration of the labial salivary glands, and dysfunction of the immune system, indicated by the presence of serum auto-antibodies.



Lissamine green staining as seen on a dry eye patient.

Evaluating tears

It is possible to evaluate the health of the three tear components: lipid, aqueous, and mucin.

The easiest of these to test is the lipid layer, which is the thin, smooth coating on the outside of tears that prevents them from evaporating. Lipids can be tested during a routine examination by squeezing the eyelid margin to encourage expression from the meibomian gland. If the discharge does not resemble motor oil and puddles at the orifice, the patient may be suffering from meibomian gland dysfunction.

The aqueous component comprises the watery part of the tear. It can be tested by measuring tear lysozyme, tear lactoferrin, epidermal growth factor, aquaporin 5, lipocalin, and immunoglobulin A concentrations with enzyme-linked immunosorbent assay techniques, in addition to tear film osmolarity (TFO). TFO has been shown to be elevated in patients with dry eyes but has been criticized for lacking specificity in meibomitis, herpes simplex keratitis, and bacteria conjunctivitis.

Finally, the mucin component, which is a layer of proteins created by the surface of the eye to allow the aqueous to adhere to the otherwise water-repellent cornea, can be assessed by impression cytology or brush cytology techniques. These methods collect goblet cells that are tested for mucin messenger RNA expression. Although impression cytology is a highly sensitive test, it is a difficult test to perform, requiring proper staining and expert evaluation of samples.

No one test dominates the dry eye field. Practitioners tend to pick and choose which test and evaluation works best for them. Certain tests work better in individual hands. But one thing is certain: The ability to help work up dry eye patients will make you more valuable to your employer.

Frank Celia is a freelance healthcare writer based in the Philadelphia area. Reach him at frankcelia@aol.com.

Peroxide

Continued from page 8

solutions out of fear of misuse. Many of us have been eyewitness to patients who *rinsed* their lenses with a peroxide cleaner. Upon application, the lens delivers a significant burn—the longer it is in the eye, the greater the toxic keratitis that develops. The outer layer of corneal cells in the epithelium is extremely fragile and can be damaged and sloughed off with very little effort. When un-neutralized peroxide ends up in the tear film, it is harmful to these cells. Even after the lens is removed and the eye is rinsed, there is lingering patient discomfort (such as light sensitivity, tearing) because the cells are damaged. Fortunately, once the natural tear film is restored, these cells heal very quickly. Meanwhile, supportive treatments, such as artificial tears and gels, can provide symptomatic relief. It is important to understand and to educate patients that **no** permanent damage is done, even if the product is used incorrectly by accident.

Peroxide-based cleaners provide patients with exceptional disinfection against microbes and excellent lipid and protein removal when a surfactant is present. Patients are extremely loyal and compliant with its use. When recommending a peroxide-based system, understand what differentiates the products and what cleaning steps are involved. Then make a recommendation for a specific product accompanied by patient education on use and compliance.

Likewise, we should consider the difference in our delivery and try to translate that same degree of urgency to our multi-purpose system users in an attempt to improve compliance and reduce complications among *all* our patients.◗

Injection

Continued from page 11

struments and supplies—such as Betadine, lidocaine, sterile gloves, extra packages of cotton tips, and extra needles—are placed on a plastic-backed towel on the counter. Sterile instruments and supplies—including the preloaded syringe of medicine, eyelid speculum, sterile cotton tips, and 4x4s —are dropped onto my Mayo tray. We place the Mayo tray near enough to the reclined patient that I can reach it.

Time management

After I examine, educate, and consent the patient, I go to the next exam room to see my next patient while my assistant sets up the counter and sterile tray for the first procedure. With her help, it takes less than 10 minutes from start to finish. I stand at the head of the patient. I like my Mayo tray to my right because I am right-handed. My assistant stands on the opposite side of the patient with Betadine in hand and sealed cotton tips at the ready. As I said before, my assistant knows the process well and knows exactly what to do.

We instruct the patient to try to relax, keep his hands away from his face, and not to speak. My assistant and I also avoid speaking. We've learned that the mouth is a main source of bacteria that can cause endophthalmitis. So, no talking, no coughing, and no sneezing. If a patient has a head cold, she must reschedule. If we suspect the patient will be chatty, then she must wear a mask. If one of my assistants has the sniffles, he is not allowed to assist. We take this precaution very seriously. The other option would be for all of us to wear masks, but right now that doesn't appear to be necessary.

It is an exciting time to be in the eyecare industry. Not long ago, the treatment options we offered our patients ranged from minimal to nonexistent. Today, we have more options and there will be even more to come. With diligence and precaution, we can really impact our patients' lives in a positive way.◗

Conjunctivitis

Continued from page 10

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