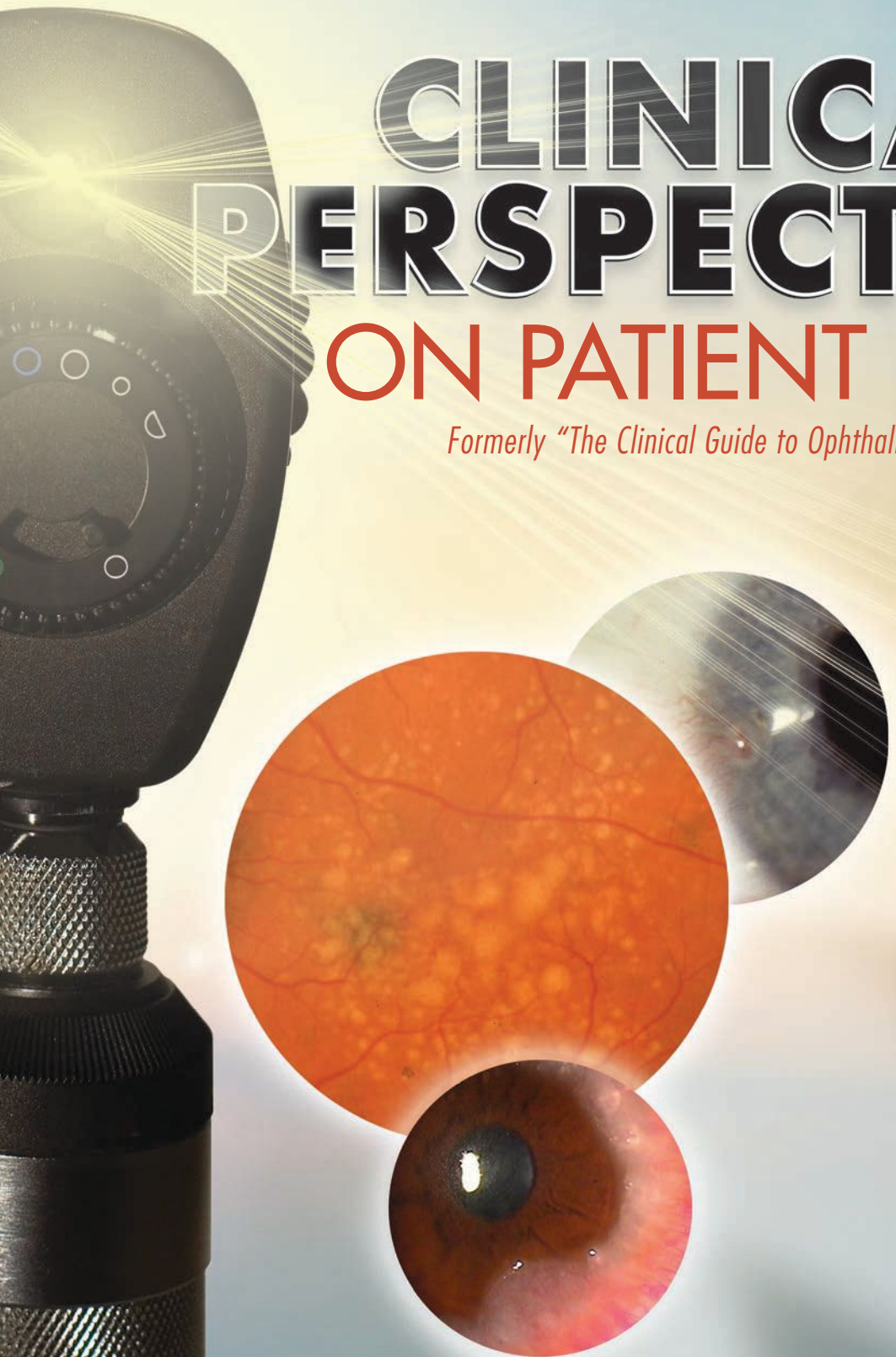
CLINICAL PERSPECTIVES ON PATIENT CARE

24th edition

Formerly "The Clinical Guide to Ophthalmic Drugs"



See the practice of optometry through the eyes of three experts.

Ron Melton, OD

Randall Thomas, OD, MPH

Patrick Vollmer, OD

A Supplement to

REVIEW® OF OPTOMETRY

Supported by an unrestricted grant from Bausch + Lomb

On the Virtues of Change

In a tumultuous year, we still have much to be excited about.

The COVID-19 virus has unequivocally altered all of our lives and practices. Two of us (Drs. Melton and Thomas) have tested positive for the virus—and survived. Once this terrible storm passes, however, our patients will once again be in need of our professional services. We hope the clinical information in this supplement will further equip you to more fully care for your patients in the post-COVID era.

You'll also notice some radical changes to this annual publication. We are broadening our scope of topics this year. Why? Because optometric practice has broadened, too. Simply giving a run-down of drug categories, as we did when this started back in the 1990s, just doesn't live up to the present moment for optometry. After nearly 25 years of producing a "drug guide," we want you to get an up-close look at how we three clinicians actually practice, and think about, all facets of optometric care. Thus, *Clinical Perspectives on Patient Care* is born!

Imagine this supplement as a chance to sit alongside us as we consider literally hundreds of different day-to-day challenges. We'll give you our unvarnished take on all of them. If there is no literature reference, consider the statement to be our professional opinion. Other doctors will no doubt have their own approaches, and that's fine. Our aim is not to present every conceivable idea—just our own, earned through countless hours in the clinic.

For better or worse, we have now managed to accumulate over 80 combined years of intensive clinical experience. Our practice pattern has always been to care for patients with non-surgical eye conditions ourselves. We hold ophthalmic surgeons in high regard, and are most happy to work collegially with them in caring for our patients with surgical needs; otherwise, we manage the extensive gamut of medical eye conditions within our own optometric practices.

Rather than chapters per se, this new approach will share a somewhat random selection of topics germane to bringing you up to date on a wide variety of eye conditions and issues, organized in three main sections. Note that we cannot condense four years of clinical training into a single supplement. We are assuming a strong foundation of clinical knowledge by the reader, and are only attempting to add succinct, salient "pearls" to this foundation.

Our goal in writing this guide is to help further equip our colleagues with knowledge to provide a broader range of top-quality patient care services. Of all the conditions we need to master, the two most important ones are glaucoma and dry eye disease. We encourage you to attentively read these discussions, pay attention to the professional journals and exhaustively seek lectures on glaucoma.

As always, we are grateful to Bausch + Lomb Pharmaceuticals for their unwavering support of this optometric educational product through the years, and to the editorial team at *Review of Optometry* for helping shape this supplement into a highly readable work.

We hope and pray that each of you and your loved ones endure this viral assault, and come out of this disaster stronger and more resolute than ever before.

With our best wishes,
Drs. Melton, Thomas and Vollmer

Disclosure: Drs. Melton and Thomas are consultants to, but have no financial interests in, the following companies: Bausch + Lomb and Icare. Dr. Vollmer has no financial interests in any company.

Note: The authors present unapproved and "off-label" uses of specific drugs in this publication.

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ON PATIENT CARE

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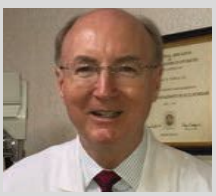
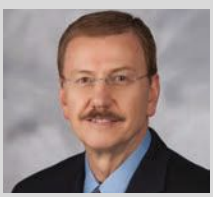


Randall K. Thomas, OD, MPH, FAAO



Ron Melton, OD, FAAO

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PEER • REVIEWED • PRA • ARTICLE •

A PEER-REVIEWED SUPPLEMENT

Warning: Major Changes Coming to Optometry

If you think you can rely on dispensary income and routine eye exams, you may be in for a rude awakening.

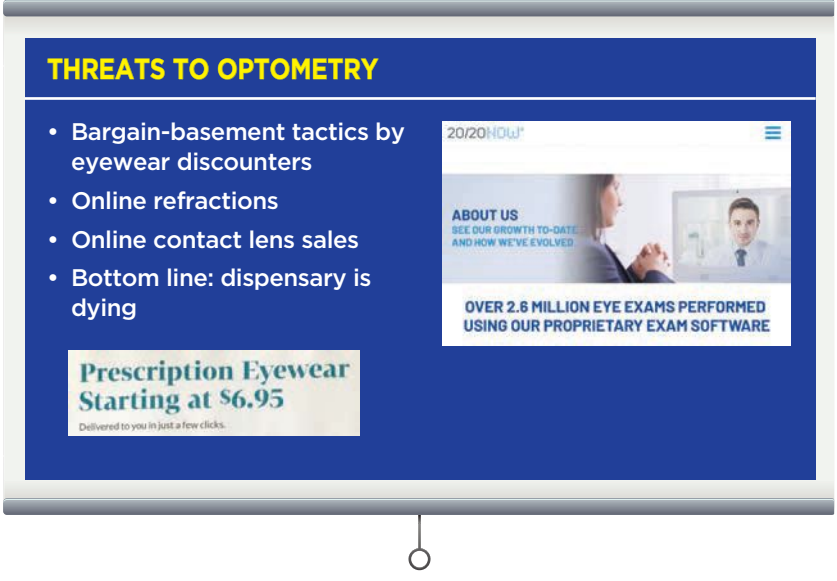
A quick look at the professional literature clearly shows major sea changes in how eye care is being delivered. Online refractions, eyeglasses and contact lenses are already available in many places of the world, and are now available in the United States. The 3-D printers are making complete eyeglasses, and this technology will only improve. Drugs to push back presbyopia will also be here soon, thus dampening the bifocal market. Autorefractors and automated subjective systems are already here, and they too, will continue to improve. Eyeglasses are heavily promoted for as little as $6.95!

The Department of Veterans Affairs (VA) now has operational programs in place in which laypersons are trained to perform essentially full eye examinations, including refraction, and patient satisfaction is reported to be "high." For decades, ophthalmologists have had high school graduates performing their refractions, and people flock to their practices. Based upon this reality, one could rationally and accurately assume that the public's quest for competent, thorough, medically-oriented eyecare is valued far more than just "refraction." This is a powerful observation, and one that we should take to heart.

NO TIME TO WASTE

A comprehensive consensus of these observations should compel thinking optometrists to reevaluate their practice modus operandi and develop strategies to remain viable in the face of these tidal waves of changes coming our way.

Our relatively straightforward plan is to simply begin keeping all the patients who present to us. Stated another way, it is imperative that we stop hemorrhaging patients through referrals, and that we provide a much broader base of comprehensive medical care services; this is critical to our survival as a profession. For perspective, the table at right is a near-comprehensive list of medical eye conditions that attentive and caring ODs can readily address.



MEDICAL EYE CONDITIONS ALL ODs SHOULD MANAGE

- Assessing hydroxychloroquine (Plaquenil) retinotoxicity risk
- Diabetic retinopathy
- The glaucomas
- Acute symptomatic posterior vitreous detachments
- Acute red eyes: allergic, bacterial, viral, chlamydial
- Injuries and abrasions
- Blepharitis
- Meibomian gland dysfunction
- Dry eye disease
- Zoster ophthalmicus
- Eye pain: trichiasis, ectropion, entropion, lagophthalmos
- Bell's palsy
- Corneal dystrophies
- Optic neuritis
- Macular degeneration
- Presurgical cataract care
- Epiphora
- Post-op care for numerous surgeries
- Lid infections: acute hordeola, styes
- The gamut of contact lens complications
- Episcleritis/scleritis
- Giant cell (temporal) arteritis
- Recurrent corneal erosion
- Contact blepharodermatitis
- Superior limbic keratoconjunctivitis
- Phlyctenular keratoconjunctivitis
- Eroding tarsal concretions causing foreign body sensation
- Thygeson's superficial punctate keratopathy
- Transient vision loss from carotid artery disease
- Ocular migraines
- Corneal infiltrates and ulcers/CLARE
- Giant papillary conjunctivitis
- Epithelial basement membrane assessment and monitoring

If you want to insulate your practice from the threat of online refraction services, evolve to a medical foundation.

Caring for patients with these conditions, especially the glaucomas, holds massive potential for building a dynamic practice, and possesses a strong firewall against technological advancements into traditional optometry. "Refraction" is a technical procedure, and bright, sharp, friendly high school graduates can be rapidly trained to perform this data-collection task, thus freeing the doctor up to have more time doing those tasks only a doctor can do. As doctors, it is our duty and responsibility to have quality-assurance oversight on the final refraction; thus, looking at the current eyeglasses prescription, the autorefraction, and the technician's performance of subjective refraction accomplishes such.

Now, we are keenly aware of how radical some of these changes and approaches may seem, but we implore you to begin to become proactive and not find yourselves scrambling to play "catch-up" when you are faced with technological advancements; they indeed are coming.

KEEP UP WITH RESEARCH

A very enriching way to fast-forward your expertise in these areas is to subscribe (as we do) to the following journals. These can be readily accessed via a simple Google search:

1. *Ophthalmology*
2. *American Journal of Ophthalmology*
3. *JAMA Ophthalmology*
4. *Survey of Ophthalmology*

You can read these journals solely on your own, but perhaps a wiser way to increase your knowledge base would be to develop monthly "journal clubs" where four of you each subscribe to one of these journals, then get together over a nice dinner one weekday per month to review salient, relevant articles. The four of you will grow exponentially! Trying to feed yourselves via continuing education meetings provides a very low yield in professional growth, whereas perusing optometric and ophthalmological journals is a high-yield professional growth exercise.

Another resource to keep you attuned to the latest research is the website www.practiceupdate.com. You can sign up to have a daily email newsletter sent to you each morning with important studies in eye care.

Yet another way to increase your professional abilities is to call upon a colleague to gain his or her advice. There is nothing wrong in asking for help, or getting an opinion, but keep your patients in your practice.

What about being "on call"? Doctors like to receive after-hours calls about as much as patients like undergoing air-puff tonometry; however, as doctors we need to develop a system whereby optometric patients have at least consultative access to optometric care outside of normal office hours.

Here again is where coming together as teams provides the perfect solution. Find six or seven like-minded, patient-centric colleagues and form a formal call group. In this way, an OD is available to meet the needs of our collective optometric patient population. If you consider your fellow ODs only as competitors, that is a shallow, rather desperate view, and quite simply, is pitiable. We should all work together as colleagues in an effort to enhance patient care, and to keep optometric patients as optometric patients! Your practices will thrive, your patients will be well served, and public health will be enhanced. Remember, above all, you are your brother's keeper.

OUR PRACTICAL ADVICE

Now that we have comprehensively laid the groundwork and have made the case for expanded care by ODs, we turn to sharing the knowledge gleaned from the literature and our combined 80 years of clinical practice. It is our hope that what we share herein enables you to further enhance your competence as a patient-centric caregiver and medical practitioner of the eye.

REFRACTIONIST OR DOCTOR?

- A new world of vision testing and eye wear sales is dawning now that refractions and prescription fulfillment are being offered online.
- These developments may not be a negative for ophthalmology practices and patients.
  - Visibly
  - EyeNetra
  - MyVisionPod
  - Myeyelab.com
  - Smart Vision Labs
  - Vmax Vision
  - Warby Parker
- Optometrists: Expand your scope of patient care services to protect your future!
- The AOA is aggressively fighting for optometry: Join the AOA!

Optometry "On Call": A Not-So-Novel Concept

It's commonplace in other fields, yet somewhat rare in our profession. Patients who need urgent care deserve the attention and expertise that ODs can provide.

As we all know, eye care provided by anyone outside of optometry or ophthalmology is abysmal. Whether one practices in a group, private practice, a retail/commercial setting or in any other setting, there should be one uncompromising goal: providing optometric patient access to optometric care 24/7.

First, it is the rare individual who enjoys being "on call." It is encumbering, but the cases are usually stimulating and can stretch your clinical confidence.

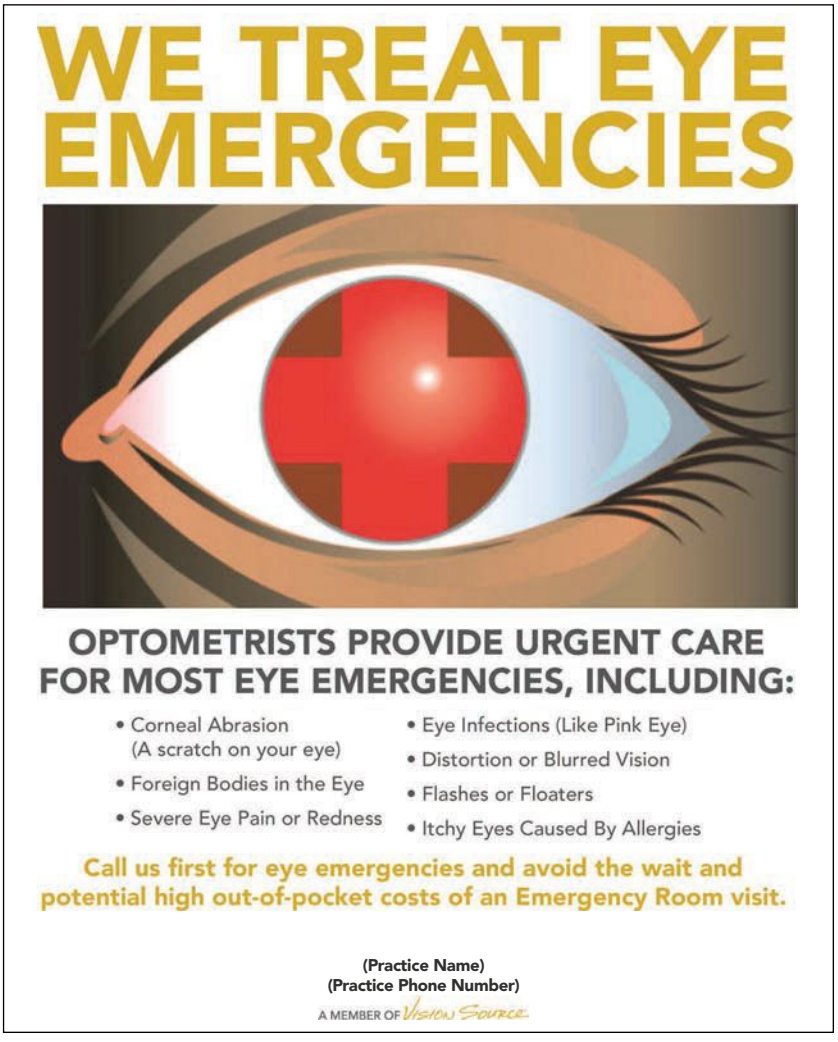
It is our collective perspective that patients should have access to emergency medical optometric care whenever the need arises. When a patient calls her or his optometrist, there should be an answering machine/service guidance as to how to contact the optometrist on call!

Here we share a parallel example of how many dental practices meet the needs of their patients: six to eight dentists come together and form a call group, such that a single dentist is on call for the group every six to eight weeks. By spreading the responsibility, they move from being "always on call" (which, in reality, we all are), to being on call only every six or eight weeks. With this shared call system, emergency patients always have ready access to a dentist. If we had a dental emergency, called our dentists and the answering machine said "Our office is now closed," or if we were directed to contact an emergency department/urgent care, the three of us would be finding other dentists!

We urge our optometric colleagues to become proactive in a like manner—that is, form such a call group with your colleagues to provide emergency patient care. To allow your office phone to simply ring and ring after hours is completely irresponsible; instructing your after-hours answering service to direct the caller to an emergency department or urgent care center is even worse.

We are a healthcare profession, doctors, and our collective patients deserve to be seen by an optometrist when an ocular emergency arises, no matter the time of day or night. For perspective, the vast majority of these calls can be dealt with by phone; only rarely is there a need to meet the patient in the office in the middle of the night. Most emergencies can wait until office hours to be seen.

Let's understand our role as a patient caregiver, and develop a creative, collaborative system to meet our patients' after-hours emergency medical needs. We would want nothing less for ourselves!



Vision Source supports its members by offering this promotional flyer on the vital emergency care ODs provide.

Ophthalmologic Perspective on Emergency Eye Care

Now that more and more eye surgeons have (or have access to) outpatient surgery centers, and use those rather than hospital operating rooms, there is a shrinking need for such surgeons to serve on-call for hospital emergency departments. This leaves a vacuum relative to emergency eye care. An article in *EyeNet* magazine (December 2019) shed light on the matter:

"If ophthalmologists continue removing themselves from emergency medicine and remain unwilling to provide care outside of their offices […] it is only creating a void that others will be more than happy to fill."

"Optometrists and non-ophthalmic providers are organized and ready to jump in. They see the gap in care. If a hospital can't depend on ophthalmologists, why wouldn't they send patients elsewhere? Why wouldn't optometrists become gatekeepers?"

Everywhere else in medicine, non-surgeons are the gatekeepers, thus it seems perfectly appropriate for optometrists to fill this role. Having been on-call for our respective hospital emergency departments, we can say with authority that the need for an eye surgeon is exceedingly rare.

As there is always the remote possibility for surgical need, an eye surgeon needs to always be available, and this just makes sense.

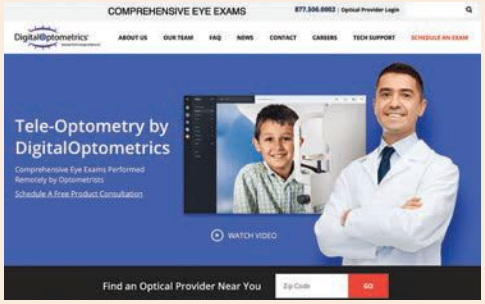
If both optometrists and ophthalmologists would proactively educate their collective patients to "call us first" before going to an emergency department, several things could happen:

- Patient care would be greatly enhanced.
- Patients would save significant time and money.
- Those caring practices would enjoy enhanced revenue.
- Emergency department physicians, who have a variably limited skill set for eye problems, would become unencumbered from eye emergencies.

We all need to step up to the plate and reach out to this subset of patients with urgent eye care needs. We applaud those optometrists already providing such emergency eye services, and to our friends at Vision Source for being formally proactive in this regard.

PATIENTS ARE READY FOR REMOTE EYE EXAMS—ARE YOU?

A company called DigitalOptometrics is offering full-time and part-time positions to optometrists who are willing to perform remote comprehensive eye examinations during the day, evenings and/or weekends from their home office or other location of choice.



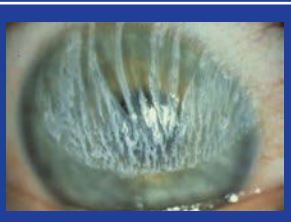
DigitalOptometrics, which operates in the United States and Canada, uses live video-conferencing technology to enable comprehensive eye health and vision analysis remote eye examinations performed by licensed optometrists. The goal, according to the company, is to make comprehensive eye exams convenient to patients in both urban and remote locations by having exams performed remotely by licensed optometrists.

Our take: These technologies are in their infancy and will only grow. Refraction-centric practices will be hurt. Medically-centric practices should be protected. Give this great contemplation.

Fortunately, our colleagues at the AOA already have. The AOA kicked off a national public awareness campaign this year on the importance of an annual, *in-person*, comprehensive eye examination with an AOA family doctor of optometry—turning a moment (the tie-in of year 2020 and 20/20 vision) into a movement.

THE EYE AND THE ED

- **Most common ICD diagnoses:**
  - **Conjunctivitis.....33%**
  - **Corneal injury.....13%**
  - **Corneal foreign body.....8%**
  - **Hordeolum.....4%**
- **Mean ED charge: $989.30 for eye visit**
- **Eye visits: 1.5% of all visits**



—Vazini K, et al. Ophthalmology 2016;123(4):917-19

- **"Approximately 387,000 patients per year present to US emergency departments with eye injuries, and children represent up to one-third of those injured."**

—JAMA Ophthalmology, August 2018

Optometrists Can Rise to the Occasion

Build your practice around caring for your patients—especially those with emergency medical needs—and you'll be ready for anything, even a global pandemic.

This year, the world has been overwhelmed by the coronavirus pandemic, which filled hospitals with COVID-19 patients and ground the everyday workings of society to a halt. Like most doctors, the majority of optometrists closed their offices to routine care. Some opened to emergency cases, but only if they had the clinical skills and community reputation to make it work. Practices that rely too heavily on refractions and are mostly perceived as an outlet for glasses fared poorly.

One of our number—Patrick Vollmer, OD—made the transition easily. Urgent care was nothing new to Dr. Vollmer, who provided emergency eye care the first day he walked in the door of his practice, long before COVID-19 struck.

"I worked tirelessly in my community to establish medical and emergency eye care," he says. "This has proven to be a virtuous decision. To my knowledge, pretty much all of the hospitals, Urgent Cares and primary care offices are a bit overwhelmed with the COVID-19 response. They don't want to deal with eye issues right now. A lot of these patients are getting funneled into my clinic day and night."

He sees each patient one at a time, so there is never more than one patient in the clinic. To further ensure safety, Dr. Vollmer wears an N-95 mask and gloves, and all patients also receive masks and gloves at the door. When the patient leaves, everything is disinfected. The procedure is a bit tedious "but it works," he says.

Dr. Vollmer and his patient each wear masks and gloves to minimize risk of contagion.

Many of Dr. Vollmer's current emergency patients tell him they would've normally gone to the ER or Urgent Care, but they were worried about being in a hospital setting currently. "I take this opportunity to educate these new patients that they shouldn't go the ER anyway. A lot of patients simply don't know this despite going to their eye doctors for years. Optometry cannot assume patients know to come to their clinics for ocular emergencies," he says.

Patients are appreciative of emergency care regardless, but they are especially grateful during this outbreak, Dr. Vollmer says. "I don't charge an after-hours fee right now, and the most I charge for any office visit is around $150 if they have no insurance or a high deductible. It's nice to be appreciated, but I get more fulfillment in knowing I helped someone in need."

Continuing to see patients who called in for urgent issues filled a critical patient care need and kept Dr. Vollmer's practice busy during the downtime. "One of the important aspects that I learned," he explains, "is how important it is to diversify your practice. If it wasn't for emergency patients and 'urgent' needs, life would have been pretty slow." Now that the practice is seeing routine care again, patients are more motivated than ever to come in because they know this is a doctor they can count on even in the toughest times.

COMORBIDITIES AND COVID-19 DEATHS

In a large study, the most common comorbidities were hypertension (57%), obesity (42%) and diabetes (34%)—all conditions that in most cases can be mitigated by lifestyle changes, and/or medications. Something to ponder as we, as a society, prepare for future pandemics.

1. Richardson S, Hirsch JS, Narasimhan M, et al. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. JAMA 2020; April 22. [Epub ahead of print]. Published online April 22, 2019.

Clinical Pearls You Can Count On

Heed these time-honored insights gleaned through 80+ years of patient visits.

Every patient is unique, and deserves to be treated as such, but these tips have proven correct again and again in numerous encounters the three of us have amassed throughout our careers.

• If there is any **unexplained alteration of visual function,** always do a retrospective review of any changes of the patient's medicines, especially if they are on any new medicines or changes to dosing have been made. By doing so, often a cause-and-effect relationship can be established that provides a rational explanation for the change in visual status.

• Studies have confirmed that patients prefer their doctors to **wear a lab coat** with their nametag on it. We prefer our nametags to have our first and last names, then OD, rather than "Dr. Last Name." We are proud to be ODs, and on occasion, it provides an opportunity to explain to our patients exactly what an OD is. To display our degree allows us to share our unique expertise in eye care, and to confirm to our patients that they are, indeed, seeing the right doctor. Be proud to be an OD!

• Unless the cause for **foreign body sensation** is clearly evident (and sometimes even when it is), always evert the upper eyelid after instilling fluorescein dye. There is always a cause for foreign body sensation, so look for things like:

– subtle epithelial basement membrane dystrophy

– Thygeson's superficial punctate keratopathy

– eroding tarsal conjunctival concretions

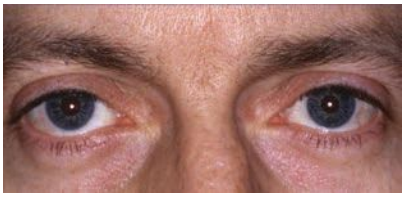
– occult trichiasis

– a loose lash in the puncta

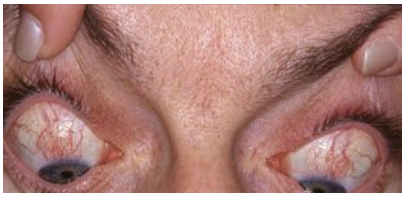
For conjunctival foreign bodies, we try not to use an anesthetic, so once the foreign body has been removed, the patient can give immediate confirmation of relief, rather than having to wait 20 to 30 minutes while the anesthetic wears off before making such a determination.

• If the eye is pretty much white yet the patient has miserable, irritated eyes with foreign body sensation, always think about **superior limbic keratoconjunctivitis** (SLK). Confirming this diagnosis takes two steps: have the patient look down so that you can examine the superior bulbar conjunctiva, and then stain the globe with lissamine green dye. Allow 30 to 60 seconds for adequate staining. If these bulbar and tarsal conjunctival tissues have become idiopathically keratinized, the mechanical rubbing of these two interfacing tissues is the cause for the distressing symptoms.

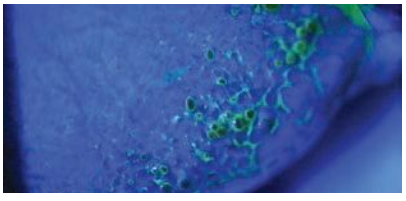
We initially use 0.5% silver nitrate compounded solution to help diminish these keratinized tissues. After the patient takes your prescription to a known ophthalmic compounding pharmacy and obtains the solution, have him or her bring the drop back to the office where topical proparacaine is instilled twice (about 30 seconds between each drop). We then dip a sterile cotton swab into the compounded solution, flick off the excess,



Eyes in primary gaze appear healthy.



Upon downgaze, the diagnosis of SLK is obvious, thus emphasizing the necessity of lifting the eyelids to search for the cause of his presenting symptoms.



These eroding calcific bodies caused this patient's foreign body sensation.

SUPERIOR LIMBIC KERATOCONJUNCTIVITIS

- **Both sexes affected, women more**
- **Main symptoms: distressingly irritated eyes**
- **Dry eyes common companion finding**
- **Symptoms disproportionate to clinical findings**
- **Spontaneous exacerbations and remissions**
- **25% to 40% have some thyroid dysfunction**
- **Tx (difficult): 0.5% silver nitrate, optimum lubrication, pressure patching, therapeutic soft lenses, surgical resection, cryotherapy**

and have the patient look down, evert the upper eyelid(s) and "paint" the superior tarsal tissues.

This is just like painting a wall with a paint roller; do this for about 20 seconds. Then un-evert the eyelid and have the patient look down. Now perform the same procedure to the affected superior bulbar conjunctival tissues.

We then instill a moderate amount of generic Maxitrol (neo-poly-dex) ophthalmic ointment, which we keep in our lab coat pockets. We encourage these patients to frequently instill lipid-based artificial tears to the eye(s) over the course of the day and to use a preservative-free artificial tear ointment at bedtime until they return to us in one month, at which time we repeat the "painting" procedure. We keep the patient's silver nitrate solution in our refrigerator, clearly marked with the patient's name, date of birth and medical record # until that time.

While this process is highly beneficial, there may be occasional recalcitrant-to-treatment patients. If, after this two-step therapeutic intervention, the patient is still not below symptomatic threshold, a consult with a cornea and external disease surgical subspecialist for a conjunctival resection of these afflicted tissues is in order.

Superior limbic keratoconjunctivitis is a commonly missed and/or misdiagnosed condition. Being thorough in your diagnostic pursuit will easily reveal the cause for the patient's visit. While rare, SLK is yet another opportunity to care for our patients.

EYELID CLEANSING TREATMENTS FOR BLEPHARITIS

- **Study compared "dedicated eyelid cleanser to diluted baby shampoo"**
- **Cleaning was done BID for four weeks**
- **Conclusion: improvements occurred with both treatments**
- **"However, only the dedicated eyelid cleanser proved effective in reducing inflammation and was the preferred therapy."**

—The Ocular Surface, October 2017

• Baby shampoo for **treatment of blepharitis** has gone the way of the horse and buggy. There are numerous commercially prepared "eyelid cleansers" readily available over-the-counter, and we exclusively recommend these when eyelid scrubs are indicated in the care of patients with symptomatic blepharitis.

• **Monocular "diplopia"** can result from a couple of subtle corneal conditions: unilateral Thygeson's SPK and epithelial basement membrane dystrophy. Instillation of fluorescein dye can help uncover these two subtle presentations. There is always an explanation for monocular diplopia; our duty is to find the correct cause and treat it appropriately.

• Ethambutol is commonly used to treat tuberculosis, but it can lead to **toxic optic neuropathy**. Color vision is commonly compromised in this situation, so, if possible, be sure to perform a color vision test to establish a baseline prior to starting therapy for tuberculosis. The general toxic threshold is 30mg/kg per day, so the greater the dose, the higher the risk of neuronal toxicity. Beyond color vision testing, certainly establish best visual acuity and baseline 10-2, as well. Depending upon dosage, follow these patients quarterly and repeat testing as deemed necessary.[1]

• A recent review in a cardiology journal notes that **diagnoses of COPD** were incorrect in about 62% of cases. The authors caution, "Physicians need to do a better job of identifying patients with COPD and not over-diagnosing it. Performing spirometry before and after administration of a bronchodilator is essential before making a diagnosis."[2]

Our take: This seems to be somewhat **parallel to the challenges that eye doctors face with regard to glaucoma**. Obviously, it is essential to

MIND YOUR MEDICINES

An OD recently encountered a woman in her late 20s whose chief complaint was near blur. She did not have hyperopia nor did she have latent hyperopia on cycloplegic refraction. Her exam was normal except for "presbyopia." With a +2.50, she saw a crisp 20/20. Reviewing her medical record, it was seen that she was taking Qbrexa for her axillary sweating which has a significant anticholinergic effect, thus causing her symptom. This perfectly illustrates the importance of being attentive to any new medicines when encountering an unusual patient complaint.

STRATEGIES FOR SUCCESS

perform an appropriate and comprehensive workup prior to initiating therapy.

• An internal medicine journal notes "**soft drink consumption** has been associated, not only with weight gain and obesity, but also with excess mortality in US studies. Associations were found for both sugar-sweetened and artificially sweetened drinks."[3]

Our take: Play outside and be active. For the most part, try to eat a plant-based diet; wear your seat belts; don't drink alcohol (or soft drinks) excessively; sleep adequately; certainly do not smoke; and if you wear contact lenses, do *not* sleep in them!

• **Presbyopia-"correcting" eye drops** are coming. The bifocal market is about to take a hit! This first sentence is to get your attention; the following discussion is to explain the pharmacologic mechanisms to reduce the demand for bifocal lenses.

There are two primary approaches: (1) miotic induction to create a pinhole effect in a non-dominant eye, and (2) restoration of crystalline lens intrinsic elasticity. The former approach may come to market first; however, we are excited for the latter approach.

It's a year or two too early to get into the details, but we feel an obligation to put our colleagues on notice that mega-changes are coming down the road. Anticipate the emergence of these innovative drugs and how they might impact your practices.[4]

• Looking into resolution of **congenital nasolacrimal duct obstruction**, *JAMA Ophthalmology* recently stated, "The rate of spontaneous resolution plateaued after nine months, and initial probing success declined after 15 months."[5]

Of course, different articles seem to consistently find different outcomes. This is always so frustrating. A study from the December 2019 *British Journal of Ophthalmology* found that "spontaneous resolution occurred in 45% of patients at a mean of 17.8 months of age."

Our take: We would recommend appropriate lacrimal sac massage for several weeks, but if treatment is not successful, we would recommend a pediatric ophthalmological consultation at about nine to 10 months of age. While we still hold to this recommendation, if the parent(s) prefer to continue to try massage up to 15 months of age, that may well be reasonable.

• **Blue light protection glasses.** There have been a number of articles published regarding blue light protection of late. There is no consensus that such "protection" serves any humanitarian purpose, yet ignorance of the professional literature seems to fail to deter sales-centric opticals. Because blue light can modify our circadian rhythms, all of these articles advise us not to work at a screen two to three hours before bedtime, however.

• In a similar vein, the alleged benefit of wearing **yellow-tinted glasses** to enhance contrast has been found to be a myth.[6] Now, we all have patients who swear by these, and we see no practical reason to rain on their parades. However, it is important that we are all aware of this research—that's why we read the journals!

• **Topical antibiotics** play a very limited role in contemporary eye care, as their only indication is for the treatment of bacterial infection, which is relatively uncommon as compared to inflammatory eye conditions.[7] There are three prime uses for antibiotics:

– children with bacterial conjunctivitis

– prophylaxis when using a bandage contact lens

– bacterial corneal ulcers

When we encounter adults with acute bacterial infections, we treat with a combination antibiotic-steroid such that we address the infection and the secondary inflammation simultaneously. For more advanced bacterial infections, we most commonly prescribe generic moxifloxacin or Besivance. Note that Besivance is an

THE BENEFITS OF DRINKING WATER

"Clinicians should use simple, clear messaging on the role of water as the primary drink for all children, adolescents, and young adults when discussing healthy habits with families."

Rosinger AY, Bethancourt H, Francis LA. Association of caloric intake from sugar-sweetened beverages with water intake among us children and young adults in the 2011-2016 National Health and Nutrition Examination Survey. JAMA Pediatric. 2019;173(6):602-04.

YELLOW-TINTED GLASSES AND NIGHT DRIVING

- **"Wearing yellow-lens glasses did not improve (i.e., more likely worsened) performance either with or without headlight glare."**
- **"These findings do not appear to support having eye-care professionals advise patients to use yellow-lens night-driving glasses."**

—JAMA Ophthalmol., August 2019

ophthalmic suspension and needs to be shaken before each instillation. For this reason, when used for prophylaxis in the setting of a bandage soft contact lens, we would choose generic moxifloxacin, since it is a solution. For corneal ulcers, we would use besifloxacin because of it superiority as demonstrated in the ARMOR study (*see p. 29 for the 2020 ARMOR data*).

• Some patients with migraine headaches, blepharospasm and post-concussion suffer from quality-of-life –altering **photophobia**. An FL-41 (FL stands for fluorescent) spectacle lens coating can filter out certain wavelengths of blue/green light that have been shown to contribute to light sensitivity.[8] Of course, it is important to rule out ocular surface disease, so conduct a trial of topical corticosteroids QID for two weeks to address any inflammatory component before suggesting FL-41 coating. Addressing severe photophobia may require multiple approaches, but do be aware of such options.

• **Steroids** are simple: we prescribe Durezol (Novartis) for advanced cases of anterior uveitis and episcleritis; for everything else, we prescribe Lotemax SM (Bausch + Lomb). As emulsions, neither require shaking prior to instillation. There are times when regulatory formularies limit us to generic prednisolone acetate, which must be shaken well before each use.

• Regarding eyedrops, we ourselves personally demonstrate to our patients **how to properly instill** these agents: with the face looking at the ceiling while pulling down the lower eyelid, and having the bottle tip about a half-inch away from the eye. This is especially important for our new glaucoma patients. Most people have an incomplete understanding of the proper technique, and giving them a live demonstration greatly enhances the efficacy of therapy.

• While **neomycin and benzalkonium chloride** (BAK) suffer much abuse, neither merit it. In a large study, neomycin allergy developed in only 1.5% of subjects. When such does occur, it is only a mild annoyance or aggravation. Discontinuation of the offending drop, optional use of cool compresses and/or triamcinolone 0.1% cream can be used for two to three days.

An article in the British literature provides a more practical perspective on BAK (*see slide above*).

Further, it is well known that the original 0.3% Lumigan (Allergan) caused a fair amount of conjunctival and eyelid irritation. It was reformulated to a much more tolerable 0.1%. However, there is four times more BAK in the 0.1% formulation. Deductive reasoning will now soften the accusations against this maligned preservative.

• What about **online "symptom-checkers"**? More and more patients are seeking advice via these. An interesting article in the June 2019 *JAMA Ophthalmology* found that the WebMD site listed the correct diagnosis as the first diagnosis in 26% of cases. The correct diagnosis was not on the list at all in 43% of cases. Their euphemistic conclusion: "There is room for improvement in the domain of online symptom-checkers for ophthalmic symptoms." Bottom line—just see an optometrist!

Like all technologies affecting human medical care, these sites will improve over time, and while they may be helpful adjunctively to clinic-based care, nothing will replace the care and attention of a face-to-face doctor visit.

• Thankfully, newer, better and easier to use **antithrombotic medicines** are dampening the prevalence of Coumadin (warfarin). However, there is still an abundance of people on warfarin for stroke prevention. A blood assay known as the International Normalized Ratio (INR) quantifies thrombotic control. It is yet another blood test beyond CBC, sed rate and C-reactive protein (CRP) with which we all need to be familiar. In our tireless pursuit of simplicity, just know INR generally needs to be between 2 and 3 for warfarin patients. This metric is not applicable to any other drug. Essentially, if the INR is <1, the blood is more prone to clot, and if it is >3, the risk of hemorrhagic events is increased.

• There are three commonly used **antibiotic-steroid combinations**. From oldest to newest, these are: Maxitrol (neomycin, polymyxin-B and dexamethasone, Novartis), which comes in both suspension and ointment forms; TobraDex suspension and ointment (tobramycin with dexamethasone, Eyevance); and Zylet (tobramycin and loteprednol, Bausch + Lomb), which is only available as a suspension.

HOW IMPORTANT IS IT TO BE "PRESERVATIVE-FREE"?

- **"Published studies have not demonstrated any clear benefits of the BAK-Free formulations."**
- **"There is a lack of evidence of clinically significant harm from a small number of BAK preserved drops in patients without OSD. This means that generally more expensive PF glaucoma medications should only be recommended for those on poly pharmacy or those with OSD but are not necessarily required for all patients."**

—Br J Ophthalmol, July 2018

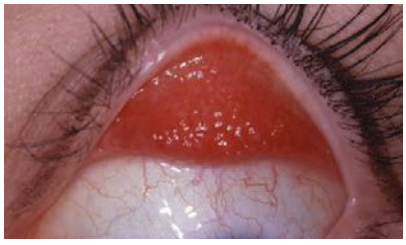
– From least to most expensive, these are: generic Maxitrol (about $25), Zylet (with a coupon it is about $35) and generic TobraDex (about $60-80). These prices may vary depending upon insurance plans and geographic location of the patient.

– From safest to least safe (all are relatively safe): Zylet, Maxitrol and TobraDex. All three suspensions need to be shaken before instillation. Regarding antibiosis, these medicines are all clinically effective. There is no debate that Zylet is the "pick of the litter" here, especially for chronic conditions such as staphylococcal blepharitis, because of the ester-based steroid. When cost is truly imperative, generic Maxitrol is the best choice, but only for acute conditions that generally need treatment for no more than seven to 10 days, because of the dexamethasone.

These combination drugs are real workhorses in routine clinical care. Do bear in mind, however, that unless there is a breach in the integrity of the corneal epithelium, an antibiotic is generally not needed, and only a straight steroid should be employed.

• Intranasal steroids are the treatment of choice for **allergic rhinitis** in patients over age 12; adding an oral antihistamine confers no benefit. If the intranasal steroid alone does not fully control the allergic response, then "an intranasal antihistamine such as azelastine can be added, albeit at the expense of dysgeusia."[9]

• **Giant papillary conjunctivitis** continues to be a menace. It could be relegated to history if everyone could/would wear daily disposable contact lenses. For symptomatic patients, such as in the image below, we have them cease contact lens wear for at least a week, and preferably for two weeks.



GPC remains common among the contact lens population but is easily managed.

(Every contact lens wearer with a functionally significant prescription needs a backup pair of eyeglasses!)

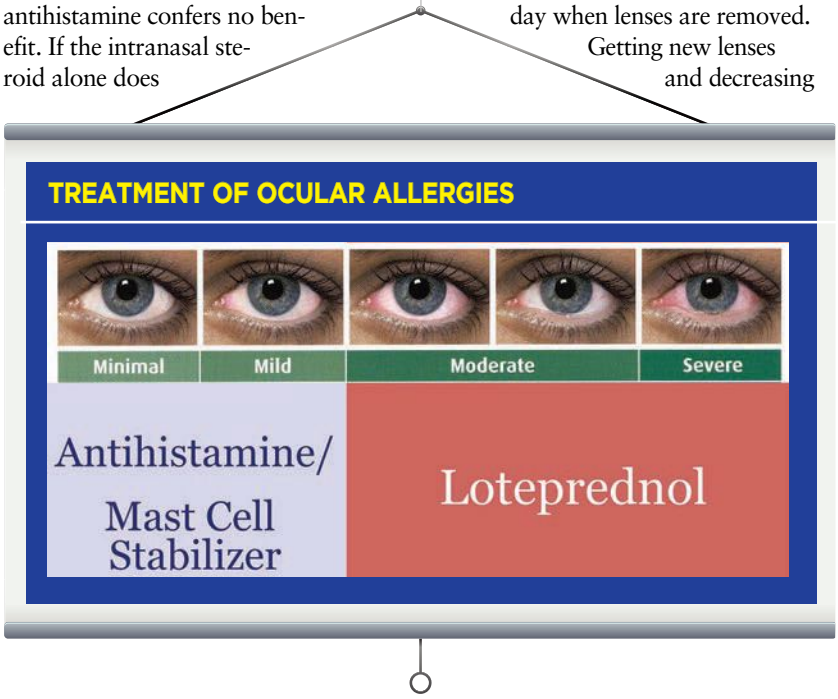
We prescribe Lotemax SM for these patients QID for one to two weeks, then BID for two more weeks. During the last two weeks, we instruct the patient to instill a drop 10 minutes prior to lens application and a second drop at the end of the work or school day when lenses are removed. Getting new lenses and decreasing wear time are significant maneuvers in the ultimate resolution of symptoms. According to Mathea Allansmith, MD, a renowned ocular allergist at Harvard, and our esteemed colleague Jimmy Bartlett, OD (professor emeritus at UAB), loteprednol is the steroid of choice in treating this condition.

• An FDA program called "Rx to OTC" recently brought both 0.1% olopatadine (Patanol, Alcon) and 0.2% olopatadine (Pataday, Alcon) OTC. These drops can no longer be prescribed. This will bring two more products onto the already-crowded OTC shelves. Since all these histamine type 1 receptor blockers perform similarly, the advice we give our patients is to select a 10mL bottle when it costs about the same as a 5mL competitor. Use any of these drops BID for a week, then try to drop back to once daily use as needed to control ocular itching.

Different insurance plan formularies may mean that, cost-wise, you provide a better service to your patient by prescribing a brand name–protected Rx anti-allergy drop, such as Bepreve (bepotastine, Bausch + Lomb), rather than asking them to purchase an OTC product. By being attentive to this cost-saving maneuver, you can wisely and compassionately keep down out-of-pocket expenses for your patients!

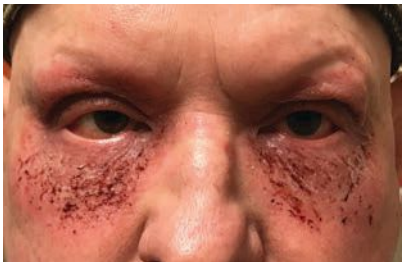
• A young man presented to us with his third episode of some sort of **dermatitis to the eyelid and periocular tissues** in six months. He had seen his internist twice before, about three months apart, and was treated successfully (albeit temporarily) with oral prednisone. This time, the patient wanted to try an eye doctor. It appeared to be a 4+ case of contact dermatitis so severe that he was getting secondary ectropion from the epidermal inflammation.

He was treated with 40mg of prednisone (it was not known what his prior dosage had been) for five days, along with 0.1% triamcinolone cream applied to the affected tissues QID for five days. The cynical saying "no good deed goes unpunished" applies here,



in that the patient never returned for follow-up, and his phone mailbox was full or his phone simply rang and rang.

Finally, after about four months, we were able to see him. He shared with us that his condition had quickly resolved and had not recurred during this four-month period. That's great, but we still only had a presumptive diagnosis of contact dermatitis. This was in May 2018. Fortuitously, in the June 2018 issue of *Ophthalmology*, there was an article that grabbed our attention. Looking at the pictures, it clearly reminded us of this patient. Well, it turns out that the diagnosis was more than contact dermatitis—it was impetigo! Because we consistently read the literature, we were able to grow our clinical knowledge. Should this patient ever return with similar symptoms, we now know to how to address his issue more definitively and competently. In addition to the steroid, we will also prescribe an oral antibiotic such as cephalexin 500mg BID or Augmentin 875mg BID, depending upon our clinical judgment; it's an art.



Note the secondary ectropion to this patient with impetigo.

• What's the risk for **corneal melt with the use of topical nonsteroidal anti-inflammatory drugs** (NSAIDs)? Anti-inflammatory drops are routinely used postoperatively, and only rarely do they cause problems. An important recent article in *Survey of Ophthalmology* offers these insights:[10]

– "The FDA has approved ophthalmic NSAIDs for use in four areas: pain and inflammation associated with cataract surgery, pain associated with corneal refractive surgery, inhibition of intraoperative miosis, and seasonal allergic conjunctivitis." However, their use in prevention of postoperative cystoid macular edema is central in their prescribing frequency.

– "Alarmingly, topical NSAIDs may be used by eyecare practitioners for extended periods of time without a clear diagnosis or indication."

– "Corneal complications of topical NSAIDs include superficial punctate keratopathy (punctate epithelial erosions), corneal infiltrates, and epithelial defects; the most severe of all is corneal melt."

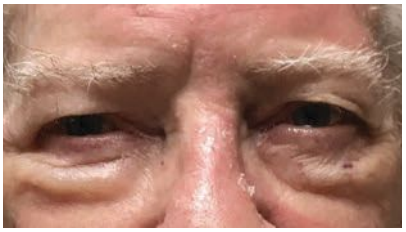
– "An intriguing aspect of such melt is the apparent requirement for a compromised cornea for it to occur." It appears that compromised epithelial cells respond differently to NSAIDs than healthy ones.

– "Some ocular surface diseases such as dry eye are considered relative—and for most experts—absolute contraindications to the use of ocular NSAIDs."

BILATERAL PERIORBITAL IMPETIGO — DERMATITIS

- **Impetigo is a *Staph. aureus* infection, often seen in patients with eczema**
- **Usually seen in children and young adults**
- **Can cause a secondary inflammatory dermatitis**
- **Can create cicatricial ectropion**
- **Tx with oral antibiotic and topical antibiotic/steroid or steroid ointment**

—Ophthalmol, June 2018



Patients may be anxious about festoons but they are harmless.

• **Festoons.** These are fluid-filled, "squishy" pockets gravitationally exacerbated by age-related laxity of the upper facial muscles. They can also accompany inflammatory dermatologic diseases; most relevant to us, herpes zoster ophthalmicus. These non-tender festoons look bad but carry no pathological relevance. The treatment is patient reassurance, or if he/she desires, a referral for facial plastic surgery.

• Medicines that can cause **dysgeusia:** prednisolone acetate, lifitegrast, topical carbonic anhydrase inhibitors and azelastine.

1. Stuart A. Drug Toxicity to the Retina and Optic Nerve: Are You Missing It? EyeNet Magazine. September 2019. Available at: https://www.aao.org/eyenet/article/drug-toxicity-to-the-retina-and-optic-nerve?september-2019 (last accessed April 14, 2020).
2. Sator L, Horner A, Studnicka M, et al. Overdiagnosis of COPD in subjects with unobstructed spirometry: a BOLD analysis. Chest. 2019 Aug;156(2):277-88.
3. Mullee A, Romaguera D, Pearson-Stuttard J, et al. Association between soft drink consumption and mortality in 10 European countries. JAMA Intern Med. 2019;179(11):1479-90.
4. Thompson V. Examining presbyopia treatments. Eye World. December 2019. Availablee at: https://www.eyeworld.org/examining-presbyopia-treatments (last accessed April 14, 2020).
5. Sathiamoorthi S, Frank RD, Mohney BG. Spontaneous resolution and timing of intervention in congenital nasolacrimal duct obstruction. JAMA Ophthalmol. 2018; Nov 1;136(11):1281-6.
6. Hwang AD, Tuccar-Burak M, Peli E. Comparison of pedestrian detection with and without yellow-lens glasses during simulated night driving with and without headlight glare. JAMA Ophthalmol. 2019; Aug 1.
7. Keen M, Thompson M. Treatment of acute conjunctivitis in the united states and evidence of antibiotic overuse: isolated issue or a systematic problem? 2017; Aug; 124(8):1096-8.
8. Migraines & FL-41 Tinted Lenses. University of Utah Health/Moran Eye Center. Available at: https://healthcare.utah.edu/moran/optometry/fl41-lenses.php (last accessed April 14, 2020).
9. Wallace DV, Dykewicz, Oppenheimer J, et al. pharmacologic treatment of seasonal allergic rhinitis: synopsis of guidance from the 2017 Joint Task Force on Practice Parameters. Annals of Internal Medicine. 2017; Dec. 19.
10. Rigas B, Huang W, Honkanen R. NSAID-induced corneal melt: Clinical importance, pathogenesis, and risk mitigation. Surv Ophthalmol. 2020 Jan-Feb;65(1):1-11.

Perspective on Pupillary Dilation

Patients may not like this experience but that's no excuse for avoiding a vital step that can make or break a diagnosis.

No one enjoys being dilated; no woman enjoys having a Papanicolaou (Pap) smear; no man enjoys a prostate examination; however, all three examination procedures are important and represent excellent healthcare. Face it—in life, many vitally important functions, procedures and activities are just not fun.

Certainly, there are technologies to image the retina without pharmacologic dilation, and in some cases, these can be useful. However, community standards of care and prestigious medical centers fully embrace the dilated eye examination. In most cases, a dilated exam is essential to:

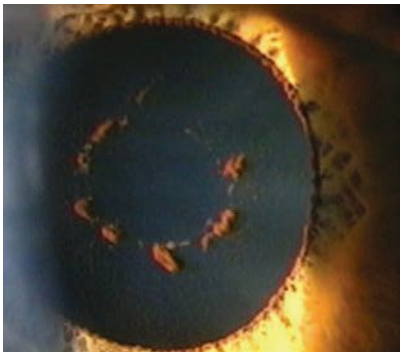
– diagnose pseudoexfoliation

– meticulously examine for diabetic retinopathy and maculopathies

– search for subtle retinal tears (for example, associated with symptomatic posterior vitreous detachments)

– identify pars planitis or ciliary body tumors

– assist with visualization of countless other conditions



This case of synechial anterior uveitis finally yielded to atropine, Durezol and 10% phenylephrine. The residual lens face "tattooing" of iris pigments will largely dissipate over the years.

We explain to our patients that if they were being seen at any prestigious medical center, their eyes would be dilated; thus, why should we provide our patients with anything less than the very best of care? We rarely have patients adamantly decline dilation, and when we do, we document in our medical record that the patient refused AMA (against medical advice).

One maneuver we typically use to dilate most of our patients is the instillation of Paremyd (0.25% tropicamide with 1% hydroxyamphetamine hydrobromide, Akorn). This combination drug provides rapid, short-lived dilation with a considerably truncated cycloplegic effect.

For older, diabetic patients (who typically are more difficult to achieve dilation), we revert back to the traditional use of 1% tropicamide and 2.5% phenylephrine. Post-mydriatic sunglasses are always provided. As healthcare professionals, we have an obligation to provide our patients the highest levels of care, and pharmacological dilation represents the gold standard in this regard.

Given that "failure to diagnose" is by far the most common reason optometrists are successfully sued, we have yet another good reason (beyond our desire to provide excellent patient care) to embrace the inconvenient virtue of pupillary dilation.

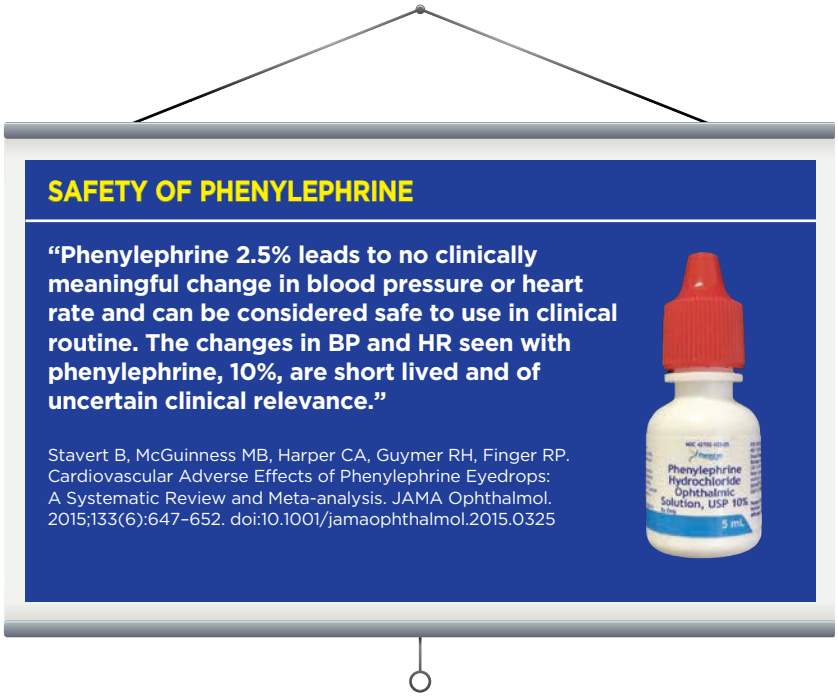
During one of Dr. Thomas's externships, the brilliant ophthalmologist's routine dilation protocol was use of 1% tropicamide and

PAREMYD OPHTHALMIC SOLUTION

- **A combination of tropicamide 0.25% and 1% hydroxyamphetamine HBr, an indirect acting sympathomimetic (adrenergic agonist).**
- **An excellent, less intrusive dilating drug we use for routine dilation.**
- **For patients who are of African origin and/or patients with diabetes, we commonly use 1% tropicamide with 2.5% phenylephrine.**
- **Marketed by Akorn in a 15ml bottle**

10% phenylephrine. There was no adverse event with any of these hundreds upon hundreds of mostly elderly patients.

We share this to provide a perspective on the safety of *both* phenylephrine concentrations. Since the 2.5% formulation (in combination with 0.5% or 1% tropicamide) provides ample dilation, we rarely have a practical need to use the 10% concentration. However, we do find the 10% concentration can be adjunctively helpful in breaking some recalcitrant synechiae, and for subsequent visits of patients known to dilate poorly.



GUEST COMMENTARY, by Richard Edlow, OD

The Not-So-Secret Strategy to Turbocharging Practice Growth

We were certainly right in thinking the year 2020 would be special for all of us—just not the way we anticipated.

The world and the way we interact is changing, perhaps forever. Optometry's practice patterns must also change, but not in the ways one might be thinking.

I will share a number of data points that should be a wake-up call for all optometrists, regardless of practice environment, to fully embrace providing medical eye care services. The data is a compilation from sources including CMS/Medicare, Census Bureau, National Eye Institute, optometric and ophthalmology training programs and insurance utilization statistics.

The following projection (net changes from 2020 to 2030) reveals a unique opportunity for the growth of optometric practice over the next 10 to 20 years. An aging population, the prevalence of age-related eye conditions and a relative shrinking supply of ophthalmologists presents a once-in-a-lifetime open window to embrace medical eye care.

GROWING DEMAND & MARKET SIZE

The US population is expected to grow 6.7% this decade. Of greater significance: projected growth among those age 64 and under is only 1.9%, while the 65-and-older increase is 30.5%.

The demand for medical eye care services will grow 20 times more rapidly than the demand for vision exams. The latter are defined as ICD-10 refractive diagnosis codes, while medical eye care exams are those that have a medical diagnosis. Eye care providers (ECPs) will need to collectively deliver two million additional vision exams per year, 10.8 million additional diagnostic tests per year, 16 million additional medical eye exams per year and 1.4 million additional cataract surgeries per year—all above and beyond what we are providing today in 2020. For perspective, current levels are 111.4 million vision exams, 64 million diagnostic tests, 60.4 million medical eye exams and 4.2 million cataract surgeries.

SUPPLY OF ECPs

The supply of optometrists will increase at a pace somewhat greater than overall population growth but much slower than the 65 and older demographic.

The game-changer is that the supply of ophthalmologists is almost flat. Ophthalmology residency programs will produce approximately 460 new entrants each year, and 420 practitioners will be exiting, for a net increase of 400 ophthalmologists over the entire decade—just 40 each year for the entire country. To just provide for the increase in cataract surgical procedures, we would require 3,500 surgeons.

Ophthalmologists will find themselves more and more in the operating room, less and less in the office setting.

The message is clear: Optometry must rapidly embrace providing medical eye care services in their practices. If one uses Medicare Provider Utilization & Payment data as a proxy for how engaged optometry is in providing medical eye care, it is at a very low level—less than 28% of optometrists provide any level of care.

It is incumbent upon the entire eye care industry to rapidly increase optometry's involvement in medical services and turbocharge practices, regardless of practice setting. ■

Dr. Edlow, AKA "The Eyeconomist," practices in Catonsville, MD, and is known for strategic trend analysis.

The Horrors of Medical Malpractice

Protect yourself from the three most fearsome words in all of healthcare: "failure to diagnose." **By Randall Thomas, OD, MPH**

I have had the sad opportunity to be an "expert witness" for a number of optometric medical malpractice cases, so I want to share with you this brief tutorial on how *not* to be sued. Such events horrifically traumatize both plaintiff and defendant. Most all such cases are easily avoidable, which is just maddening when trying to defend colleagues!

There are four basic requirements in avoiding medical malpractice cases:

- Truly care about your patients.
- Provide competent, state-of-the art care.
- Thoroughly communicate your findings and recommendations.
- Document those communications clearly in your medical records.

First and foremost, it must be stressed that most all cases of optometric malpractice involve misdiagnosis, mostly related to glaucoma and retinal detachments, so be thorough in your clinical evaluations.

On the treatment side of this equation is one prime caveat: when treating any unilateral red eye, always remember that herpes simplex keratitis must be considered. So, if the diagnosis is not clearly evident, an antibiotic-steroid combination drop may provide the greatest chance of addressing the condition; however, always tell the patient (and of course, clearly document this conversation in your medical record) to return right away if the condition worsens, or does not resolve. Perhaps better, call the patient in a couple of days to see how he or she is doing.

If the patient reports any unexplained symptom beyond the comprehensive dilated examination, always obtain a 30-2 visual field.

Measure intraocular pressure at the earliest practical age. The Icare tonometer has greatly facilitated acquisition of this important metric. No psychiatrically normal patient enjoys puffs of air being blown onto their eyes!

If you cannot give a definitive explanation for symptoms or decreased vision, maintain a low threshold to obtain a second opinion.

Be friendly, nice, polite and palpably interested in your patient's well-being. Such behavior is so appropriate and it protects against lawsuits.

Last, if you are sued, be aware that this arduous process often takes at least a year or two. Just remember that most all malpractice cases can be prevented by simply being attentive and by conducting a state-of-the-art evaluation.

The text to the right is intended for patients. Please feel free to photocopy and use in your practice with our compliments.

VISION INSURANCE VS. MEDICAL INSURANCE

Whether or not insurance covers eye care is a common area of confusion. There are two types of coverage that people often have that cover different eye care needs.

"Vision plans" cover routine eye checkups, which often lead to an eyeglasses and/or contact lens prescription. Vision insurance does NOT cover medically-related eye problems, such as:

- Red or painful eyes
- Loss of vision
- Diabetic eye disease
- Glaucoma
- Eye injury
- Cataracts
- Flashes of light
- Macular degeneration

These types of problems are covered under your standard medical insurance.

Vision plans are usually an option above and beyond what is generally referred to as medical insurance, and they only cover completely routine eye exams. For example, if you have diabetes, you should have a dilated medical eye examination annually. Your medical insurance should cover this visit. However, if you also want to get new glasses or if you have a vision plan, you will need to schedule another appointment for a different date to have an eyeglasses-oriented, vision-related visit, or pay out-of-pocket for the non-medically covered eyeglasses/contact lens prescription. Note that some offices only accept medical insurance, and do not accept vision plans or vice-versa. You should contact your eye doctor's office to determine this.

Vision plans usually cover routine care visits once every year or two, whereas medical insurance can be used any time you encounter a medical eye problem.

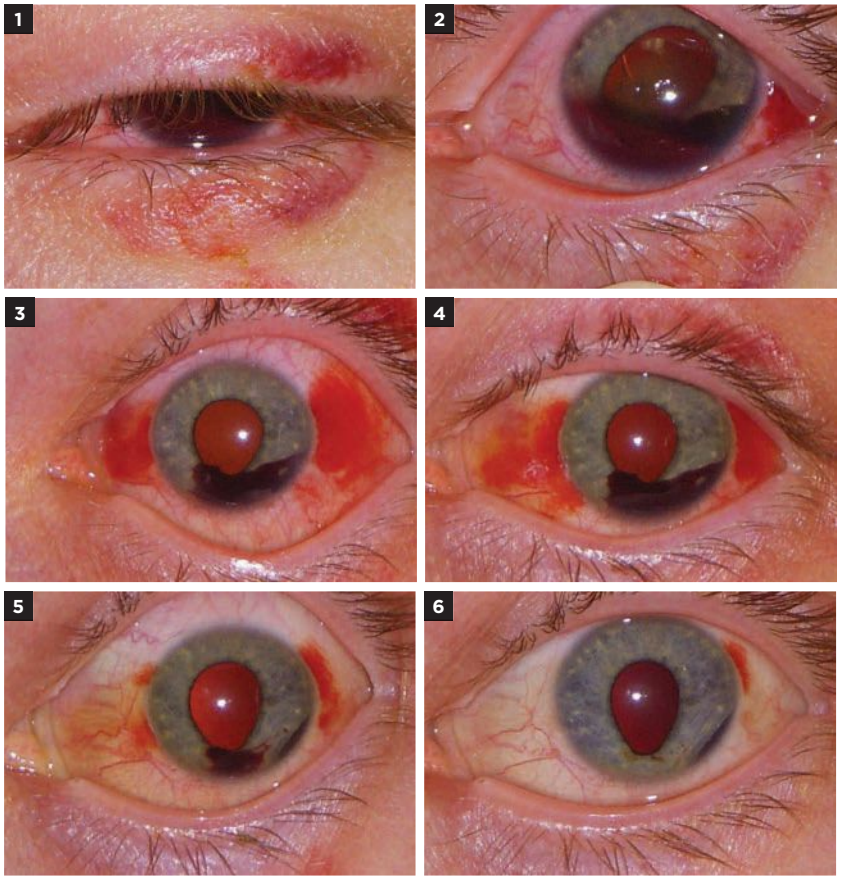
Case Report: Bungee Cord Injury

This perilous emergency ultimately had a positive outcome thanks to the vital pairing of judicious steroid use and patience.

This 31-year-old man was packing for an anticipated vacation when the bungee cord snapped and struck his eye. As can be seen in this series of photographs taken over a two-week period, he initially had soft tissue ecchymosis and hyphema.

We cyclopleged the eye with 5% homatropine and prescribed Lotemax SM (Bausch + Lomb) to be used every two hours for two days, and then QID for one week. The bulk of therapy was, however, "time," while our medical intervention hastened recovery. After about 10 days (*Figure 5*), iridodialysis can be seen from 4 o'clock to 6 o'clock, and the iris sphincter inferiorly developed traumatic iridoplegia. (For bothersome photophobia, or cosmetic concerns, opaquely tinted soft contact lenses can be employed.)

After a month, we performed gonioscopy to assess the ciliary body face tear, and explained to the patient his long-term risk of increased intraocular pressure, and the need for annual monitoring.



A NEW HIGH FOR PORTABLE REFRACTION

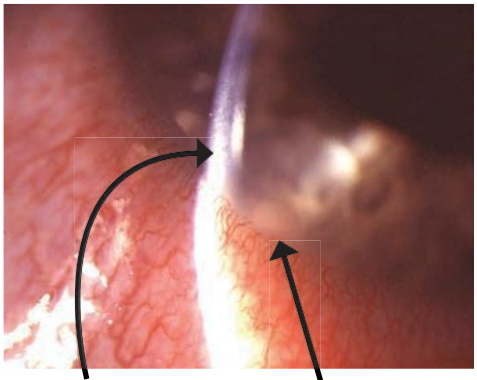
The technology of automated refraction continues to evolve and become more portable. We even envision the day your iPhone or laptop camera device can be configured to perform self-refraction.

When an automated refractor was needed for a medical mission to Uganda and Kenya, the humanitarian leadership at Plenoptika graciously loaned us one of their portable "Quicksee" autorefractor units. The instrument performed exactly as we hoped, and ultimately, vision was enhanced for several needy people in these underserved communities. The ease of operation and precise results were a blessing to the team and to those who were served. We highly recommend this technology, not only for mission service, but also in optometric practices.

Acute White Lesions in the Peripheral Cornea: Infectious or Inflammatory?

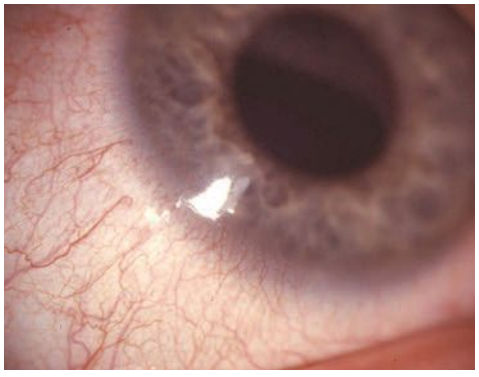
Don't let unfounded fears about steroids make it harder than it should be.

The answer to this perennial question is, "almost always inflammatory." There are many triggers of leukocytic chemotaxis into the peripheral cornea. If these cumulative concentrations of leukocytic infiltrates remain in the anterior stroma for a few days, there can be a small, retrograde epithelial breakdown that will stain minimally with vital dyes, whereas an infectious corneal ulcer will have a staining defect roughly the same size of the underlying stromal infiltrate.



There is a soft surround of anterior stromal infiltration at the affected site, which is indicative of a sterile process.

This is the focal sterile leukocytic infiltrate, which was thought (erroneously) to be the beginning of an infectious ulcer.



Here is the eye two days after appropriate steroid therapy.

Here is the bottom line: any time that you see any round or oval whitish lesion at or near the limbus, it is almost invariably a sterile, leukocytic infiltrate that merits suppression with a topical corticosteroid.

Since there is a sliver of a chance of secondary opportunistic bacterial infection, we always prescribe an antibiotic-steroid combination drug, such as Zylet (tobramycin 3% with 0.5% loteprednol, Bausch + Lomb), generic Maxitrol (neomycin, polymyxin-B, 0.1% dexamethasone) or generic TobraDex (tobramycin 0.3% with 0.1% dexamethasone).

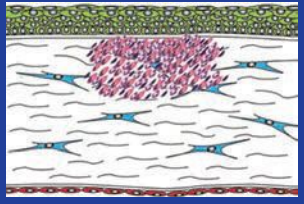
For clinical, practical perspective, recall that generic Maxitrol is the least expensive, followed by Zylet at around $35 (with a coupon). The most expensive agent is generic TobraDex, which costs about $80 to $90. All of these drugs perform identically, as they are clinical equivalents.

We know of two representative cases in which such peripheral corneal lesions were mistakenly identified as "corneal ulcers," were treated with topical antibiotics and did not improve—because leukocytic infiltrates do not respond to any antibiotic! In each case, the patient sought out another doctor (which was one of us). We added a topical steroid and the cornea cleared within two to three days.

It is critically important that we collectively understand the difference between inflammation and infection, and realize that, almost without exception, corticosteroid suppression is crucial to achieve enhanced patient care.

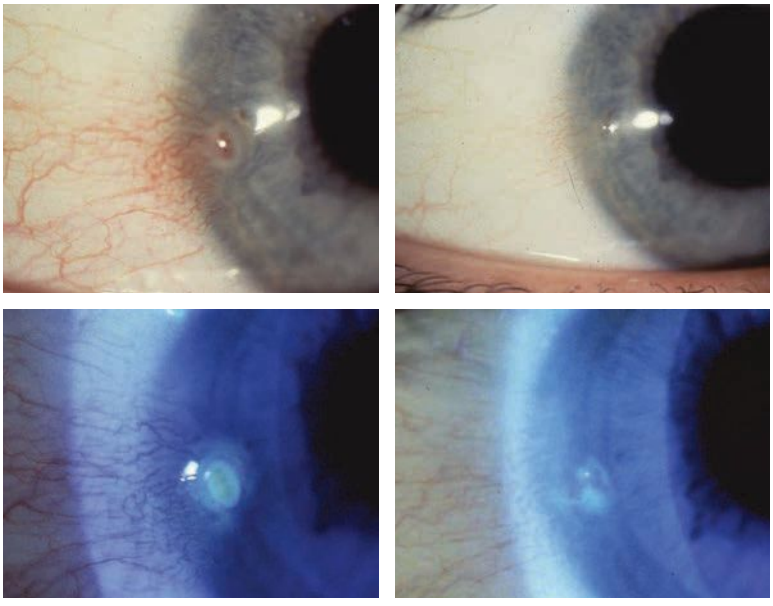
CROSS-SECTION OF CORNEAL INFILTRATES

- **These chemotactically attracted leukocytes migrate into the (usually peripheral) subepithelial tissues.**
- **If they are numerous enough or present long enough, epithelial compromise can occur, which will manifest as a relatively small fluorescein staining defect.**
- **At the stage depicted in this rendering, the bulbar conjunctiva is usually mildly injected.**
- **A topical antibiotic/steroid combination drug used QID for one week is the appropriate treatment.**

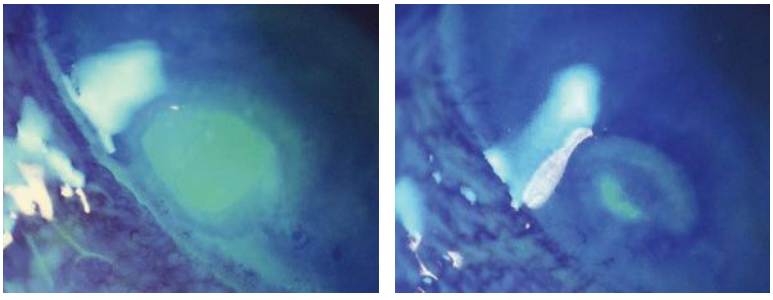


Below are three more cases where patients were seen by other eye doctors and placed on antibiotics, were not improving, and presented to us for a second opinion. In all cases we prescribed a topical steroid, and here you can see the dramatic improvement in just two or three days.

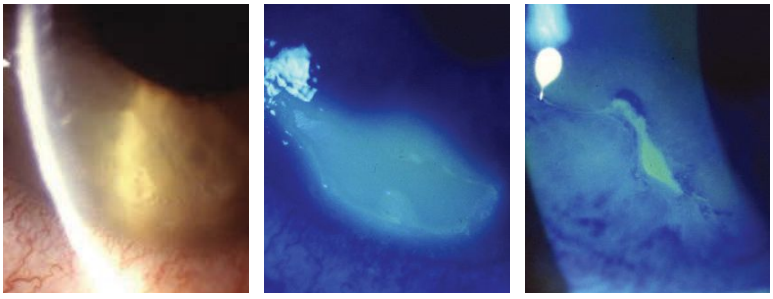
CASE 1



CASE 2



CASE 3

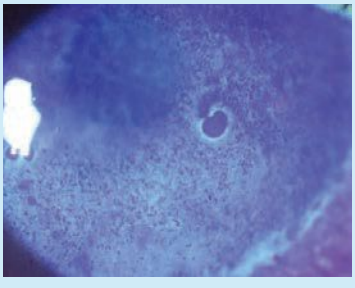


Note this white band of leukocytic (sterile) infiltrates. The overlying zone of secondary epithelial breakdown can be seen with the cobalt blue filter.

MANAGING MICROCYSTIC CORNEAL EDEMA

This condition is generally seen in two circumstances: with acute intraocular pressure rises, usually above 50mm Hg, and as a response to marked corneal inflammation such as with herpes zoster ophthalmicus. The former is treated with IOP-lowering medicines of timolol and/or brimonidine (or in the combination Combigan). Note that prostaglandins are not nearly as fast-acting as are timolol and brimonidine. The latter condition is treated with a topical corticosteroid to suppress the epithelial tissue inflammation.

This patient developed Posner-Schlossman syndrome, also known as glaucomatocyclitic crisis, and presented acutely with an IOP of 56mm Hg.



This patient developed herpes zoster ophthalmicus, and delayed in seeking care. He manifested considerable corneal edema as a result of untreated corneal inflammation. These corneal microcysts negatively stain with fluorescein dye, just like pseudodendrites (which are more of a pronounced expression of epithelial toxicity).

Practical Pearls for Managing Dry Eye Disease

Control the inflammation and you'll fast-forward symptomatic control.

Dry eye has got to be the most common condition we encounter in practice. Because there are so many patients, some clinicians overthink their approach. Here are some of our best tips, suitable for most patients.

• Diagnosis is heavily symptom-guided.

• Only history, a slit lamp examination of the ocular surface with a vital dye, assessing the tear meniscus height and the tear film breakup time are needed for diagnosis. All other assessments are superfluous. Keep it simple—it is!

• Since the vast majority of dry eye disease results from lipid deficiency, always try a standard bottle of a lipid-based artificial tear first. If there is a clinically significant amount of punctate epithelial erosions, then perhaps a preservative-free formulation could be used initially along with something like GenTeal Gel (Alcon) lubricant at bedtime. Follow back up with your patient in about a month to assess progress, and to modify the treatment plan as needed.

• If none of your rational therapeutic interventions alter the symptoms, then consider "neuropathic pain" as the etiology. No eye doctor can successfully "treat" this somatosensory neurological disease. These are relatively rare patients, but they are out there, so be attentive to these recalcitrant patients. A second opinion may be in order.

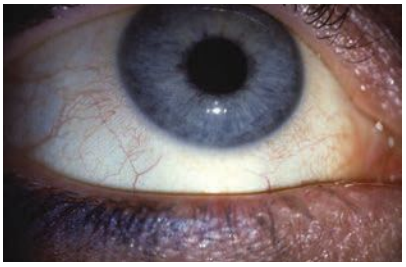
• The focus of managing dry eye disease is attending to foundational meibomian gland dysfunction. While meibography is optional, practically speaking, it is desirable; however, keep in mind that there is a high probability of meibomian gland disease accompanying and/or causing dry eye.

We recommend starting with this approach: use your golf club spud to scrape back and forth three or four times along the top of the eyelids where the orifices of the meibomian glands are. No anesthesia is required for this maneuver. Of note, there is no CPT for it either. Then, guide the patient to use very warm compresses for at least five minutes, and then to perform gentle to moderate

LOTEPREDNOL EFFECTS ON DRY EYE DISEASE

- **Using 0.5% loteprednol QID for one month was sufficient to control ocular surface inflammation**
- **"No cases showing a significant increase of IOP were detected."**
- **"Pflugfelder and associates reported no clinically significant changes in IOP in any patient who received topical loteprednol four times daily for one month."**
- **Summary: Loteprednol can provide greater anti-inflammatory effects and clinical benefits through reduction of ocular surface inflammation without serious adverse events.**

—AJO, December 2014 (see ref. 6)



As can be readily seen, this dry eye patient has a scant lacrimal lake.

DED TESTING TO DYE FOR

• "Of all the available dry eye tests, corneal fluorescein staining is reportedly the most commonly performed, and the conjunctival lissamine green is the least commonly used test."

• "This could be due to ease/difficulty of access to these dyes or perhaps lack of knowledge or awareness regarding the significance of each."

• "The degree of baseline conjunctival staining was a significant predictor of the worsening in corneal staining after sustained reading."

• "Subjective symptoms showed the strongest correlation with baseline conjunctival staining of all the dry eye parameters. Conjunctival staining needs particular attention when evaluating patients for dry eye."

—Ophthalmology, October 2018 (see ref. 7)

Our take: This further supports our perspective that dry eye disease diagnosis is very straightforward without the need for superfluous ancillary tests. We all need to appreciate the usefulness of lissamine green dye in our dry eye disease evaluations.

eyelid massage. The LipiFlow device (Johnson & Johnson Vision Care) does this best, but cost of acquisition is still a relative barrier.

• It is well understood that "inflammation" of the ocular surface is commonly present in the setting of dry eye disease. So, the next question is fundamental: which drug class best addresses the "inflammatory" component? It should be profoundly obvious that the answer is a topical corticosteroid. Objectively, the "pick of the litter" is loteprednol because of its efficacy, enhanced safety profile and lower cost.

Just as in glaucoma patient care, cost is a major deterrent to patient compliance. The cost of prescription drugs such as Restasis (Allergan) and Xiidra (Novartis), and even OTC artificial tears, can put an undue burden on the patient. Now, let's put this into clinically relevant, patient-centric perspective. The vast majority of dry eye patients develop symptoms before the age of 65, *i.e.*, while of working age. Lotemax SM (Bausch + Lomb) can be purchased (with a coupon) for $25 to $35. In our experience, nothing out there to treat dry eye symptoms is more efficacious and less expensive. Studies have shown that after one month of corticosteroid suppression, the inflammation is subdued.[1] Once this major

CORTICOSTEROIDS FOR DRY EYE DISEASE

- **Study: PF Refresh Optive vs. PF 0.1% dexamethasone, each QID**
- **No difference between untreated and AT-treated at two-week mark**
- **After two weeks of steroid treatment, both signs and symptoms were "significantly" improved**
- **"Our study shows that corticosteroids can mitigate the adverse effects of low-humidity environmental stress on the ocular surface in individuals with DED."**
- **"The increased irritation and ocular surface epithelial disease [...] is attributable to inflammation that can be modulated by a corticosteroid."**

—AJO, July 2015 (see ref. 8)

OUR DRY EYE MANAGEMENT ALGORITHM

All therapy—dry eye included—should be individualized to the patient. That said, here is our usual approach to symptomatic dry eye management.

TWO WEEKS	TWO WEEKS	INDEFINITELY
Lipid-Based Artificial Tear Four to six times a day as needed	**Lipid-Based Artificial Tear** Three to four times a day as needed	**Lipid-Based Artificial Tear** Two to four times a day as needed
Lotemax SM Gel 0.38%* Four times a day	**Lotemax SM Gel 0.38%** Two times a day (Consider punctal plugs if needed)	**Discontinue Lotemax SM Gel 0.38%** If symptoms break through or continue, then pulse dose Lotemax SM gel drops four times a day for one week, or consider loteprednol once daily as needed.

The risk of increased IOP with loteprednol is uncommon at high dosage and rare at low dosage.
Our experience has been that if an increase in IOP is going to occur, it will do so at the initial one-month follow up, and not later.

Omega-3 essential fatty acids (derived from fish and/or flaxseed oil)
Can be initiated at any stage, based on clinical judgment.

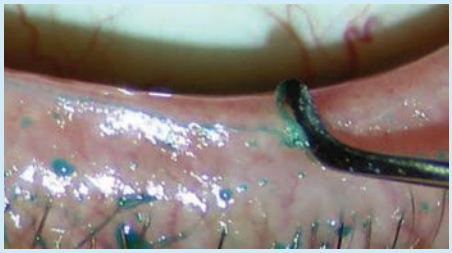
*Alternatively, instill loteprednol ointment daily at bedtime for three weeks, then M-W-F for two weeks.
Loteprednol therapy for inflammation due to dry eye disease is considered an "off-label" use.

OMEGA-3 FATTY ACIDS, ROSACEA AND MGD

- "A major focus of treatment of ocular rosacea is the management of DED caused by MGD."
- "Two well-designed studies have demonstrated improvements in the subjective symptoms and objective signs of MGD with the use of oral omega-3 fatty acids."

Wladis EJ, Adam AP. Treatment of ocular rosacea. Surv Ophthalmol. 2018 May-Jun;63(3):340-6.

MG ORIFICE SCRAPING IN TREATING DED



Legendary dry eye scientist, educator Donald Korb, OD, had this to say a number of years ago: "In the future, the health and maintenance of the mucocutaneous junction (MCJ) and keratinized lid margin may be considered integral to routine eye care. This shift in our culture will involve improvements in our observation skills and also the willingness to incorporate novel techniques such as debridement-scaling of the MCJ and keratinized lid margin in our clinical practice."

Korb DR, Blackie CA. Debridement-scaling: a new procedure that increases Meibomian gland function and reduces dry eye symptoms. Cornea. 2013 Dec;32(12):1554-7.

pathological component is conquered, there is no reason to use suboptimal, highly expensive topical medicines twice daily for years. So, for less than $70, treatment of the inflammatory aspect of dry eye disease is done—so simple, so patient-centric, so scientifically sound!

However, no single approach works effectively for all patients, and sometimes deviation from our approach is needed to achieve and to maintain patient comfort. We do have several patients who require once-daily loteprednol, as that is the least anti-inflammatory effect that keeps them comfortable.

We have never had a patient develop ocular hypertension at this dosing schedule. For perspective, many patients are using once-daily prednisolone acetate chronically for stromal herpetic disease, corneal transplant rejection suppression or for chronic anterior uveitis. This approach to inflammation control is time-honored. Think about this. Which is safer, loteprednol or prednisolone? Such chronic low-dose inflammatory suppression may be required for a subset of patients in a very cost-effective manner.

• Cyclosporine 2.0 is upon us. Authoritative journal articles have questioned the patient benefit of Restasis.[2] It is now well recognized that the vast majority of patients with dry eye disease have some degree of meibomian gland dysfunction, and patient-centric interventions include aggressive use of warm soaks (compresses), mechanical debridement of the meibomian gland orifices and mechanical expression. Note that all renditions of cyclosporine are indicated to "increase tear production." Without a physiological lipid layer, the addition of tears is minimally effective.

With Restasis (0.05% cyclosporine) now being generically available, there's a market opportunity for a newer brand-name cyclosporine, Cequa, a 0.09% solution, available from Sun Ophthalmics, a division of Sun Pharma. It is thought that its nanomicellar formulation might be an improvement over its predecessor. The data show modest gains. The FDA trials found vehicle-increased Schirmer results of 10mm or more in 9.2% of patients, whereas the 0.09% concentration did this in 16.6% of patients. As with the 0.05% formulation, about 25% of patients using the 0.09% drop experienced instillation-site pain vs. 4.3% with vehicle.[3]

As we have asserted for over 20 years, if the goal is to reduce ocular surface inflammation, a month-long course of loteprednol is optimally effective and vastly less expensive than other brand-name products.

0.09% CYCLOSPORINE OPHTHALMIC SOLUTION

- **As opposed to cyclosporine 0.05% emulsion, this nanomicelle formulation is a clear solution**
- **Like the 0.05% emulsion, dosage is BID**
- **Significant improvement within 12 weeks; as early as four in some**
- **"Lubrication of the ocular surface can alleviate symptoms; as such, the lubricating effect of the polymeric vehicle also may have contributed to the improvement of symptoms."**
- **24% experienced mild stinging or burning (4% in vehicle group)**
- **Marketed as Cequa by Sun Pharmaceuticals**

—Ophthalmology, September 2019 (see ref. 3)

The Medical Letter is a highly prestigious publication and is similar to *Consumer Reports*, in its exhaustive and objective analysis. The December 2, 2019 issue of *The Medical Letter* stated that Cequa "appears to be similar in efficacy" to Restasis.[4] It goes on to say that the "addition of topical corticosteroids in the first month [of treatment] may be helpful." In our opinion, that is because our experience and the peer-reviewed literature have confirmed that a one-month course of loteprednol suppresses the ocular surface inflammation![1]

We all need to practice based on science and medical literature, not on commercial marketing; it is really pretty evident, but one has to read in order to be able to separate acquisition of knowledge from salesmanship.

• Although there is controversy over the impact of omega-3 essential fatty acids in the care of patients with dry eye disease, the vast majority of optometrists (as surveyed in our lecture audiences) subscribe to their benefit, and so do we. We start all of our patients on fish oil at about 2000mg/day. By the way, this dosing is well below the levels that affect blood coagulation based on conversations we have had with cardiologists.

• We have laid out a rational, cost-effective, patient-centric and literature-supported approach to diagnosing and managing patients with dry eye disease. Beware of industry-driven "education," and adhere to time-honored, scientifically sound patient care. It is very straightforward.

• A recent literature review comes to the following conclusions: [5]

–"Recognition of the role of inflammation in dry eye has been a crucial factor in facilitating dry eye treatment. Inflammation plays a significant role in dry eye, promoting ocular surface disruption and symptoms of irritation."

–"Pretreatment with Lotemax induction two weeks before the initiation of cyclosporine-A can provide more rapid relief of dry eye signs and symptoms and greater efficacy than cyclosporine-A and artificial tears alone."

–"The inflammatory nature of dry eye has been widely accepted; thus, the direction for treatment research is geared toward the reduction of inflammatory cytokines."

Our take: Let's take a moment here to engage logical thought. When treating inflammatory eye conditions, we never use an NSAID, cyclosporine or lifitegrast; we use a steroid! Studies have shown that loteprednol QID for four weeks eliminates this inflammatory component, so *any* eyedrop following this course of therapy will do just fine, because the targeted inflammation has been conquered.

So, the intelligent, cost-effective, scientifically sound approach is to prescribe Lotemax SM (with a coupon) QID for two weeks, then BID for two more weeks (or a similar

STEROIDS AND DRY EYE DISEASE

- **"Because chronic inflammation at the ocular surface plays an essential role in the pathogenesis of DED, topical steroids have been commonly used in these patients."**
- **"Although the pathogenesis of DED is multifactorial and not fully understood, inflammation has been recognized as a key mechanism in its development and propagation."**

—Ophthalmology, June 2018 (see ref. 9)

- **"Once DED is diagnosed, the ASCRS protocol encourages aggressive, rapid-acting treatment that includes the use of steroids on the ocular surface. All kinds of loteprednol should see a bump in prescriptions written because of this."**

—OSN, September 25, 2019 (see ref. 10)

PERSPECTIVE ON CYCLOSPORINE AND LIFITEGRAST

• Frequent side effects could make Restasis and Xiidra hard to take.[1,2] For example, "burning and stinging associated with initial use of topical cyclosporine were reported as the common reasons for early discontinuation."[2] For Xiidra, dysgeusia is a unique side effect reported by patients.[1]

• "Over 60% of DED patients discontinued treatment within 12 months of initiation."[1] The median time to discontinuation was three months for Restasis and one month for Xiidra.[1]

• "During the first 12 months following [Restasis or Xiidra] initiation among patients with DED, the overall adherence was low at 30%."[1]

• "Side effects, as well as delayed onset of effect, have been reported with these two anti-inflammatory treatments."[1]

• Cyclosporine "may take weeks of administration before an effect occurs."[3]

1. White DE, Zhao Y, Ogundele A, et al. Real-world treatment patterns of cyclosporine ophthalmic emulsion and lifitegrast ophthalmic solution among patients with dry eye. Clin Ophthalmol. 2019:13:2285-92.

2. Mah F, Milner M, Yiu S, Donnenfeld E, Conway TM, Hollander DA. PERSIST: physician's evaluation of restasis satisfaction in second trial of topical cyclosporine ophthalmic emulsion 0.05% for dry eye: a retrospective review. Clin Ophthalmol. 2012;6:1971. doi:10.2147/OPTH.S30261

3. Bjordal O, Norheim KB, Rødahl E, et al. Primary Sjögren's syndrome and the eye. Surv Ophthalmol. 2020;65(2):119-132.

DRY EYE DISEASE: IT'S ALL ABOUT THE SYMPTOMS

- "The most important metric when treating DED is patient symptoms." *(Our take:* We have been stressing this in our collective lectures for over a decade.)
- "Your patient is not really interested in corneal clearance or the slope of tear osmolarity decline. All they know is how they feel and how well they see."
- "Symptoms direct treatment. Ultimately, symptoms determine the success of our interventions."
- *Our take:* Doing a bunch of testing may generate revenue, but does it truly enhance patient care? Our care is symptom-driven. Let's keep simple what is simple.

White DE. It is still the symptoms: patients care about how they see and feel. Ocular Surgery News, April 25, 2020.

SIGNS vs. SYMPTOMS: WHICH MATTERS TO PATIENTS?

Key findings from a survey of 420 patients in 15 countries:

- **"The three most important questions pertained to effectiveness of patient education, environmental modifications and topical anti-inflammatory eye drops."**
- **Patient interest in "education was top ranked by all subgroups."**
- **The three most important outcomes were ocular burning and stinging, ocular discomfort, and ocular pain."**
- **There was little interest in "signs" as patient-centric outcomes (symptoms) were deemed most relevant to patients.**

—JAMA Ophthalmol, October 2018 (see ref. 12)

approach). Now consider punctal plugs and a lipid-based artificial tear. We start all patients on a premium-quality fish oil at 2000mg per day from the outset. For the most part, treating dry eye disease is straightforward; don't make complex what is simple.

• Regener-Eyes may have a role as an additive therapy in patients recalcitrant to steroid therapy. We have some early and limited experience with this nonmedical (biologic) eyedrop. It is in the same universe as autologous serum tears, but contains numerous biological cytokines and growth factors. We have seen no conclusive studies, but anecdotally at this time, we feel Regener-Eyes may have merit. It is very expensive (about $200 a bottle), but there are patients out there for which you have tried everything without success. This new product may be helpful to some of these more severely afflicted patients. For now, we simply suggest you explore the Regener-Eyes website (mydryeyes.com) and then use your best judgment. By next year, we will have a much more definitive understanding of its role in patient care.

NEW DED DRUG STUDY CONFIRMS OUR RATIONALE

- **A 0.25% loteprednol etabonate suspension is being evaluated for use in dry eye.**
- **Studies show that "results indicate that LE 0.25% suspension is a rapid-acting, safe and effective anti-inflammatory therapy."[1]**
- **The study used the loteprednol QID for two weeks, and (unsurprisingly) none of the hundreds of patients experienced an IOP increase greater than 5mm Hg.[1]**
- **We have been making these general statements for over 20 years with regard to loteprednol!**

1. Guttman Krader C. Investigational topical corticosteroid demonstrates efficacy for dry eye, Oph Times, April 15, 2020

1. Lee H, Chung B, Kim KS, et al. Effects of topical loteprednol etabonate on tear cytokines and clinical outcomes in moderate and severe meibomian gland dysfunction: randomized clinical trial. Am J Ophthalmol. 2014 Dec;158(6):1172-1183.e1.
2. Seitzman GD, Lietman TM. Dry Eye Research—Still Regressing? Ophthalmology. 2019;126(2):192-94.
3. Goldberg DF, Malhotra RP, Schechter BA, et al. A Phase 3, randomized, double-masked study of OTX-101 ophthalmic solution 0.09% in the treatment of dry eye disease. Ophthalmology. 2019;126(9):1230-37.
4. Drugs for common eye disorders. Med Lett Drugs Ther. 2019;1586.
5. Hessen M. Cyclosporine Shoot-out: How Do They Match Up? Rev Optom. 2019 May 15;156(5):58-65.
42-9.
6. Lee H, Chung B, Kim KS, et al. Effects of topical loteprednol etabonate on tear cytokines and clinical outcomes in moderate and severe meibomian gland dysfunction: randomized clinical trial. Am J Ophthalmol. 2014 Dec;158(6):1172-1183.e1.
7. Karakus S, Agrawal D, Hindman HB, et al. Effects of Prolonged Reading on Dry Eye. Ophthalmology. 2018 Oct;125(10):1500-05.
8. Moore QL, De Paiva CS, Pflugfelder SC. Effects of Dry Eye Therapies on Environmentally Induced Ocular Surface Disease. Am J Ophthalmol. 2015 Jul;160(1):135-42.e1.
9. Yin J, Kheirkhah A, Dohlman T, et al. Reduced efficacy of low-dose topical steroids in dry eye disease associated with graft-versus-host disease. Ophthalmology. June 2018;190:17-23.
10. White DE. Annual anti-inflammatory review. Ocular Surgery News. 2020 Feb 25.
11. Stevenson W, Chauhan SK, Dana R. Dry eye disease: an immune-mediated ocular surface disorder. Arch Ophthalmol. 2012 Jan;130(1):90-100.
12. Saldahna IJ, Petris R, Han G, et al. Research Questions and Outcomes Prioritized by Patients With Dry Eye. JAMA Ophthalmol. 2018;136(10):1170-1179.

The Elusive Foreign Body Sensation

This experience can be maddening to patients, and the origin may be a genuine object found in the eye or just the feeling of one, as in advanced dry eye disease.

Several years ago in our state's largest newspaper, there was an article describing a distraught lady who had been to 11 different eye doctors of all stripes over a two-year period for a chronic, low-grade foreign body sensation with occasional secondary tearing. Some poor soul even performed a dacryocystorhinostomy on this patient.

As it turns out, "Dr. Eleven" was an optometrist who swept the recesses of the patient's superior cul-de-sac, and out came a folded-over soft contact lens!

Here's the lesson—if you do not see a foreign body or other cause for the patient's complaint, consider performing this maneuver:

(1) Use a couple of drops of proparacaine.

(2) Moisten the tip of the cotton swab with any eye ointment (for lubrication).

(3) Have the patient look down and insert the cotton swab (as seen in *Figure 1*).

(4) Gently sweep the entire cul-de-sac back and forth two to three times.

If there is something hidden up there, it will generally come out with the swab. In our experience, pieces of (and sometimes even a whole) soft contact lens can be found beneath the upper lid. Except in severe dry eye, there is almost always a detectable reason for foreign body sensation; our job is to find it.

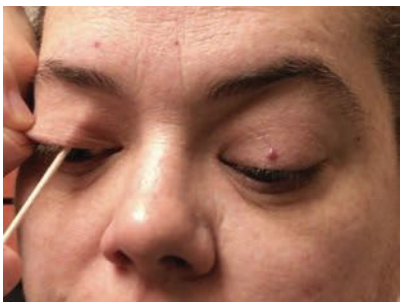


Fig. 1. Be prepared to perform this procedure with care and adequate patient education prior to beginning.

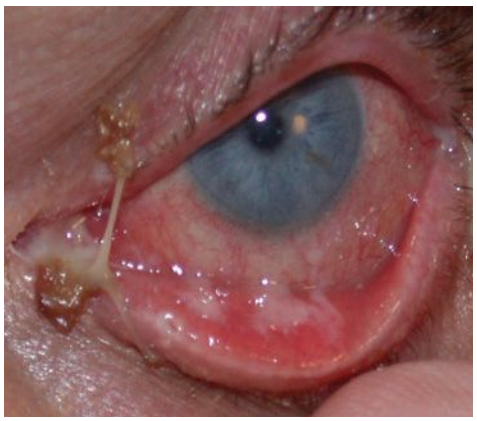


Fig. 2. An example of the somewhat rare finding of giant fornix syndrome. This is how the eye looked after three days of every-two-hour use of moxifloxacin—obviously, either the bacteria were resistant to fluoroquinolones, or more likely, revealed the inadequacy of topical treatment alone. Thank goodness for the professional literature!

There is yet another occasion to sweep the cul-de-sac: in the setting of giant fornix syndrome. This is a condition seen almost exclusively in older people with deep-set eyes that result in a pronounced and deepened superior fornix. This anatomic configuration allows for an inoculum of *Staph. aureus* to gather in the recesses of the cul-de-sac, thus resulting in a subacute to chronic conjunctivitis.

Treating without removing this goop of inoculum will result in therapeutic failure. Once the sweep of the cul-de-sac is done, prescribing an oral antibiotic such as cephalexin 500mg BID for one week along with Besivance ophthalmic suspension (Bausch + Lomb) QID for 10 days, and a steroid eyedrop QID for one week can effect a cure.

Figure 2 shows a case we nearly failed to properly treat because we failed to appreciate the presence of giant fornix syndrome. After reading about this condition in the literature contemporaneous with this patient's visit, we were able to adequately resolve the condition.

A more recent article about cul-de-sac sweeping in the setting of giant fornix syndrome appeared in the January 2020 issue of *JAMA Ophthalmology*, and shared that moistening the cotton tip with 5% Betadine is another approach.[1] This sounds like a reasonable alternative to us. As much as we love Betadine, we will likely continue the use of generic Maxitrol ointment, especially for the lubricating character of an ointment.

1. To J, Macsai M, Phelps PO. Chronic conjunctivitis in an older patient with ptosis. JAMA Ophthalmol. 2020;138(1):97-98.

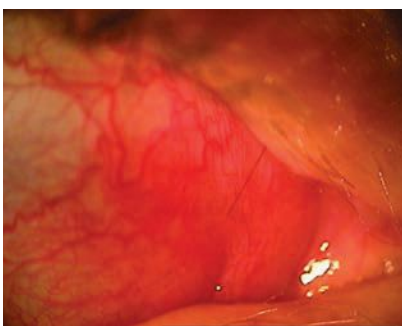


Fig. 3. This is an example of subtle, obscure reason for atypical foreign body sensation. Here, a loose lash found its way into the superior puncta. Easily removed without topical anesthesia, the patient was immediately relieved.

Oral Medication Dos and Don'ts

Some patients need the relief that only systemic administration can deliver.

With topical drugs abundant in eye care, sometimes we neglect the prudent use of oral therapy. Here are a few pointers:

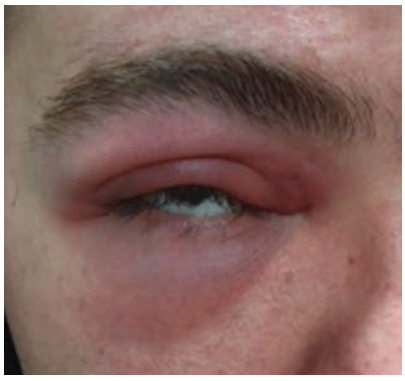
• The need for oral antibiotics far surpasses the need for topical antibiotic eye drops.

• Oral antibiotics along with aggressive warm soaks are the mainstay of ubiquitous eyelid infections. Most such infections can be treated with proper application of warm soaks, but if the infection is marked and/or worsening, we virtually always prescribe a first-generation cephalosporin, cephalexin (original brand name Keflex) 500mg twice daily. Some experts recommend three or four times daily dosing, but the 500mg used twice daily has never failed us. Cephalexin can be taken with meals, and we prescribe it for seven days.

• Doxycycline does double duty: it is actively antibacterial at 100mg twice daily *and* is used for its anti-inflammatory effect at 50mg per day for four to six months to augment treatment of meibomian gland dysfunction and rosacea blepharitis. Doxycycline comes in two forms: hyclate and monohydrate. While not a major factor, the monohydrate form is a bit more gastrointestinally friendly. Because of concern for altered enamelization of the teeth, it is *not* to be used in children under age 10 (some experts say age eight, but we are a little more conservative).

Doxycycline maintains 90% of its potency four years after its printed expiration date and, contrary to older teaching, does not become toxic beyond its expiration date.[1]

• Penicillin "allergy" is extremely rare, and while the cephalosporins share a similar molecular structure to penicillin, a penicillin allergy would rarely preclude the use of any cephalosporin. If the patient has a history of true anaphylaxis, we would use either doxycycline or a combination antibiotic originally known as Bactrim or Septra. These are a combination of trimethoprim and sulfamethoxazole. Because of the sulfa component, we would not use it in a patient with a history of severe sulfa allergy.



This man presented with a four-day history of painful, tender and worsening redness to his right eyelids. He was treated with cephalexin 500mg BID along with aggressive use of warm soaks.

• Because of the rare event of devastating tendonitis and tendon rupture, we would never prescribe an oral fluoroquinolone. As an interesting aside, ciprofloxacin is also good four years past it expiration date.[1]

• Sort of like doxycycline having a dichotomous character, so too does oral prednisone. The difference here is more temporally related than dosing related. Long-term use of steroids (for longer than two weeks) portends an increasingly higher risk of legendary side effects; however, short-term use of prednisone carries little risk, especially at the typical dosing of 40mg to 60mg per day. If ever any questions regarding its use arise, never hesitate to consult with the patient's primary care provider.

For example, if we felt the need to use a higher dose (let's say 100mg per day for initial therapy) in a patient suspected of having giant cell arteritis, we would make a quick call to the PCP just to make sure there was no reason that such a dosage would be inappropriate for this patient. Note that life is a

FACTS ABOUT CEPHALEXIN (KEFLEX)

- **Cephalexin — a first-generation cephalosporin**
- **Effective against most gram-positive pathogens**
- **Some earlier-generation cephalosporins share about a 1% cross-allergenicity to PCN**
- **Usual dosage: 500mg BID x 1wk**
- **Useful in soft tissue Staph. infections, such as internal hordeola, preseptal cellulitis and others**

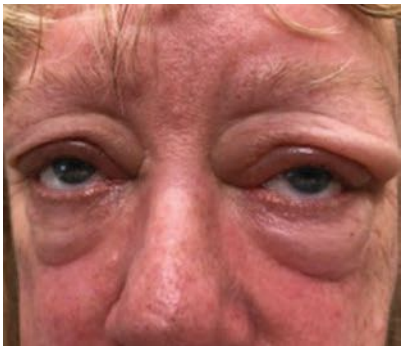
team sport, and so we should all work together to help one another. However, for the mundane, garden-variety use of prednisone, such as for marked reaction to poison oak or poison ivy, periocular/facial dermatitis or concurrent use in a patient with more severe or painful shingles, where we would typically prescribe 40mg per day, we rarely proactively consult. Rather, we write a brief note to the PCP so that the patient's health care team is fully aware of the status of the patient.

Comparing risks for perspective, patients who wear contact lenses sometimes encounter serious, vision-threatening problems and some patients who are prescribed prednisone get jittery or have trouble sleeping, but these are very rare, albeit annoying, situations.

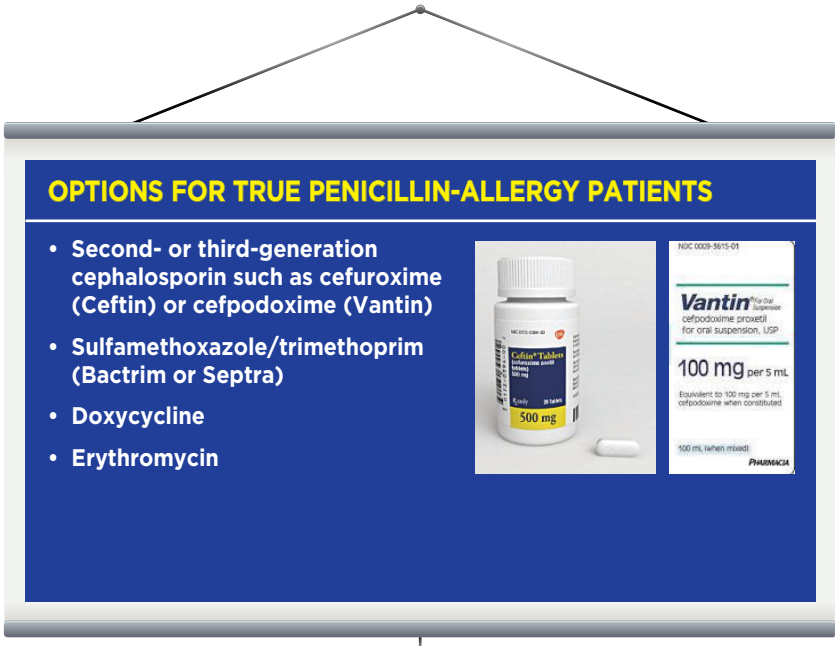
In clinical practice, we generally prescribe prednisone for three to five days without tapering. For shingles, when prednisone is needed along with the oral antiviral, we might prescribe 40mg for five days and then 20mg for five more days to mitigate concurrent pain, as well as to dampen the expression of post-herpetic neuralgia. Such prescribing decisions are highly fluid, thus making them a perfect example of the "art" of medical therapy.

We have never encountered a single significant adverse event in our decades of prescribing oral prednisone, and this medicine has markedly benefited myriad patients.

• We rarely prescribe oral antihistamines, mainly because they are not needed. For some mild to moderate cases of epiphora, a week-long trial of an antihistamine rationally can be tried to dampen the tearing, but a nasolacrimal evaluation may very well be in order.



This woman presented with acute redness and swelling to her face and eyelids since the day prior. Note the bilateral and equal involvement. She was treated with 40mg of oral prednisone for three days along with cool compresses.



A FEW PEARLS ON PAIN MANAGEMENT

• "Neuropathic pain is caused by a lesion or disease of the somatosensory parts of the nervous system."

• "Long-term opioid administration has minimal effect on chronic pain and can cause tolerance, drowsiness, and dependence, as well as impaired memory, concentration [difficulties]."

• The mechanisms of action of acetaminophen is not known; it is, however, "the leading cause of acute liver failure in the United States since 1998." "There is no evidence of an effect on neuropathic pain."

• Classic antidepressants and serotonin-norepinephrine reuptake inhibitors (SNRIs) such as Cymbalta and Effexor reduce the intensity of pain. They "have been used as 'first-line treatments' for neuropathic pain."

• Gabapentin (Neurontin) and pregabalin (Lyrica) are first-line therapies for neuropathic pain, but can also cause dizziness and somnolence.

• For local pain (such as zoster-related, post-herpetic, dermatologic neuralgia), "lidocaine patches at a dose of 1.8% to 5%" are approved for such. Other than occasional skin irritation, these "patches" are applied over the sites of pain for up to twelve consecutive hours per day.

• "Pharmacologic and interventional treatments for chronic pain often provide no reduction, or only a small reduction in pain, and are often judged by the patient to be inadequate." "Education and training of healthcare professionals to ensure cost-effective and safe, evidence-based treatments are therefore considered essential for pain management."

Finnerup NB. Nonnarcotic Methods of Pain Management. N Engl J Med. 2019; Jun 20;380(25):2440-8.

• The only time we use acetazolamide is in the management of some cases of acute angle-closure. We would give the patient two 250mg tablets right away (because we proactively keep these on-hand in our offices). However, timolol and brimonidine drops are the mainstays of managing acute pressure rises.

• The oral antivirals are a godsend for patients enduring shingles, and they represent the drug class of choice in treating herpes simplex epithelial keratitis, as well. Because of the antivirals' unique mechanism of action, they are extremely safe. Viral thymidine kinase dynamically activates these otherwise inactive drugs, thus they are only therapeutically active in virally infected tissues, sparing any non-infected tissues.

The only Achilles' heel is that these medicines are metabolized in the kidneys, so that patients with renal disease will have to have reduced dosing. The PCP, nephrologist, internist or pharmacist can guide dosing based on the patient's creatinine clearance levels, which should be able to be obtained from one of these providers by means of a quick telephone call.

These antiviral medicines were developed primarily to treat shingles; however, their use in herpes simplex epithelial keratitis has become commonplace over the last couple of decades, and they are indeed the treatment-of-choice for such herpetic presentations.

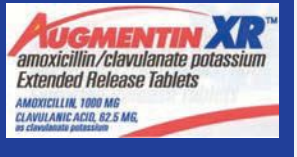
The varicella zoster virus is more virulent than the herpes simplex virus, so we prescribe standard dosing for shingles and half-dosing for herpetic eye disease. For acyclovir, the shingles dosage is 800mg five times daily for one week; thus, for herpes simplex, the dosing would be 400mg five times daily for one week. For valacyclovir (original brand name Valtrex), the shingles dosage is 1000mg three times daily for one week; the herpes simplex dosage is 500mg three times daily for one week. In like manner, the dosing of generic famciclovir (former brand name Famvir) is 500mg three times daily for shingles, and is 250mg three times daily for herpes simplex. While the brand-name drug has been discontinued, generic famciclovir is available. Famciclovir is recommended for the over-65 population because of enhanced tolerability, although all three drugs do perform quite well.

1. Lyon RC, Taylor JS, Porter DA, et al. Stability profiles of drug products extended beyond labeled expiration dates. J Pharma Sci. 2006;95(7):1549-60.

2. Paauw, D.S. & Deye, D. L. Practical Reviews in Ophthalmology, Volume 40-10, 2019.

AMOXICILLIN/CLAVULANIC ACID (AUGMENTIN)

- **Clavulanic acid enables amoxicillin to be bactericidal against common gram-positive pathogens**
- **Useful in treating soft tissue infections**
- **Cannot use if patient is allergic to penicillin**
- **Tx: 250mg, 500mg & 875mg (generic) or 1000mg (branded only) tablet q12hrs x 7-10 days**
- **Can be taken with meals**



QUESTIONS COLLEAGUES ASK...

Q "Do you recommend a specific probiotic when you prescribe doxycycline? I know it has a low-risk profile, but a few patients of mine have developed Clostridium difficile (C. Diff infection).

A As usual, we consulted authoritative literature to gain an answer: "Comparison of findings from the American College of Gastroenterology, the association for professionals in infection control and epidemiology, and the European Society of Clinical Microbiology and Infectious Diseases, does not recommend probiotic prophylaxis when antibiotics are prescribed, citing insufficient evidence."[1]

Our take: Exceedingly rarely have we ever recommended concurrent use of a probiotic with any oral antibiotic. For patients with a history of *Clostridium difficile* infection, we would consult with the patient's primary care practitioner prior to prescribing any antibiotic.

Q "What pain regimen do you employ when patients have significant post-herpetic neuralgia?

A From a lecture we attended on opioid medicines, we learned from an esteemed pain management expert that alternating ibuprofen 400mg QID with 500mg of acetaminophen QID is slightly more effective than the standard 5mg hydrocodone/acetaminophen drugs, so we have heeded this instruction. However, most of the time we direct these patients to a neurologist or a pain management clinic.

1. Goldenberg JZ, Mertz D, Johnston BC. Probiotics to prevent Clostridium Difficile infection in patients receiving antibiotics. JAMA. 2018;320(5):499-500.

The 2020 ARMOR Update

This long-running study of bacterial susceptibility to antibiotics helps us understand which agents are most formidable and which are weakest.

The Antibiotic Resistance Monitoring in Ocular Microorganisms (ARMOR) study—a massive and ongoing effort regarding antibiotic resistance—was recently updated in the May 2020 issue of *JAMA Ophthalmology*.

The researchers tested more than 6,000 isolates of *Staphylococcus aureus*, coagulase-negative staphylococci (CoNS), *Streptococcus pneumoniae*, *Pseudomonas aeruginosa* and *Haemophilus influenzae* collected between 2009 and 2018.

Here are the latest findings:

- Vancomycin remained robust for all gram-positive species.
- Besifloxacin was roughly equivalent to vancomycin—a constant finding within the study.
- When the researchers calculated the lowest drug concentrations that inhibited the growth of 90% of indicated isolates, they found that tobramycin, ciprofloxacin, moxifloxacin, gatifloxacin and trimethoprim showed slightly diminished effectiveness against gram-positive species.
- Ciprofloxacin remains the most effective drug against *Pseudomonas*.
- About 30% of *Staph. aureus* isolates and half of *Staph. epidermidis* isolates were methicillin resistant, and this was especially observed in patients older than 80.
- Older patients were more likely to have resistance than children. However, even pediatric patients did show notable levels of antibiotic resistance.
- Of the methicillin-resistant isolates, 75% demonstrated multi-drug resistance.
- Azithromycin was, by far, the least effective of the antibiotics tested.
- Both *P. aeruginosa* and *H. influenzae* isolates were found to have low levels of resistance.

Overall, there was little deviation from the data published in 2015.

2020 ARMOR SURVEILLANCE DATA: MIC_{90} COMPARISONS FOR STUDY ISOLATES

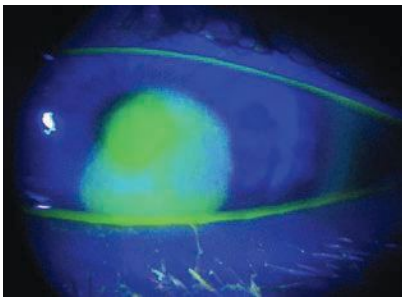
	S. aureus		MRSA		CoNS		MRCoNS	
	2015 (n=1169)	2020 (n=2189)	2015 (n=493)	2020 (n=765)	2015 (n=992)	2020 (n=1765)	2015 (n=493)	2020 (n=871)
Besifloxacin*	0.25	1	2	2	0.25	2	4	4
Vancomycin	1	1	1	1	2	2	2	2
Trimethoprim*	2	4	2	2	32	>128	>128	>256
Moxifloxacin*	1	4	1	16	1	16	32	32
Gatifloxacin	2	4	16	16	2	16	32	32
Ofloxacin	8	>8	>8	16	8	>8	>8	32
Ciprofloxacin	8	128	256	256	8	64	64	64
Tobramycin*	1	128	>265	256	4	16	16	32
Azithromycin	>512	>512	>512	>512	>512	>512	>512	>512

* Denotes the four antibiotics we use most routinely, given their proven efficacy and relatively low resistance profile.

As a reminder, the lower the MIC_{90}, the more potent the anticipated efficacy.

CoNS = coagulase-negative *Staph.* species, of which the majority are *Staph. epidermidis*.

Sources: Asbell PA, et al. JAMA Ophthalmol. 2015;133(12):1445-1454.
Asbell PA, et al. JAMA Ophthalmol. Published Online April 9, 2020.



This *Pseudomonas* ulcer required treatment with Besivance and cycloplegics.

Keep in mind this is an *in vitro* study and thus may not perfectly reflect the clinical efficacy of these drugs.

THE LATEST ON BETADINE AND IODINE "ALLERGY"

- Seafood allergy is caused by various protein allergens. Therefore, an allergy to seafood is not a contradiction to the use of Betadine.
- Allergy to iodinated contrast media is not related to the iodine, but to other intrinsic chemicals.
- "The current literature suggests that iodine itself is not an allergen; it is required for thyroid function and other normal biological processes and does not have the complexity necessary for antigenicity."[1]
- "There are currently no reports of anaphylaxis secondary to topical ophthalmic use of povidone–iodine."[1]

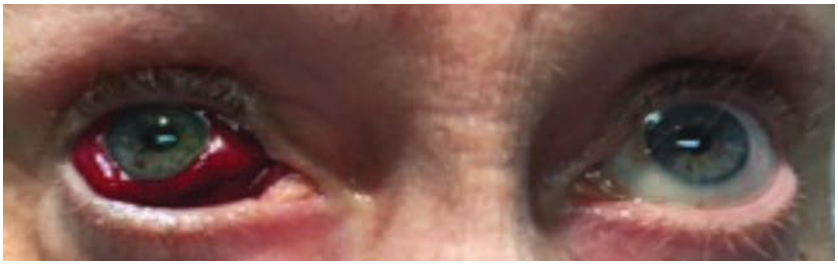
1. Bellchambers AS, Wearne MJ. Intraocular surgery endophthalmitis prophylaxis with self-reported iodine allergy. J Cataract Refract Surg. 2020 May;46(5):795-6.

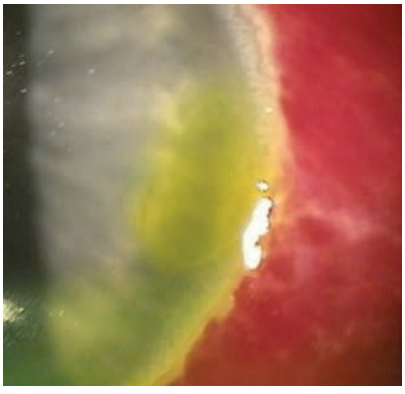
Subconjunctival Hemorrhage: Harmless?

It's mostly self-limited and unlikely to affect anything but appearance, but severe cases can bring on a secondary complication.

Most all subconjunctival hemorrhages are plain old garden-variety cases that just look worse than they are in terms of risk to the patient, but occasionally the volume of the blood can create more of a three-dimensional anatomy to the bulbar conjunctiva. In our experience, most of these patients are on some type of an anticoagulant, such as warfarin, Xarelto (Janssen) or Eliquis (Bristol-Myers Squibb), which seems to exacerbate such hemorrhages. They also tend to be more common in men vs. women and people over age 50.

When the hemorrhage creates a raised area at the conjunctivolimbal interface, it can create a blink void at the peripheral cornea such that the blink misses these focal peripheral corneal tissues and allows for the creation of a dellen. This then results in corneal thinning and pooling (not staining) of the fluorescein dye in this area.





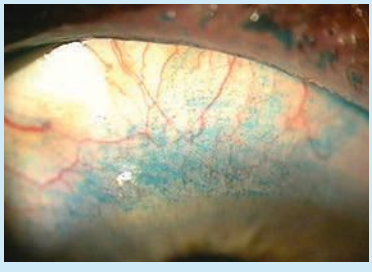
This severe instance of conjunctival hemorrhage (above) resulted in elevation to the bulbar conjunctiva, which then in turn led to the formation of a dellen (right).

There are a variety of approaches to treatment, but the goal is simply to hydrate these tissues while the tissues heal and the blood clears. Frequent instillation of a preservative-free, lipid-based artificial tear or GenTeal Gel (Alcon) is our usually choice. A preservative-free artificial tear ointment at bedtime may also be needed until hemolysis resorbs the blood which "deflates" the bulbar conjunctiva.

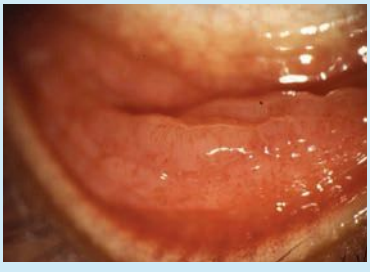
THE "LOOK UP, LOOK DOWN" MANEUVER WHEN EVALUATING THE SYMPTOMATIC RED EYE

There are times when asking the patient to look down (while you hold the eyelid up) can reveal the often-missed or misdiagnosed superior limbic keratoconjunctivitis (SLK). Conversely, having the patient look up while you hold the lower eyelid down can reveal the giant follicles indicative of chlamydial infection, which is another often-missed or misdiagnosed condition.

Our approach to SLK treatment is discussed elsewhere in this publication on page 8, while the treatment of chlamydial infection is 1000mg of oral azithromycin taken all at once. A brief letter to the patient's primary care provider is most appropriate so that a genital examination can be performed, and to facilitate medical examination of sexual partners. Such cases often involve tedious (and sometimes awkward) conversations, but we must "man up" or "woman up" and be the doctors we are! There are times when having these hard conversations is just part of our responsibility in providing good patient care.



Classic presentation of SLK. Lissamine dye nicely highlights the keratinized epithelial tissues of the superior bulbar conjunctiva.



In upgaze, with the lower eyelid being pulled down, the pathognomonic expression of "giant" follicles is easily appreciated.

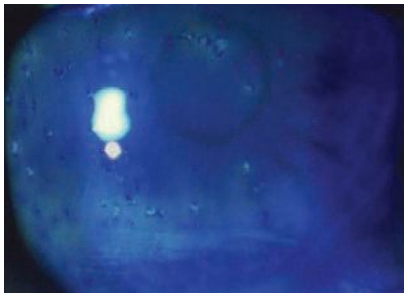
How to Distinguish Three Corneal Pathologies

Thygeson's superficial punctate keratopathy, herpes simplex keratopathy and phlyctenular keratoconjunctivitis share several signs. Here's how to sort them out.

Here are three conditions that can affect the cornea, and may cause diagnostic confusion. Thygeson's SPK is most always a bilateral, simultaneous condition of unknown cause. It is firmly recognized as an inflammatory keratitis, but the genesis of the inflammation has not been established (even though it was discovered by and named for Dr. Thygeson in 1950). While most cases of Thygeson's SPK are very straightforward, about one in five cases is expressed only in one eye, and the fluorescein staining pattern along with it being unilateral can make one think it could be herpetic. Here is how to separate these two:

- Thygeson's SPK comes on quickly, as in a day or two, whereas microorganisms like the herpes virus have to build up over a few days until it bothers the patient enough that they present for care.
- The eye in Thygeson's SPK can be nearly quiet or have mild injection, whereas in herpes simplex keratitis, the eye is usually more injected.
- The appearance of the lesion in Thygeson's SPK is like tiny, crushed bread crumbs, or like stars in the night sky; the lesions in herpes simplex disease are more coalesced and tend to be more linear.

Thygeson's SPK resolves in just two to three days with a mild steroid such as loteprednol 0.2% (Alrex, Bausch + Lomb). In herpes simplex disease, however, a steroid can accelerate herpetic expression. Should such an event occur, simply stop the steroid and initiate oral antiviral therapy—no problem at all. However, we always tell patients we treat with a steroid, "This medicine should have you much better in just a few days, but if your eye does not improve and certainly if it worsens, be sure to contact us right away." We duly chart this conversation in our medical record! Putting steroids on herpes simplex keratitis is not a rare occurrence, nor is it in any way a big deal. If such occurs, do as directed above and all will be fine.



Thygeson's presents as small, focal opacities scattered across the cornea.

Phlyctenular keratoconjunctivitis (PKC) most commonly is an immune response to *Staph.* bacteria and is almost always observed "straddling" the limbus. On occasion, the lesions occur exclusively on the cornea, and will stain with fluorescein. As opposed to Thygeson's SPK, which has multiple lesions, the phlyctenule tends to be only one or two larger lesions. Herpes simplex keratitis generally has a single lesion, but it is not round or oval as one sees in Thygeson's or PKC. As with Thygeson's, a steroid is the treatment of choice in the setting of PKC, but since subclinical *Staph. aureus* is thought to be the primary cause, we treat these cases with an antibiotic-steroid combination, usually QID for four to five days, and then BID for four to five more days.

Note that tuberculosis infection is becoming less rare. Decades ago, tuberculosis caused the majority of PKC, and it can still occasionally be so. Therefore, in your history, specifically ask if the patient has been in any situation (e.g., nursing homes) or location where tuberculosis is commonplace (such as on Indian reservations, South-East Asia or the African region). The treatment is the same whether tuberculosis is the cause or not, but if there is reason to believe the PKC lesions might to be associated with tuberculosis, it would be a service to the patient to alert them to see their primary care practitioner with this possibility in mind.

Last, keep in mind that infections have a discharge (bacterial = mucopurulent; viral = watery) whereas inflammatory processes do not.

LITERATURE PERSPECTIVE ON STEROIDS AND ELEVATED IOP

- "IOP elevation is much more common with older steroids such as dexamethasone, prednisolone, and fluorometholone, compared to newer steroids such as loteprednol, difluprednate, or rimexolone."
- A note about difluprednate: "Though the occurrence of increased IOP is about 3%, the IOP elevation may be significantly higher compared to other newer steroids." Only about 2% of patients experience "a clinically significant IOP increase" with loteprednol.
- "Post-operatively, loteprednol did not induce a significant IOP elevation and when used as a replacement for older steroids led to a significant IOP reduction in known steroid responders."

Roberti G, Oddone F, Agnifili L, et al. Steroid-induced glaucoma: epidemiology, pathophysiology, and clinical management. Surv Ophthalmol. 2020 Jul-Aug;65(4):458-72.

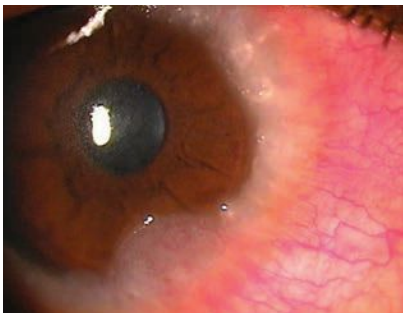
The Telltale Signs of Vernal Conjunctivitis

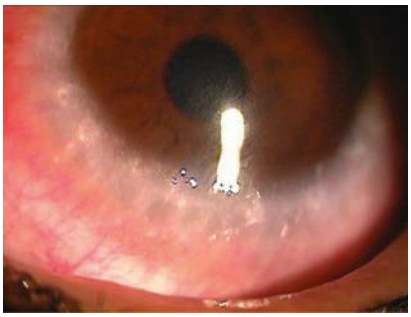
Perilimbal inflammation in an itchy, red eye will clue you in to this diagnosis.

While puberty often ushers in a plethora of challenges, it is commonly the cure for the aggravating disease of vernal conjunctivitis. This clinical entity is largely a disease of children, especially—but not exclusively—black males. There is itching and redness to the eyes with this condition, but the distinguishing feature is the "gelatinization" of portions of the corneal limbus. Within these gelatinized tissues will be seen the classic Horner-Trantas dots, especially when aided with fluorescein dye. There is usually a copious, stringy/ropy mucoid discharge present as well. This is not to be confused with the mucopurulent discharge that is seen with bacterial infections. Patients are also likely to complain of photophobia.

Left untreated, or in more severe cases, there can be an immune-mediated "shield" ulcer. These rare complications are treated with an antibiotic-steroid combination eye drop. However, only a straight steroid like Lotemax SM (Bausch + Lomb) is needed for initial suppression of these relatively uncommon presentations of ocular allergy. Many of these patients also have atopy, so they may be under the care of an allergist, as well.

Our usual approach in treating cases of vernal conjunctivitis is to prescribe Lotemax SM to be used Q2hrs for two to three days, then QID for one week, then BID for two weeks. It is our hope at that point to be able to switch the patient to an antihistamine/mast-cell stabilizer BID for several weeks to several months as needed.





Limbal "gelatinization" and Horner-Trantas dots are classic signs of VKC.

FAST FACTS ON VERNAL DISEASE

- **Common in young African and Asian males in hot, dry climates.**
- **Like Thygeson's SPK and SLK, can be chronic with episodes of acute exacerbations.**
- **Characterized by ropy mucoid discharge, itching and redness; papillary hyperplasia of superior tarsus and limbus. "Shield" corneal ulcers can occur in untreated cases.**
- **History of asthma, eczema, and hay fever seen in half of patients**
- **Tx: Loteprednol for 2-3 weeks, then convert to antihistamine BID PRN long-term. Also, lipid-based artificial tears PRN.**

—Survey Ophthalmol. May/June 2019

ANOTHER EMERGENCY DEPARTMENT MISTAKE

- Hx: 19-year-old male develops bilateral red eyes two weeks prior
- After a week of no improvement, he seeks care at an ED visit and is given erythromycin ointment
- After another week of no improvement, seeks optometric care
- CC: Eyes "crusty" in the morning with burning/itch OU
- VA: 20/15, 20/15, no nodes, mild upper lid edema
- SLE:
  - » 3+ injection to inferior bulbar conjunctiva
  - » 1+ injection to superior bulbar conjunctiva
  - » Mild gelatinization of inferior limbal conjunctival tissues with scattered foci of conjunctival staining
- Dx: Limbal vernal conjunctivitis OS>OD
- Inferior tissues more involved than superior
- Horner-Trantas "dots" are classic findings
- Tx: Loteprednol QID for five days, then BID for five days

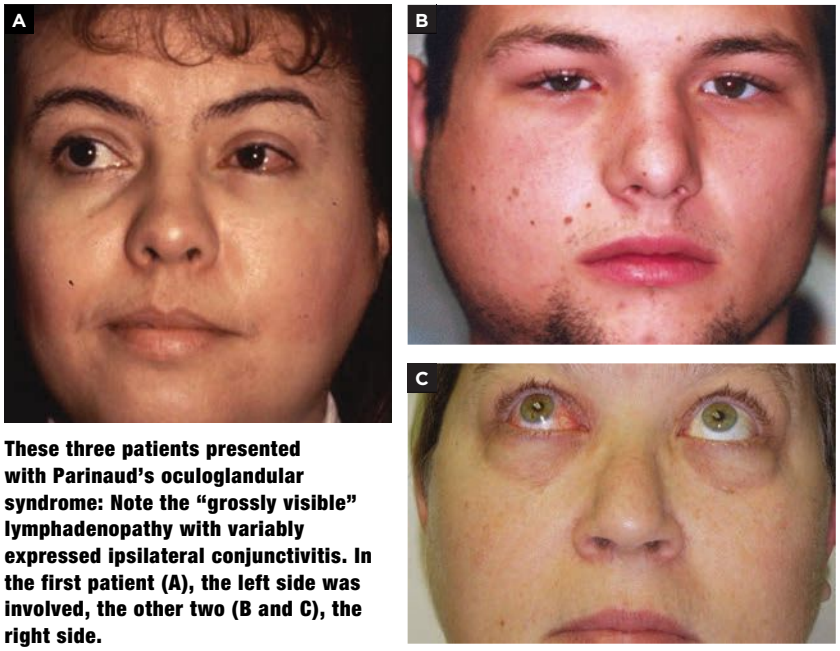
Prep for Parinaud's Oculoglandular Syndrome

Patients with visibly enlarged lymph nodes and unilateral red eye may have this.

This unusual unilateral bacterial infection results in a regional lymphadenopathy and conjunctivitis, thus it is termed an "oculoglandular" presentation. The lymphadenopathy is grossly visible, as is seen in these three patients, yet is only mildly uncomfortable in most cases.

While the cause of Parinaud's is not always determinable, most cases have a history of a recent kitten scratch leading to infection (i.e., cat scratch disease). A less common cause that results in a more fulminate expression is tularemia, a bacterial infection that can be associated with exposure to rabbits and other such furry animals. A fungal infection called sporotrichosis, somewhat more common in South America, can also be the origin.

Whatever the cause, we treat this syndrome with aggressive warm soaks to the glandular area, as well as with oral doxycycline 200mg per day for a week. We prescribe a combination antibiotic-steroid eyedrop QID for one week. Fortunately, Parinaud's is a relatively benign, self-limiting infection in most cases.



These three patients presented with Parinaud's oculoglandular syndrome: Note the "grossly visible" lymphadenopathy with variably expressed ipsilateral conjunctivitis. In the first patient (A), the left side was involved, the other two (B and C), the right side.

New Treatment for Thyroid Eye Disease Proptosis

Finally, there is a drug to help reduce the expression of proptosis in patients with Graves' hyperthyroidism. If you watch any television, you have seen a spate of advertisements for the flood of "biologic" agents that are now available for treatment of a wide variety of human diseases. Teprotumumab (Tepezza, by Horizon Therapeutics) is yet another human monoclonal antibody and it is specifically FDA-approved for the treatment of adults with thyroid ophthalmopathy.

This promising new drug blocks the inflammatory/autoimmune pathophysiology that leads to thyroid eye disease. About 75% of such patients with proptosis obtained slightly more than 2.5mm reduction.

Pricey but potentially revolutionary, Tepezza could bring much-needed relief for patients like this.

Many patients ordinarily will have to undergo multiple orbital surgeries for such proptosis and/or diplopia, and it is hoped that treatment with Tepezza can markedly reduce the need for such interventions (similar to how prostaglandins have diminished trabeculectomy rates).

Of course, like so many medicines, Tepezza can cause a number of side effects, such as muscle spasm, nausea, alopecia, diarrhea, fatigue, hyperglycemia, hearing loss, dry skin, dysgeusia and headache.

Tepezza is administered via intravenous infusion every three weeks for a total of eight sessions over the six-month course of treatment at a retail price in excess of $100,000 (this is not a typo).

Only time will tell what impact Tepezza will have on protocols for the treatment of thyroid eye disease; however, there are approximately 15,000 to 20,000 patients in the United States with thyroid-associated proptosis that may be amenable to this therapy.

Douglas RS, et al. "Teprotumumab for the Treatment of Active Thyroid Eye Disease." New England Journal of Medicine. 382.4, January, 2020.

Glaucoma Management: Tricks of the Trade

These clinical pearls can help to kick-start your journey in treating patients with this underserved, chronic condition.

For the most part, we have found that ophthalmologists, as highly skilled microsurgeons, have little interest in medical management. They do it because it is expected of them, of course, but it is the rare surgeon who possesses a passion for medical eye care.

The three of us have a great passion for all aspects of medical eye care, but especially for the care of patients with glaucoma.

For political reasons, ophthalmologists do not want optometrists to perform medical eye care in general and, specifically, glaucoma care. However, most of these same physicians would prefer not to deal with medical stuff clogging up their surgical practices. A good number will never admit this publicly, of course.

Glaucoma is an area of service in which optometrists can easily excel, but, for reasons that mystify us, many have not enthusiastically embraced it. Our practices are heavily weighted in glaucoma patient care, and we find great satisfaction in providing such care to these patients. All we can do is urge our colleagues to expand their scope of professional services to passionately and enthusiastically embrace these glaucoma patients. With this plea, we now offer a wide variety of clinical pearls to whet your appetite and to further enhance your skill level:

• There may be patients who require a prostaglandin or a rho-kinase (ROCK) inhibitor—the two available ones are Rhopressa (Aerie) or Rocklatan (Aerie)—who develop chronic conjunctival hyperemia. While it is never ideal to have to use Drug B to address the side effects from Drug A, sometimes it may be the only tenable solution. Here is where Lumify (brimonidine tartrate 0.025%, Bausch + Lomb) can be employed to meet both a medical and cosmetic need. However, if 0.2%, 0.15% or 0.1% brimonidine is causing the red eyes, Lumify does little or nothing to help because it is the same molecule, so the prescriber has to replace brimonidine with another drug class, usually a carbonic anhydrase inhibitor (CAI).

• Timolol, a beta adrenergic receptor antagonist, is most effectively dosed upon awakening when the physiological adrenergic system becomes active. There is little gain in trying to pharmacologically dampen a system that is already physiologically suppressed during the sleep cycle. Therefore, evening dosing is relatively unproductive.

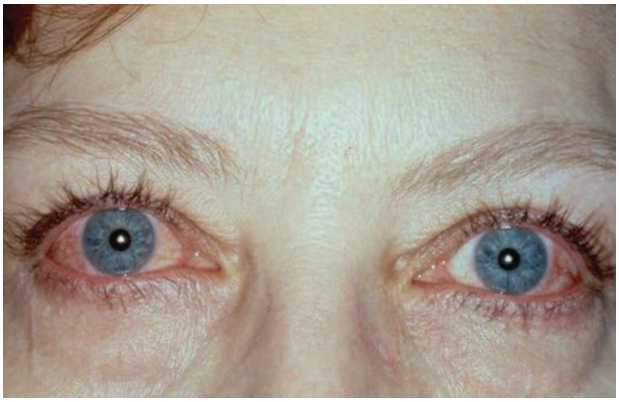
• There are only two topical medications that act quickly to reduce IOP, timolol and brimonidine, which is why they are preferentially used post-laser, post-surgery and in cases of acute angle-closure.

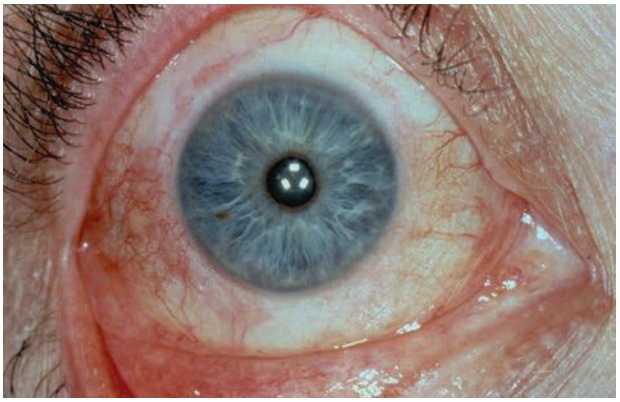
• Try to keep medical treatment simple with once-daily dosing. The four once-daily drugs that are available are: timolol, the prostaglandins and the ROCK inhibitors Rhopressa and Rocklatan (which contains both Rhopressa and latanoprost). All the others require at least twice-daily dosing.

• Regarding "combination" drugs, one would rarely initiate treatment with two medicines in the same bottle. Therefore, the prudent doctor would try one of the single-ingredient drugs first, since it alone might very well achieve target range IOP. In addition, the individual component drugs are almost always far less expensive than the combination agents. For example, rather than start with Combigan (0.5% timolol and 0.2% brimonidine, Allergan), try the less expensive, once-daily timolol first to see if that brings the IOP into target range. If the timolol brings the IOP close to target range, but not quite there, then you can try Combigan to see if the added brimonidine closes the gap.

BRIMONIDINE TARTRATE

- **Alpha-2 adrenergic agonist; TID FDA approval.**
- **Acts by reducing aqueous production with some enhancement of uveoscleral outflow.**
- **Reduces IOP similar to timolol 0.5% BID.**
- **Side effects: fatigue and dry mouth are the most common; uveitis has been reported; it may reduce systolic BP by 10mm Hg; causes less tachyphylaxis or allergy than apraclonidine.**
- **Neuroprotective potential speculated but not confirmed.**
- **Alphagan (0.2%, Allergan) and generic, Alphagan P (0.15%, Allergan and generic) and Alphagan P (0.1%, Allergan)**





This woman developed a classic brimonidine allergic response nearly a year after initiating therapy. There was also a follicular response to the inferior tarsal conjunctiva.

The problem now is that the patient must go from once-daily drop administration to twice-daily dosing, and the cost is disproportionately higher for the combination drug. If cost is a critical factor in patient compliance, you could prescribe timolol to be used in the morning upon awakening, followed by a drop of 0.2% brimonidine 10 minutes later. A second drop of brimonidine will have to be instilled about eight hours later, since this drug is only effective for about eight hours.

Brimonidine is actually approved for TID dosing, but it is almost always prescribed as BID because of more achievable patient adherence with twice-daily dosing. The same thought process can be applied to all combination glaucoma drugs, the only exception being Rocklatan, as it is a combination of two, once-daily medicines (Rhopressa and latanoprost). However, the same principle applies to trying the more effective and less expensive latanoprost first, and adding Rhopressa (in the form of the combination drug Rocklatan) only if required to achieve target IOP range.

• If target IOP is not achieved with latanoprost alone, then there are three commonly used options: (1) switch to Vyzulta (latanoprostene bunod ophthalmic solution 0.024%, Bausch + Lomb), as it can further reduce IOP as a sort of "latanoprost-plus" single-molecule addition of nitric oxide to enhance trabecular outflow; (2) add timolol once daily in the morning; (3) or add Rhopressa in the evening. Be sure to instruct the patient to wait 10 minutes between use of the two evening-dosed medications.

• Brimonidine allergy may be delayed for up to 15 months following initiation of therapy. In one study, there was little difference between the diurnal and nocturnal baseline IOP profile. Other studies have found the IOP to be significantly more elevated during the sleep cycle.[2]

What sets Vyzulta apart from the other prostaglandins is the addition of nitric oxide, which aids outflow through the trabecular meshwork.

• Keep in mind that "failure to diagnose" is by far the most common reason optometrists are sued. We plead with our colleagues to carefully study the optic nerve and (relatively) ignore the IOP. Normal and low IOP readings can be misleading, and only a careful study of the optic nerve head can reveal the proper diagnosis. Do not allow the IOP reading to misguide you! Normal-tension glaucoma is common, and while it usually occurs in older patients, it can be seen (albeit rarely) even in younger patients.

• Coupons have become a relatively new avenue to reduce the cost of prescription drug treatment. Almost all newer (and more expensive) ophthalmic drugs have coupons to lower their cost. These coupons can be provided to you as hard copies by the various drug representatives (if you prescribe in a sufficiently high enough volume to warrant their office visit), or they can be downloaded from the manufacturers' various websites by you or the patient.

The website www.goodrx.com can also be helpful in certain situations. Whatever the case, as caring medical caregivers, we need to advocate for our patients at all levels, including helping them afford their medications. Moreover, every drug company has "indigent assistance" programs,

in which the manufacturer supplies truly needy patients with their medications at no cost at all. Of course, there are the requisite forms that must be completed to verify the need and to enroll such patients.

• A recent study on a topical CAI and brimonidine noted that the TID use protocol was a limiting factor in the validity of the study. The drugs have a short IOP-lowering effect that's not adequate for BID dosing, "yet we know the entire world uses these drugs BID for patient convenience and compliance," the invited commentary states. "The IOP at ten to twelve hours for both brinzolamide and brimonidine is not significantly different from placebo, and the combination of the two does not change the kinetics. I suggest that brinzolamide, brimonidine and their combination are poor choices for solo therapy. I would like to see a future study address actual patient use of BID, but I doubt such a study could find a sponsor given the expected poor trough results."[3]

• Some systemic medicines have a positive, protective effect regarding glaucoma, while others have a negative effect. As is common knowledge, some patients progress despite having lower IOP, indicating that there may be other factors at play that can alter the course of the disease.

With the use of metformin—at two years on the standard dose of 2g per day—we have found about a 20% reduction in risk of developing glaucoma. This is likely independent of its effect on glycemic control.

In like manner, statins seem to be protective, and this is also likely independent of their cholesterol-lowering effect. The reason is thought to be related to the fact that statins increase nitric oxide vasodilatory effects. After two years on statin therapy, studies show there is about a 10% to 15% reduction in risk for the development of glaucoma. Selective serotonin re-uptake inhibitors such as Zoloft (sertraline, Pfizer), Prozac (fluoxetine, Eli Lilly), Celexa (citalopram, Allergan) and Paxil (paroxetine, GlaxoSmithKline), to name a few, and serotonin and norepinephrine reuptake inhibitors such as Cymbalta (duloxetine, Eli Lilly) and Effexor XR (venlafaxine, Pfizer), also exert about a 20% reduction in risk for glaucoma. Note that these medicines have weak anticholinergic properties and may potentiate angle-closure in patients with anatomically narrow angles.

The other side of the coin is represented by calcium channel blockers, such as Norvasc (amlodipine, Pfizer), which can exert a harmful effect on optic nerve perfusion. If used at all, amlodipine should be taken in the morning to dampen its systemic hypotensive effect during the sleep cycle. This may require communication with the prescribing physician on behalf of your patient to ensure they avoid taking the medicine in the evening and instead take it with breakfast.[4]

• Sulfonamide-containing drugs, such as sulfamethoxazole—think Bactrim (Roche) or Septra (Pfizer)—hydrochlorothiazide, Topamax (topiramate, Johnson & Johnson) and acetazolamide can precipitate angle-closure, even in individuals without anatomically narrow angles. Note that acetazolamide, which is commonly used in acute angle-closure, should be avoided in sulfonamide-induced angle-closure cases, such as with topiramate.[5]

• Physical activity helps control glaucoma. While not nearly as robust in effect as the 40% to 50% in a previous study, the 10% reduction found in another study certainly lends credence to the notion that exercise can decrease the risk of progressive glaucomatous optic neuropathy.[6]

"Greater levels of physical activity are associated with statistically significant slower rate of visual field loss in persons with glaucoma," the study says. "Physical activity is also beneficial with regard to dementia, where it may slow cognitive decline and reduce the likelihood of developing dementia."

The researchers noted that "greater physical activity and lower vascular risk independently attenuated the negative association of Aβ burden with cognitive decline in neurodegeneration in asymptomatic individuals. These findings suggest that engaging in physical activity and lowering vascular risk may have additive protective effects on delaying the progression of Alzheimer's disease."[6] Other researchers note that "there is no consensus on which activity mea-

THE STRENGTH OF OPTOMETRIC GLAUCOMA CARE

- **"Although highly desirable, physician-patient communication is an often overlooked but essential element in engaging patients in their own care."**
- **"When physicians communicate well, adherence rates are 19% higher than for patients whose physicians communicate less effectively."**

—Ophthalmology July 2015

- **Our take: Who can spend more time with their patients, those seeing 20-some patients daily or those seeing 40-some patients daily? It's simple arithmetic!**

sure is most correlated with health outcomes."[7]

It was also found that "older age, worse baseline severity and non-white race are associated with a faster rate of visual field loss."[8]

• We have always used the 24-2 SITA-Fast testing algorithm to capture static threshold perimetry in our glaucoma evaluations. The literature supports our clinical approach. Although there is now available a slightly faster visual field algorithm (the SITA-Faster), we find no compelling reason to alter our current practice.[1] The SITA-Faster algorithm does provide several more central test spots that could make this a more desirable approach, and we may switch to this newer algorithm at some point, but for now, we are going to stick with our tried-and-true SITA-Fast. Stay tuned for an update next year! We will see.

• Repeating an anomalous visual field test should be a very common procedure. For example, if a visual field is normal at baseline yet is defective at the six to 12-month follow-up visit, simply repeat the visual field, because it would be highly unusual for glaucoma to progress at such a rapid rate. This would be especially true if the IOPs were stable, and the retinal nerve fiber layer measurements were also stable.

CHALLENGES OF GLAUCOMA DROP ADHERENCE

- **"Approximately half of patients with glaucoma do not take their medicines as prescribed."**
- **There are significant projected shortages in the MD workforce and expected increases in the number of people with glaucoma.**
- **"In one short study of 279 video-recorded patient visits in which a new medication was prescribed, less than one third of patients received any education or counseling about their glaucoma or treatment."**
- **From a public health perspective, this is why optometry should begin to play a much larger role in glaucoma patient care. We can and do spend more time with our patients!**

—Ophthalmology, May 2020

The critical lesson here is simply this: if the visual field doesn't make sense, do nothing but repeat the visual field in a month or two or three. With rare exception, glaucoma progression is slow. A recent editorial noted that the Ocular Hypertension Treatment Study "demonstrated that in eyes with ocular hypertension and full fields at baseline, new defects are nearly always artifactual, and 86% resolved with retesting."[9]

• When there is considerable asymmetry in the IOP, consider at least these three possibilities: history of ocular trauma, pigment dispersion syndrome and pseudoexfoliation syndrome.

• Studies suggest that risk factors for fast visual field progression in glaucoma include older age, a higher peak IOP, worse baseline damage noted by the mean deviation (MD) on the visual field and pseudoexfoliation. As an *AJO* paper put it last year, "This is rather intuitive, but merits following the MD, as it is the most telling of the global indices."[10]

• Most unusually, the IOP associated with anterior uveitis is low owing to the ciliary body being inflamed, which diminishes its aqueous production. However, if the IOP is elevated in uveitis, it indicates trabecular inflammation, which inhibits aqueous outflow. Aggressive topical steroid use will renormalize these tissues and restore IOP to baseline levels.

• Historically, beta-blockers (systemic and ocular) were thought to be contraindicated in patients with chronic obstructive pulmonary disease (COPD). Not so! In a recent study of 1.3 million individuals, the researchers found that "beta-blocker users who subsequently received a diagnosis of COPD did not have worse outcomes; indeed, outcomes were better in the beta-blocker cohort."[11]

• There seems to be an epidemic of sleep apnea. A recent study found obstructive sleep apnea in just over half of both glaucoma patients and

DETAILS ON DURYSTA (SUSTAINED-RELEASE BIMATOPROST)

Since many glaucoma patients seem unable to consistently instill their eyedrops, researchers are searching for alternate approaches. The latest innovation is a sterile, intracameral sustained-release "drug delivery system" containing 10mcg of bimatoprost. This biodegradable, rod-shaped implant is inserted through the cornea, where it settles into the inferior iridocorneal angle. Perhaps the prospect of a needle inserted into the eye may motivate patients to use their drops!

For those who take the injection, it reduces IOP about 30% and provides sustained reduction in IOP for about 12 weeks (or longer), and a new implant can be inserted up to three additional times within one year. Studies are ongoing for extended use. As expected with bimatoprost, about 25% of patients experienced conjunctival hyperemia.

This innovative intracameral biodegradable implant may be very helpful to patients who are physically incapable of instilling eyedrops. It is marketed as Durysta by Allergan.

THE OCULAR HYPERTENSION TREATMENT STUDY IN PERSPECTIVE

- About 5% of Americans over age 40 have ocular hypertension.
- Screening tests include retinal nerve fiber layer assessment and visual field testing.
- "Median time to develop POAG was 6 years in the observation group and 8.7 years in the medication group."[1]
- "There is little absolute benefit of early treatment in low-risk ocular hypertensive patients. Most ocular hypertensive patients fall into this group and probably can be followed less frequently without treatment."[1]
- Five factors—age; IOP, central corneal thickness, vertical cup-to-disc ratio and visual fields—all merit our attention.

Our take: We would like to add a sixth "key factor" to this list: that of measuring the status of the retinal nerve fiber layer. If we are keenly attentive to these six factors, it is our opinion that glaucoma would never be missed. Note that true glaucoma is a progressive optic neuropathy, as evidenced by the data in the third bullet above, but we stress this: it usually takes a few years for conversion from ocular hypertension to glaucoma, so again, there is rarely a need for rushing to therapy; even with traditional therapy, conversion occurs, but it does extend the time of conversion by about two and a half to three years. At that point, therapy needs to be modified to achieve further reduction in the intraocular pressure. The only positive to glaucoma is that in most all cases, it is slowly progressive at about 3% per year.

Gordon MO, Kass MA. What we have learned from the Ocular Hypertension Treatment Study. Am J Ophthalmol. 2018 May;189:xxiv–xxvii.

the control group. However, there was no evidence of relationship between obstructive sleep apnea and primary open-angle glaucoma.[12]

We do know there are indeed similar associations in other disease processes such as diabetic retinopathy, ischemic optic neuropathy and floppy eyelid syndrome.

• Low blood pressure "dips" during the sleep cycle can lead to hypoperfusion of the optic nerve head, potentially leading to glaucomatous optic atrophy. Approximately 15% to 25% of individuals older than 40 years of age have an extreme dipping pattern, defined as a nocturnal change < 20% compared with daytime blood pressure.[13]

• There are four medications that are used once daily: a prostaglandin, including Vyzulta (Bausch + Lomb), timolol, Rhopressa and Rocklatan.

• We usually start with generic latanoprost or generic timolol. If these two do not achieve target IOP, there are a few possible next steps:

- Switch from latanoprost to Vyzulta.
- Add timolol to latanoprost.
- Add Rhopressa to latanoprost.

If the additional Rhopressa achieves target range IOP, then consider replacing the two medicines with Rocklatan for simpler dosing.

If one of these relatively simple approaches does not achieve target range IOP, then 0.2% generic brimonidine or generic dorzolamide can be added, but will require BID dosing. Both brimonidine and dorzolamide have about an eight-hour effect and have minimal, if any, effect during the sleep cycle.

We have found only the prostaglandins provide a modest effect during sleep. For this reason, we direct our patients to use these BID drugs shortly after awakening and to use the second drop about eight hours later. This allows us to extract the most benefit from their pharmacological activity.

• Reducing IOP to a reasonably safe level is very straightforward most of the time. The pinnacle challenge is determining when to initiate therapy, and perfectly competent doctors have different thresholds—thus, the "art" of medicine.

• We generally perform a 24-2 SITA-Fast visual field and an OCT nerve fiber layer measurement annually for each glaucoma patient.

• When performing a glaucoma assessment, we conduct gonioscopy at the initial visit and then approximately every five years thereafter.

• Central corneal thickness measurements are always done at the initial workup.

• Regarding hysteresis, the literature does give it some merit, but it is generally not needed to accomplish state-of-the-art diagnostic assessment. We queried a glaucoma subspecialist and here is her perspective:

"Corneal hysteresis is an interesting topic for us glaucoma specialists. It kind of falls into the same category as the OCT nerve fiber layer used to: in the beginning, we had no idea if its application would even be useful. Now we know that it most certainly deserves a role, particularly in early/undetected glaucoma. I, for one, do not use hysteresis as part of my glaucoma workup; I still rely most heavily on intraocular pressure, identified risk factors from the Ocular Hypertensive Treatment Study trial and the visual field. The OCT retinal nerve fiber layer certainly aids in those, 'Hmm, I just don't know…' cases, but at this point, I'm not ready to add yet another variable to an already challenging diagnostic algorithm. But who knows what the future holds."[14]

Our physician colleague seems to offer a thoughtful and practical approach and one with which we wholly agree. As she assessed, maybe in a few years, but at this point, we

see no merit in further complicating the already-multifaceted glaucoma workup.

• Let's talk about self-tonometry. It is widely acknowledged that most people have their highest IOP outside of office hours. Given that a single, in-office IOP assessment only provides a snapshot of the pressure profile, it is obviously desirable to have a more comprehensive idea of a patient's global IOP profile. And only by having more complete diurnal and nocturnal IOP measurements can these data be obtained.

About 75% of patients, as trained by your contact lens technician, can competently measure their own IOP multiple times outside of office hours. The Icare Home instrument provides an excellent technology to provide this data. We urge you to investigate this technology at icare-usa.com. One final note on this topic: the optometric staff assessment of IOP is easily accomplished via the Icare in-office, handheld instrument. It is vastly superior to the highly antiquated and patient-averse air-puff technology.

• An interesting study on noctural drug efficacy uncovers two interesting findings. "Neither dorzolamide nor timolol use added to the physiologic 47% reduction in nighttime aqueous production." And secondly, "The nighttime IOP-lowering effect of prostaglandin analogues is approximately half the daytime effect."[15]

The additional data gathered by at-home tonometry can give you a valuable new awareness of the patient's IOP status. Glaucoma patients require years of monitoring and it is unrealistic to think it all can be accomplished in the office.

• A study from earlier this year found that prostaglandin eyedrops can have "many side effects involving the ocular adnexa. The cluster of findings termed prostaglandin-associated periorbitopathy include ptosis, levator dysfunction, deepening of the superior sulcus, endophthalmitis, and dermatochalasis involution."[16]

There is a possible association between prostaglandin exposure and ptosis surgery failure. So, it is important to let our patients who are using a prostaglandin, or have used it in the past, know of the increased risk of surgical outcome failure."[16]

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16. Sweeney AR, Williams KJ, Dermarkarian CR, et al. Topical prostaglandin analog use is associated with increased failure rate of ptosis repair. Ophthalmol. 2020;127(2):276-78.

ON A PERSONAL NOTE...

We would like to pause briefly to honor the commitment of our optometric colleagues in uniform currently serving our country around the world.

We were recently honored as speakers at the European Command of Optometric Military Services held in Garmisch, Germany. In the left photo, we enjoy a brief moment of rest with some of the military optometrists.

We are proud to have served along with these dedicated professionals (right photo), just about 35 years ago!

Keep Hydroxychloroquine on Your Radar

With an urgent new off-label use under investigation, now is a good time for a refresher on the dos and don'ts of Plaquenil toxicity screening and management.

It is certainly odd that a viral pandemic has brought a drug out from relative obscurity to become a household word. In the search for a treatment option for COVID-19, researchers are evaluating the efficacy and safety of Plaquenil (hydroxychloroquine, Sanofi-Aventis) to treat the pneumonia associated with the virus.[1]

Optometrists are very familiar with Plaquenil, but its more covert alteration of zinc activity on cell membranes is new to all of us. Of course, its mechanism of action in the setting of rheumatoid arthritis remains unknown as well. The drug has been touted as an anti-malarial drug, although that is only historically correct and relatively obsolete.

At least in the Western hemisphere, it is almost exclusively used in the treatment of rheumatoid arthritis and systemic lupus erythematosus. Even in areas where malaria is endemic, hydroxychloroquine is a second- or third-line option, having been displaced by newer, more effective anti-malarial medicines.

But it remains an important drug to be aware of in the eye care world.

Plaquenil is a mainstay entry-level drug in the management of rheumatoid arthritis and several other connective tissue diseases, similar to the way prostaglandins are used for glaucoma, metformin for diabetes or hydrochlorothiazide for hypertension. While there is a tendency to focus on diagnostic testing with a 10-2 visual field and OCT when you see a patient who is taking hydroxychloroquine, the most important thing you can do is check the medication dosage and the number of years taking it. Although one might think this is the exclusive province of the prescribing physician, studies show that approximately half of patients on hydroxychloroquine are overdosed, and judicial rulings have found eye doctors culpable in some of these medical malpractice cases.

Another reason to be more attentive to dosing is that we should harbor a sincere desire to provide our patients with the best possible care by doing all we can to protect and enhance their overall health, not just their vision.

So then, how are we to benevolently "coach" our rheumatologic colleagues whom we feel may be overdosing our mutual patients? Thanks to advances in technology and the development of computer algorithms, calculating accurate dosages for an individual patient is a relatively easy task. Simply download the "DoseChecker" app *(Figure 1)* and enter the patient's weight; the tool calculates the recommended dosing schedule for that patient. Traditionally, dosing has been calculated based on a 6.5mg/kg of lean, or ideal, body weight. This amounts to about 135 lbs. as the threshold, and patients with an ideal body weight of less than 135 lbs. were increasingly at potentially greater risk for Plaquenil retinal toxicity. The big picture is: the smaller the body, the more concentrated the dose; a larger body is able to "dilute" the dose so that it is easier to stay below the projected toxic threshold.

Fig. 1. Doctors have many tools at their disposal, such as online dose checkers, to ensure patients are prescribed the proper dose of hydroxychloroquine.

A CASE OF OPTOMETRIC MALPRACTICE CULPABILITY

A woman in her late 30s weighed 106 lbs., yet her rheumatologist prescribed her the standard 400mg per day dosage of hydroxychloroquine. Over the next 20 years, this patient saw three ophthalmologists and one optometrist (who was attending her when she hit hydroxychloroquine toxic threshold). None of these four doctors had ever communicated with her rheumatologist.

As it turned out, the lawsuit named the rheumatologist and the optometrist—but, inexplicably, not the three ophthalmologists who had also been involved in her care. The patient now has 20/60 to 20/80 best-corrected visual acuity as the result of five doctors' inattention. (Dr. Thomas was the defendant's expert witness in this case.)

You may think you are not responsible for proper dosing of medications prescribed by other physicians; the courts hold that you are. Good interprofessional communication can be vital in optimizing patient care.

The newer guidelines now recommend a dosing strategy of 5mg/kg of actual body weight. This means a person has to weigh at least 180 lbs. to merit dosing at the traditional 400mg per day and, obviously, patients weighing less than 180 lbs. need an incrementally decreased daily dose. In fact, for a patient weighing 100 lbs., daily doing of hydroxychloroquine should be only one 200mg tablet per day. Other patients require modified dosing based on their weight.

Since hydroxychloroquine only comes in 200mg tablets, dosing can be titrated to taking two tablets on one or more days of the week, and then taking only one tablet on the other days.

Hydroxychloroquine has a long half-life, which makes such dosing schedules both possible and practical. Remember: dosing does not have to be 100% exact to be effective and safe, but it is important to strive to get the dosing below a predictive toxic threshold level for all patients. As with any medicine, we want to use the least amount to accomplish the desired therapeutic result.

The next patient-centric step in vision preservation for hydroxychloroquine patients is to effectively and efficiently communicate your app-guided and clinically educated findings to the prescribing physician. We do this via a simple, one-page document that can be integrated into your EMR, or alternatively, fax the prescribing physician a copy (*Figure 2* at right).

Let's say you determine that your patient using hydroxychloroquine is indeed being overdosed. Simply annotate a kind and authoritative note at the bottom of the form, sharing your concerns with the prescribing physician and your recommendations. We gently share with the patient our concerns and advise them that we will be communicating with their prescribing physician.

COVID-19: HYDROXYCHLOROQUINE AND RETINOPATHY

- **Dosages of HCQ used in the setting of COVID-19 are approximately four times higher than typical use, and only for 10 days.**
- **"Evidence to date indicates that extreme doses do accelerate retinal toxicity, but with a probable time course of many months rather than days."**
- **"Short-term trials (<2wks) will have negligible risk even with doses 5-6x the usual 5mg/kg/day maximum recommendation. Usage for a few months will still have very low risk with doses under 3-4x the usual level."**
- **"Eye doctors "will be most effective in this time of crisis by reassuring physicians and the public that retinopathy is not a serious concern with respect to HCQ usage for coronavirus."**

—AJO, May 2020

Hydroxychloroquine (Plaquenil) Evaluation

Patient Name _____ D.O.B. _____

Referring Physician _____

Consultant Optometrist _____

Date ____/____/____ Number of years taking HCQ _____

Plaquenil dose _____ mg _____ Patient's Weight _____ lbs.

Acuity Right 20/____ Left 20/____

Fundus exam Normal_____ Other _____

_____

Macular Visual Field Testing (10-2) ☐ Normal Other_____

_____

SD-OCT ☐ Normal_____ Other_____

_____

Recheck: Annually_____ Other _____

Comments:

Thank you very much for entrusting us with the eye care of your patient.

Fig. 2. Here is a copy of our hydroxychloroquine comanagement document. Use it any way you wish.

THE RIGHT WEIGHT MEANS THE RIGHT DOSE

- "Many of our patients are overdosed. A 2018 study [...] found that already about a third of patients with normal body mass index were overdosed with the dosing based on ideal body weight."
- "More patients will need to reduce dosing under the new guideline (of using real body weight)."

—Despite Plaquenil dosing recommendations, retinal toxicity remains. Ocular Surgery News. September 10, 2019.

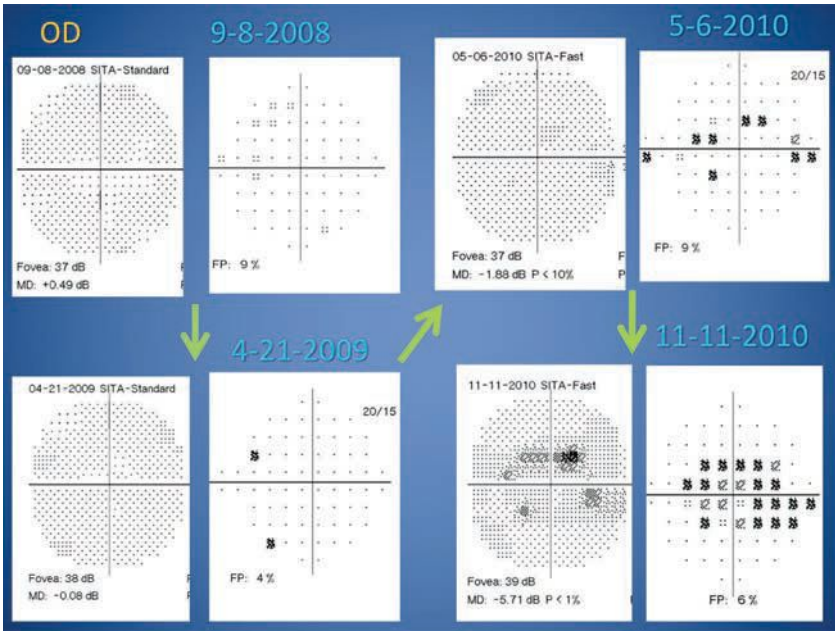


Fig. 3. This sequence of 10-2 visual field assessments demonstrates the importance of being attentive to the pattern deviation probability plots. The third visual field clearly shows multiple defects, yet was entered into the medical record as "normal" because the greyscale does indeed look normal; however, the physician was looking at the wrong data. As can be seen, the defective pattern plots in the third field have markedly progressed six months later. The patient has suffered permanent visual compromise because the fields were not interpreted correctly.

In addition, women comprise the vast majority of patients taking hydroxychloroquine, and this group tends to have a lower body weight than men. Obviously, these sorts of professional discussions can be tedious, but as long as we are patient-centric and professional in our demeanor, we have met our ethical and professional obligations. Like any and all patient care findings and communications, they must be documented in your medical records.

An *AJO* article from December 2018 puts it like this: "We believe that ophthalmologists [and optometrists] have a responsibility to alert rheumatologists of the disastrous side effect of hydroxychloroquine, in addition to screening for hydroxychloroquine retinopathy with the appropriate tests."[2] Now that we have diligently sought to achieve proper hydroxychloroquine dosing for our patients, we can turn to the relatively simple task of performing diagnostic assessments. While multifocal electroretinogram and fundus autofluorescence can be used, as clinicians we always strive for simplicity—that is, we perform white-on-white target 10-2 visual field and HD-OCT testing. The former is subjective while the latter is an objective tissue assessment.

Just for perspective, the British experts have stated that if a patient is indeed properly dosed, such testing could be rationally stopped. However, we are unaware of any eye doctors interested in eliminating these diagnostic tests.

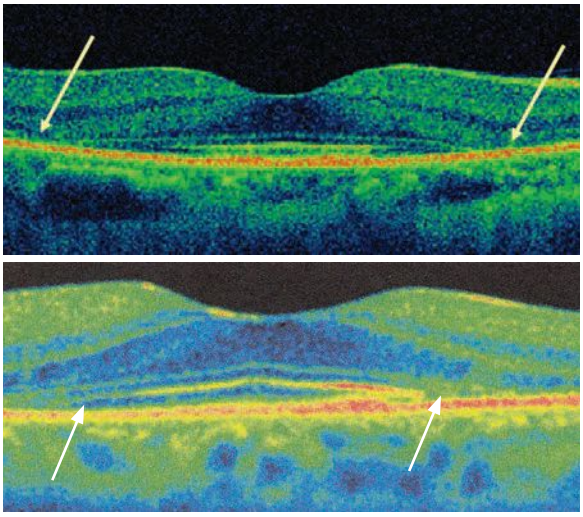
There is an ongoing debate (largely insurance-driven) as to whether such diagnostic testing needs to be performed until a patient has been on hydroxychloroquine for at least five years. This could perhaps be

PLAQUENIL TOXICITY PEARLS

- **New data using modern retinal imaging techniques identify the prevalence of hydroxychloroquine retinopathy at around 7.5% in patients taking the drug for more than five years, which increases to 20% to 50% after 20 years.**
- **HCQ is increasingly used in the treatment of systemic lupus erythematosus, rheumatoid arthritis and other autoimmune disorders.**
- **The new recommended dosage is 5mg/kg/day:**

	Least Safe Weight
400mg at 6.5mg/kg =	135 pounds
300mg at 5.0mg/kg =	100 pounds

—Lotery A, Burdon M. Monitoring for hydroxychloroquine retinopathy. Eye. 2020.



Figs. 4 and 5. These OCT scans show advanced maculopathy. Note the evident parafoveal outer layer thinning.

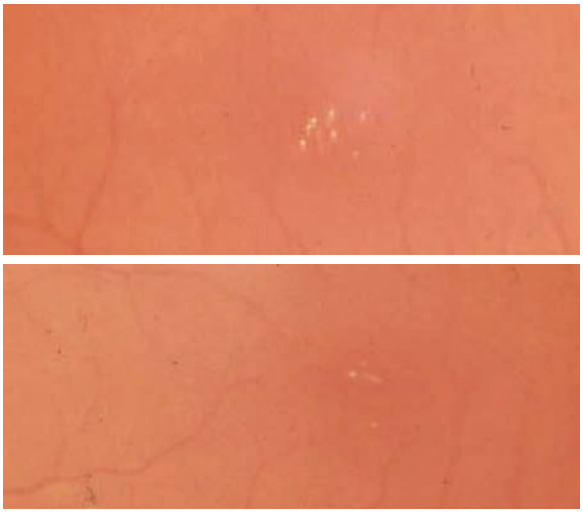


Fig. 6. Here are the maculae of a woman who is taking tamoxifen to treat her breast cancer. She presented with a chief complaint of bilateral decreased vision (20/30) over the past few months. We wrote a brief letter to the prescribing physician advising switching to another similar drug that does not carry the risk of vision compromise.

rational, as long as dosing is proper. However, it has been our collective personal experience that, in general, rheumatologists (and other occasional hydroxychloroquine prescribers such as dermatologists for systemic lupus erythematosus–associated dermatopathology) want this testing done annually. Such testing is deeply ingrained in our modus operandi, and it will be a challenge to change; however, third-party reimbursers may alter our protocols, so be attentive to such potential intrusions into your clinical judgment.

When a patient presents for a Plaquenil evaluation, we conduct a comprehensive dilated eye assessment, plus a 10-2 visual field and an HD-OCT. We take a particularly careful look at the maculae (not for hydroxychloroquine toxicity, as that would be a very late and sad finding) to look for any expression of macular disease, such as age-related macular degeneration, that could potentially confuse diagnostic testing.

Visual field testing, being subjective, can yield confusing results. Thus, if you see suspicious scotomas but the OCT is normal and hydroxychloroquine dosing is proper, these subjective findings are almost always spurious; depending on your level of concern, plan to repeat the 10-2 in a few weeks.

Since hydroxychloroquine is a very helpful drug in the management of rheumatologic disease, we do not want to recommend unwarranted stoppage of the medicine based on incomplete or inaccurate data.

Keep in mind that hydroxychloroquine causes parafoveal tissue damage; thus, central vision is preserved until quite late in the disease process. With the 10-2 visual field, look for paracentral scotomas (2° to 5° region) in all patients, except those of Asian descent, a patient population for whom tissue damage is more commonly expressed in the 8° to 10° regions.

A general note regarding visual field assessment: in glaucoma and hydroxychloroquine testing, always look at the pattern deviation probability plots, and do not rely only on the gray scale. When assessing for neurologic disease, these scotomas are almost always absolute and the grayscale provides an accurate assessment. *Figure 3* is a example in which the medical record charted "normal findings" because the un-astute doctor was fooled by looking only at the gray scale, when indeed there were clinically relevant defects in the pattern deviation probability plots.

In assessing the HD-OCT, damage to the outer layers (ellipsoid zone) is evidenced by parafoveal compromise (thinning) of these tissue lines, as can be seen in *Figures 4* and *5*.

It must be stressed that all pathological findings on OCT and 10-2 (as relevant to hydroxychloroquine) are the result of overdosage. The longer a patient is on hydroxychloroquine (many years), the higher the risk of tissue toxicity, and many patients are on hydroxychloroquine for 20 years or longer. This is yet another reason to establish a proper dosage at the outset of therapy.

While it would be very reasonable to assume that physicians know how to properly prescribe medicines, valid observational studies unfortunately show otherwise. It is actually pitiable that we optometric physicians should have to weigh in, but it is just a fact. Life in general, and healthcare specifically, are team sports, and we all need to work together for the good of our patients.

1. Hongzhou Lu, Shanghai Public Health Clinical Center. US National Library of Medicine. Clinical Trials. clinicaltrials.gov/ct2/show/study/NCT04261517. March 4, 2020. Accessed March 13, 2020.
2. Ahn SJ, Lee SU, Lee SH, Lee BR. Evaluation of retromode imaging for use in hydroxychloroquine retinopathy. Am J Ophthalmol 2018 Dec;196:44-52.

PEARLS FOR CODING YOUR HYDROXYCHLOROQUINE SCREENINGS

By Rebecca H. Wartman, OD

While baseline testing for chloroquine and hydroxychloroquine toxicity can occur prior to beginning therapy, the guidelines recommend initial testing within the first year of starting hydroxychloroquine.

Initial testing includes visual fields and scanning computerized ophthalmic diagnostic imaging (SCODI). Fundus photography and color vision testing might be considered for baseline testing to monitor for coexisting conditions but are no longer considered sensitive enough to detect hydroxychloroquine toxicity. No further testing for toxicity is recommended until the medication has been used for five years. After five years, yearly testing is recommended but more frequent testing may be necessary if the patient is at a higher risk for toxicity.

Most medicare carriers and many private insurance carriers have specific guidance for billing and coding for hydroxychloroquine toxicity monitoring. While direct retinal examination and fundus photography are no longer considered useful to evaluate potential retinal toxicity, some carriers still allow for fundus photography (92250) without hydroxychloroquine toxicity. Most insurance carriers allow some form of SCODI (92134) with some carriers specifying the use of SD-OCT because the resolution of time-domain OCT instruments are not considered sensitive enough to detect early retinal changes of toxicity. Visual field testing would typically be 10-2 testing for most patients but 24-2 or 30-2 testing is recommended for Asian patients. Even with the new guidelines, many carriers allow testing on a yearly basis regardless of duration of medication use and allow more frequent testing for those patients in a higher risk category.

There are a few other tests that may or may not be useful in monitoring for hydroxychloroquine toxicity. Multifocal electroretinography (mfERG, code 92274) is often mentioned and is allowed by some medicare carriers. Fundus autofluorescence is sometimes recommended; however, this procedure is not billed separately, as it is considered part of the normal examination.

The diagnosis codes clinicians should use can vary slightly from carrier to carrier. Generally speaking, all carriers want the diagnosis of Z79.899 when monitoring before use, with current use or past use of hydroxychloroquine or chloroquine. At least one carrier requires the use of Z03.89 if evaluation takes place prior to the initiation of drug therapy. When the drug has been discontinued but the patient is still being monitored for toxicity, the diagnosis code of Z09 may be indicated.

None of the current billing guidance from the Medicare carriers indicate the use of any diagnosis is required for the systemic reason for taking these drugs. It is important that providers check each insurer's guidance for coding of chloroquine/hydroxychloroquine use monitoring.

ICD-CM-10 DIAGNOSIS CODES

Z79.899 – Other long-term (current) drug therapy.
Z03.6 – Encounter for observation for suspected toxic effect from ingested substance ruled out. (Encounter for observation for suspected adverse effect from drug; encounter for observation for suspected poisoning.)
Z03.89 – Encounter for observation for other suspected diseases and conditions ruled out.
Z09 – Encounter for follow-up examination after completed treatment for conditions other than malignant neoplasm. (Medical surveillance following completed treatment.)

The codes for retinal toxicity are as follows, with the seventh character being either A (initial encounter), D (subsequent encounter) or S (sequela) and with the diagnosis indicating the toxicity finding.

T37.2 – Poisoning by, adverse effect of and underdosing of antimalarials and drugs acting on other blood protozoa. Excludes: hydroxyquinoline derivatives (T37.8-).

T37.2X – Poisoning by, adverse effect of and underdosing of antimalarials and drugs acting on other blood protozoa.
T37.2X1 – Poisoning by antimalarials and drugs acting on other blood protozoa, accidental (unintentional).
T37.2X2 – Poisoning by antimalarials and drugs acting on other blood protozoa, intentional self-harm.
T37.2X3 – Poisoning by antimalarials and drugs acting on other blood protozoa, assault.
T37.2X4 – Poisoning by antimalarials and drugs acting on other blood protozoa, undetermined.
T37.2X5 – Adverse effect of antimalarials and drugs acting on other blood protozoa.
T37.2X6 – Underdosing of antimalarials and drugs acting on other blood protozoa.

H35.38 – Toxic maculopathy. First, code poisoning due to drug or toxin, if applicable (T36-T65 with fifth or sixth character 1-4 or 6). Use additional code for adverse effect, if applicable, to identify drug (T36-T50 with fifth or sixth character 5).

H35.381 – Toxic maculopathy, right eye
H35.382 – Toxic maculopathy, left eye
H35.383 – Toxic maculopathy, bilateral

CPT PROCEDURE CODES

92134 – SD-OCT
92282 – Visual field testing, 10-2
92283 – Visual field testing, 24-2 or 30-2
92250 – Fundus photography
92274 – mfERG
99204/99214 or 92004/92014 Examination–typical. However, this could vary with documentation. In addition, color vision and fundus autoflorescence are included in the examination.

Dr. Wartman practices in Asheville, NC, and lectures frequently on coding responsibilities for optometric practice.

Don't Be Nervous About Neuro Management

All sorts of neurological conditions can lead to visual impairment, and it's the OD's duty to help these patients. These clinical pearls can help.

Some ODs may find themselves intimidated by neuro disease. For one, it can be hard to diagnose because it comes with varying presentations, many of which mimic other conditions. It's also a diagnosis you don't want to miss—it could be life-threatening. But you don't have to refer all these patients. Take these tips to heart so you can provide them the care they need without sending them out the door.

• Measure blood pressure on any patient presenting with neurological or retinal disease.

• Headache, transient vision loss and pulsatile tinnitus are common symptoms with idiopathic intracranial hypertension. Papilledema is very common but not always present.

• A recent review article notes, "When elevation of intracranial pressure [ICP] is suspected, MRI of the brain with gadolinium and magnetic resonance venography should be promptly conducted to exclude secondary causes of ICP. If no structural abnormality is identified, a lumbar puncture should be performed."[1]

• Losing about 8% of body weight is curative in the majority of patients with increased ICP.[1]

• Beyond "idiopathic," a common cause of intracranial hypertension can be related to the highly lipid-soluble oral medicines such as minocycline and Accutane (13-cis-retinoic acid). Any time there is any unusual patient presentation, always inquire of any changes in the patient's life, especially any new medicines.[1]

• Regarding medical treatment, 1000mg of acetazolamide (taken as two 500mg Diamox Sequels) per day is standard initial therapy, increasing as needed and tolerated up to 4000mg per day. Topamax can be substituted for acetazolamide with similar efficacy and also may have a weight loss benefit. Cerebrospinal fluid shunting, such as a lumboperitoneal procedure, can be considered if medical and/or weight loss interventions fail.[1]

• Regarding acute anisocoria, if there is neither ptosis nor extraocular muscle dysfunction, this is a benign finding and merits only reassurance (e.g., scopolamine motion sickness patches, inadvertent atropine exposure, etc.).

• When a patient presents with anterior ischemic optic neuropathy, always check blood pressure and order a erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP).

• There are two forms of anterior ischemic optic neuropathy (AION). Non-arteritic is the more common form and is vasculopathic in nature—as in marked hypertension, coronary artery disease or diabetes. The less common arteritic form is related to inflammation of the temporal arteries, known as temporal arteritis or giant cell arteritis, and has bilateral blinding potential. Patients with arteritic AION can have prodromal transient vision loss episodes, whereas the nonarteritic form does not exhibit such.

• If children have blurred disc margins, the most likely cause is pseudopapilledema related to buried drusen. B-scan ultrasonography can readily detect these.

C-REACTIVE PROTEIN TIPS

- **Became available around 1985.**
- **Less than 0.5mg/dl is the cutoff for normal.**
- **Odds of having a positive temporal artery biopsy (TAB) were three times greater with a CRP greater than 2.45mg/dl compared with a reading less than 2.45mg/dl.**
- **Like ESR, CRP is a non-specific test.**
- **For best diagnostic guidance, obtain both an ESR and a CRP.**

UPDATED MANAGEMENT OF THIRD NERVE PALSY

When patients present with a suspected nerve palsy, remember:

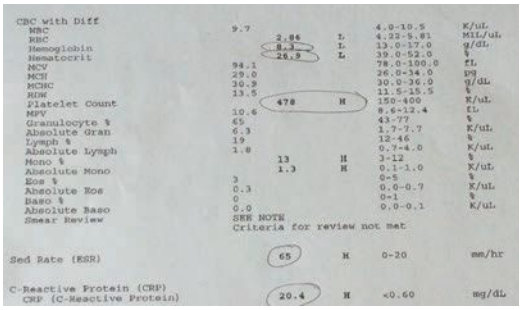
- Questions of "pain vs. no pain, pupil involvement or not" do not matter!
- All patients need emergent CTA or MRA.
- Send straight to ED, not to an ophthalmologist.
- However, about 95% of third nerve palsies are simply microvascular and not aneurysmal in nature.

Foster PJ, Khawaja AP. The association of systemic medication and disease with intraocular pressure. JAMA Ophthalmol. 2017;135(3):203-4.

THIS PATIENT WITH SUSPECTED GIANT CELL ARTERITIS HAS A LABORATORY REPORT WITH THREE KEY FINDINGS:

1. The ESR is 65. Generally speaking, most patients with GCA have an ESR above 60, but this can be highly variable.

2. The CRP is quite high at 20.4. Generally, a reading above 2.45 is high.



CBC with Diff				
WBC	9.7		4.0-10.5	K/uL
RBC	2.84	L	4.22-5.81	MIL/uL
Hemoglobin	8.3	L	13.0-17.0	g/dL
Hematocrit	26.9	L	39.0-52.0	%
MCV	94.1		78.0-100.0	fL
MCH	29.0		26.0-34.0	pg
MCHC	30.9		30.0-36.0	g/dL
RDW	13.5		11.5-15.5	%
Platelet Count	478	H	150-400	K/uL
MPV	10.6		8.6-12.4	fL
Granulocyte %	65		43-77	%
Absolute Gran	6.3		1.7-7.7	K/uL
Lymph %	19		12-46	%
Absolute Lymph	1.8		0.7-4.0	K/uL
Mono %	13	H	3-12	%
Absolute Mono	1.3	H	0.1-1.0	K/uL
Eos %	3		0-5	%
Absolute Eos	0.3		0.0-0.7	K/uL
Baso %	0		0-1	%
Absolute Baso	0.0		0.0-0.1	K/uL
Smear Review	SEE NOTE			
	Criteria for review not met			
Sed Rate (ESR)	65	H	0-20	mm/hr
C-Reactive Protein (CRP)	20.4	H	<0.60	mg/dL
CRP (C-Reactive Protein)				

3. The platelet (thrombocytes) count is elevated at 478. It is common in the setting of GCA to have thrombocytosis.

This patient, in consultation with her PCP, was started on 100mg of oral prednisone until a temporal artery biopsy was done, which was unsurprisingly positive. The patient subsequently was seen in a local outpatient infusion center, where she was treated with IV methylprednisolone at a dosage of 1000mg/day for three days. She did well and did not develop an anterior ischemic optic neuropathy. She is now being followed by rheumatology and optometry.

• In the setting of an acute third nerve palsy, historically there has been a conversation regarding pupil-sparing vs. pupil-involving. This differentiation has now gone by the wayside. Even though an aneurysm of the posterior communicating artery is very rare, it is something that could be life-threatening. Thus, the current directive is for the patient to go straight to an emergency department with your note instructing the staff to rule out posterior communicating artery aneurysm. You, the OD, take charge and do not waste time sending the patient to any other physician.

• When evaluating the possibility of Horner syndrome, it is critical to examine the pupils in both light and dark. The anisocoria should be more apparent in dark than in light, because the normal pupil will dilate more evidently than the relatively miotic affected pupil. One might wonder how to view the pupils in the dark. Here is the simple answer: the crystalline lenses are intrinsically luminescent, so pull out your UV lamp, hold it about one to two feet away and have the patient fixate on a distance target. The pupil size will be evident as the pupils will "glow" behind the iris.

• We frequently anguish at how poor glaucoma diagnosis and treatment is. Well, such pitiful care is seen in the setting of optic neuritis as well. Roughly half of all patients referred to a neuro-ophthalmology clinic with a diagnosis of optic neuritis do *not* have optic neuritis, and this pattern was the same "regardless of whether the patient was referred by an optometrist, ophthalmologist or neurologist."[2]

Most all patients with optic neuritis will have an afferent pupillary defect. Inadequate history taking and not being aware that a single finding, such as pain upon eye movement, can be caused by other processes such as headache is often the cause for misdiagnosis.

• Here are a few key pointers on stroke-related, nonarteritic anterior ischemic neuropathy (NAAION).

– "NAAION is the most common optic neuropathy among adults over 40-50 years of age."[3]

– "The pathogenesis of NAAION remains elusive; however, it may be different from that of stroke because stroke is caused by thromboembolism, whereas NAAION is mostly caused by arterial hypoperfusion of the posterior ciliary artery supplying the optic nerve head."[3]

– "Aspirin reduces the risk of stroke, but fails to reduce the risk of NAAION recurrence."[3]

Our take: If you think about the pathogenesis of the former, this makes perfectly good sense.

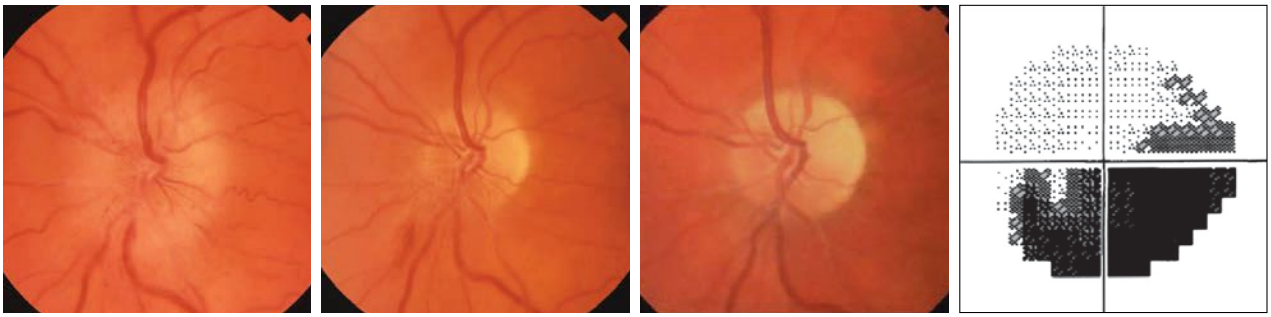
– "There is no direct association between NAAION and 'stroke,' although both share common vasculopathic risk factors."[3]

• Central retinal artery occlusion goes straight to the emergency department.

RACE NO LONGER A FACTOR WITH GIANT CELL ARTERITIS

- **Most studies have historically found GCA to be pretty much a disease of Caucasians.**
- **However, a newer study shows that patients of African descent are roughly at equal risk of developing GCA.**
- **Therefore, "race" should no longer be a risk factor when evaluating patients with suspected GCA.**
- **Women are still at higher risk.**
- **Almost all patients are aged 50 or older.**

—Gruener AM, Poostchi A, Carey AR, et al. Association of giant cell arteritis with race. JAMA Ophthalmol. 2019; 137(10):1175-79.



This gentleman sustained an acute nonarteritic anterior ischemic optic neuropathy. (His blood pressure was 180/100, and lab testing to rule out occult arteritic causation was normal). Here is his initial presentation with the edematous ONH and some subtle disc hemorrhages. One month later, the beginning of superior optic atrophy can be seen, and two months later, this sectorial optic atrophy is more evident, as is the microvasculature. His visual field shows a perfectly corresponding inferior and permanent defect.

– "CRAO is a sign of serious underlying systemic disease and the peak risk period for adverse vascular events is the initial few days after onset."[3]

– "Urgent referral to a stroke center will facilitate expeditious co-management between stroke patients and ophthalmologists"—or optometrists![3]

1. Wang R, Kini A, Othman BA, et al. Pseudotumor cerebri and papilledema. Glaucoma Today. January/February. 2019:34-46.
2. Stunkel L, Kung NH, Wilson B, et al. Incidence and causes of overdiagnosis of optic neuritis. JAMA Ophthalmology. 2018;136(1):76-81.
3. Park SJ, Yang HK, Byun SJ, et al. Risk of stroke after nonarteritic anterior ischemic optic neuropathy. Am J Ophthalmol. 2019;200:123–29.

AN UPDATED PERSPECTIVE ON ACUTE BELL'S PALSY

Most commonly, patients with acute seventh nerve (facial) palsy present to their primary care provider. Not all such presentations represent Bell's palsy, but most do. As optometrists, we are often involved in helping the primary care practitioner or neurologist manage any ocular involvement, which most often is secondary exposure keratoconjunctivitis.

A review article in the January-February 2019 *Survey of Ophthalmology* sheds light on this condition and merits sharing the authors' observations with our readers:

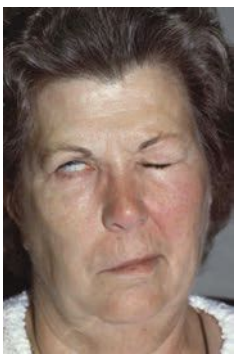
• "Although often called 'idiopathic,' Bell's palsy is by definition a benign, self-limiting inflammatory condition believed to be caused by herpes simplex virus infection."

• "Another viral cause of facial paralysis is Ramsay-Hunt syndrome. This is a complication of varicella zoster virus infection that is caused by reactivation of the latent virus in the facial nerve, and it also known as herpes zoster oticus. A characteristic, vesicular rash in the external ear can differentiate it from isolated Bell's palsy."

• "In contrast to many ophthalmic conditions, the diagnosis of facial paralysis hinges squarely on patient history. The critical challenge is to differentiate viral palsy from malignancy, which the astute clinician can often accomplish on history alone. Bell's palsy is a condition with acute onset, invariably progressing to complete facial hemiparesis within 72 hours. The palsy may be preceded by post-auricular pain, dysgeusia and hyperacusis. Slowly progressive facial paralysis should raise suspicion of malignancy."

• "A patient who cannot report the day of onset requires magnetic resonance imaging. A history of acute unilateral facial paralysis over 72 hours without other neurological symptoms is typically sufficient to make the diagnosis of Bell's palsy, and no additional serologic or radiologic testing is required."

• "Two large, randomized, controlled primary care trials concluded that corticosteroid can improve functional outcomes in patients with Bell's palsy. Although there is no specific consensus regimen, a ten-day, high-dose prednisone course is recommended, followed by a taper of 10 mg per day for five days."



Note that this patient cannot voluntarily close her right eyelid. Thankfully she has an intact Bell's reflex, which will partially protect her eye from desiccation during the acute phase and recovery.

Beyond making the diagnosis, which may be assisted by the patient's primary care practitioner, our main role in this neurological disease is to protect the ocular surface until orbicularis and eyelid function is restored. Consider such measures as taping the eyelids closed at bedtime (with or without a Fox shield), preservative-free artificial tears, gels or ointments at night and also by day as needed. Scleral contact lenses and moisture goggles are also options in this pursuit of maintaining ocular surface integrity.

McIntosh PW, Faye AM. Update on the ophthalmic management of facial paralysis. Surv Ophthalmol. 2019;64(1):79-89.

Transient Vision Loss: A Potential Emergency

When the clock is ticking, astute listening and acute intervention can be critical in these circumstances!

Three factors involved in cases of transient vision loss are of critical consideration: age, duration of vision loss and unilaterality. At the risk of oversimplification, we share the following:

If the patient is relatively young (50+/- years of age) and the visual event lasts 15 to 45 minutes, this most likely represents migrainous vasospasm. Since the pathophysiology usually occurs in the occipital cortex, the visual defect is homonymous in nature. The key is the history: the vision alteration comes "out of nowhere," builds up over a few minutes, plateaus for few minutes and then fades away after a brief period of time. Antecedent headache can follow, but most always these are isolated visual events.

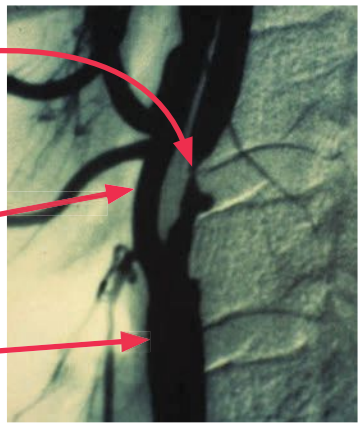
If the patient is—again, generally speaking—over age 60 and has a history of an episode of decreased vision in just one eye that lasts briefly (five seconds to five minutes), this event most likely represents carotid atherosclerotic disease, and a carotid ultrasound should be performed within a day or two. It does not matter if you hear a bruit or not; this history demands an urgent carotid ultrasound. Do not refer the patient to their primary care provider or to an eye surgeon—order the carotid ultrasound yourself.

At the very least, send your patient to an emergency department with a note explaining to the triage nurse that the patient has had a visual TIA and needs an urgent carotid ultrasound. The ED physician can take it from there if further testing is indicated.

If the patient has any sort of transient visual obscurations, has a new-onset headache and is over age 60, always obtain an ESR and a CRP level *that day* to rule out giant cell arteritis. Never order just an ESR, as the CRP result trumps that study.

GET AHEAD OF GCA

You never want to miss giant cell arteritis. If you hold high suspicion for GCA, make a quick call to the patient's primary care practitioner to get medical clearance to start 80mg to 100mg of oral prednisone until the lab results are known.



This 55-year-old patient presented with a chief complaint of transient monocular vision loss. A same-day carotid ultrasound revealed a highly stenosed internal carotid artery on the ipsilateral side. Carotid endarterectomy was performed two days later. All such patients merit an urgent carotid ultrasound since there is a relatively high risk for cerebral stroke. Going through the PCP or eye surgeon simply delays definitive care. Order the ultrasound yourself.

We always order these lab studies STAT and write a note to call our cell phone as soon as the results are available. These results will guide us regarding the need for a temporal artery biopsy and the need to get a neurologist involved, since high-dose intravenous Solu-Medrol (methylprednisolone sodium succinate, Pfizer) may be indicated for treatment. Typically, the ESR will be above 60 to 80 and the CRP level above 2.45 if the primary condition is indeed giant cell arteritis.

To refresh, there are two main expressions of GCA: anterior ischemic optic neuropathy and central retinal artery or branch retinal artery occlusion. The nonarteritic, systemic vasculopathic form of AION (*e.g.*, from hypertension, hypercholesterolemia, diabetes mellitus) does not cause visual prodromes, while some patients manifest episodes of transient vision loss in the setting of arteritic AION. So, when you hear a history of transient vision loss in the elderly, always rule out giant cell arteritis as well as carotid atherosclerotic disease.

There are certainly other, more esoteric causes for transient vision loss, but what we have just described for you will capture the vast majority of such presentations.

For a more exhaustive understanding of transient vision loss and its causes, we encourage you to read the article "A Workup Protocol for Transient Vision Loss" in the December 15, 2019 *Review of Optometry*.

Retina Care Revisited

New research and updated tools are changing the way we handle some of these patients.

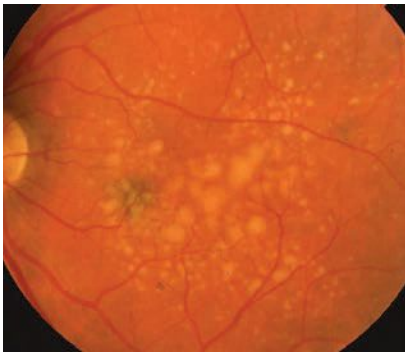
Every optometrist has the tools and clinical acumen at their disposal to care for patients with any number of retinal conditions. Newer ways of thinking are updating our approach to many of them.

• For patients with vitreous hemorrhages, the time-honored advice to sleep with the head elevated has been challenged. A new study found that such sleeping posture did not enhance resolution of the vitreous hemorrhage any differently than those sleeping in habitual positions. Not to mention, people generally sleep better in their usual sleeping positions.[1]

• While OCT-assessed retinal nerve fiber layer may hold promise for earlier detection of some neurodegenerative diseases, such has not yet been fully validated. Keep a close watch on the literature.

• While it could be argued, as it is by some retina subspecialists, that scleral depression is required to thoroughly examine the retina for a suspected retinal tear, more recent opinion is that such scleral depression is noncontributory. We generally agree with the perspective that scleral depression is optional. As we examine hundreds of patients with acute symptomatic PVDs annually, to the best of our knowledge we have never missed a tear. However, if there is ever any doubt, we unhesitatingly ask a retina specialist to offer a second opinion.[2]

• Providing patients with diabetes a comprehensive dilated examination is certainly a noble service, but unless the findings are relayed to the patient's primary care physician and/or endocrinologist, the merit of the retinal assessment is severely limited.



Advanced, soft, large, confluent macular drusen.

However, simply sending an electronic copy of your examination is maddening to the receiver, as it requires a tedious search through the absurdly long medical record to locate the clinical information relevant to them.

We heartily recommend you incorporate the form on page 51 into your EMR, or simply ask your staff to fax the single-page form to the appropriate diabetic care provider.

It is imperative that some sort of meaningful communication be accomplished, but it needs to be done in an efficient and effective manner. Good communication is a key element to enhanced patient care, and we all need to do our best to make this happen.

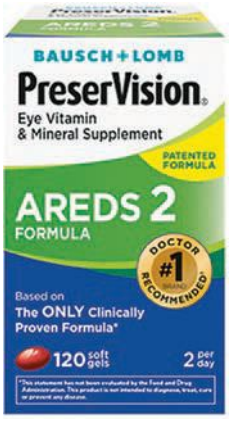
1. Pongsachareonnont P, Rattana-aram N, Somkijrungroj T. The role of head elevation in treatment of vitreous hemorrhage. Clin Ophthalmol. 2020;14:7–13.

2. Tran KD, Schwartz SG, Smiddy WE, Flynn HW. The role of scleral depression in modern clinical practice. Am J Ophthalmol. 2018;195:xviii–xix.

3. Schwartz SG, Albini TA, Berrocal AM, et al. Thoughts from your colleagues: Scleral depression: clarifying standards of care. EyeNet Magazine. 2018 July:9.

LUTEIN-ZEAXANTHIN CONTENT OF VARIOUS FRUITS AND VEGETABLES

Fruit/Vegetable	Micrograms/100g
Kale	21,900
Collard greens	16,300
Spinach (cooked, drained)	12,600
Spinach (raw)	10,200
Parsley (not dried)	10,200
Mustard greens	9,900
Dill (not dried)	6,700
Celery	3,600
Scallions (raw)	2,100
Leeks (raw)	1,900
Broccoli (raw)	1,900
Broccoli (cooked)	1,800

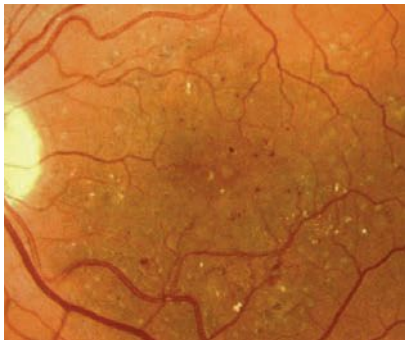


Since a good number of our patients are at risk for—or have—clinically significant macular degeneration and do not eat sufficient amounts of these foods, we recommend that they augment their diet with the AREDS2 vitamin/mineral supplement. Preventive care is an optimal approach to good health, and we want to do all we can to preserve and protect vision.

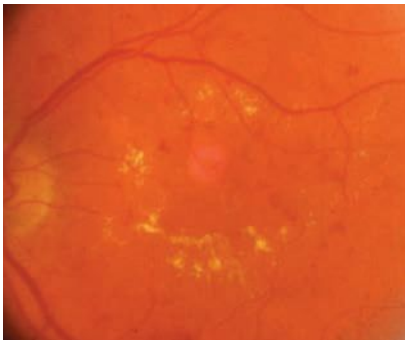
Mangles R, Holden JM, Beecher GR, et al. Carotenid content of fruits and vegetables: an evaluation of analytic data." J Am Diet Assoc. 1993;93:284-96.

How to Provide "A1 Care" for Diabetes Patients

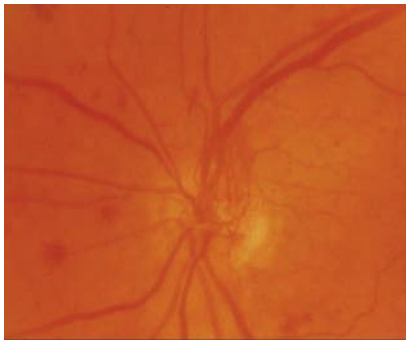
Use these two forms to help communicate your findings and recommendations.



Moderate diabetic retinopathy showing dot-like hemorrhages and exudates.



Moderate diabetic maculopathy with a circinate leakage of exudates.



Proliferative diabetic retinopathy with evident neovascularization of the disc.

Although not technically our responsibility, primary care medicine seems unable to appropriately inform patients of their hemoglobin A1c number and its importance.

As you all know, very few of your patients with diabetes have even heard of the A1c test, much less know their most recent score. It is, we think, of great importance that our patients know and follow their A1c. For that reason, we have developed a simple explanation of this test (at right) that has enabled our patients to gain a greater understanding of what this blood test is, and its relevance to their personal care. We urge you to copy or download the handout on this page so that you can move diabetes care to a higher level. Your patients, and their physicians, will be most grateful.

Good communications with other doctors is also essential, especially in diabetes care. The second form (next page) is what we use when sending diabetes referrals. Kindly feel free to make use of it in your own practice. Simply affix your office letterhead at the top to make it uniquely yours.

It is well established that most all chronic diseases are in large part self-inflicted. We all have plenty of responsibilities on our plates, and time is at a premium. Taking the time to educate, motivate and encourage our patients regarding their overall health—beyond their eyes—is the utmost expression of our compassion as doctors. Many patients smoke, eat poorly and choose "extra fries" over "exercise." We encourage our colleagues to take an extra minute to encourage these patients to try to take more responsibility for their own well-being. It's a distinctly uphill battle, but one worth the effort.

WHAT IS A DIABETES 1Ac TEST?

During the course of diabetes care, most patients have a special blood test done every three to four months. It is called the hemoglobin A1c test. The value of the A1c test is that it provides an excellent measure of how your blood glucose levels have been over the past two or three months. The daily blood glucose checks that you do yourself give you a measure of your blood glucose level at that moment, but daily blood glucose levels can fluctuate quite a bit. The A1c test is extremely important for monitoring how well your diabetes is controlled.

The good news is this is a very simple test to understand. It is reported as a small number and should be below 7. For most people with diabetes, the A1c is generally between 6 and 7; this would indicate good, consistent control. If your A1c number is lower than 6, that is even better, but any reading below 7 is generally considered acceptable.

Many times, health care providers are too busy to explain, or patients simply don't ask, about their blood work. The purpose of this handout is to encourage you to take a more active role in your diabetes care. One very important factor in your care is for you to always ask your doctor, nurse or diabetic counselor to inform you of your A1c number. They will be glad to share this important information with you.

Knowing your A1c number will enable you to know how your overall diabetic control is. Be sure to ask any member of your diabetes care team any questions that you may have about your care.

A final note: The retina within the eye is the only place in the body where blood vessels can be observed and evaluated. Since diabetes primarily affects the blood vessels, it is very important to have a dilated eye examination every year. This is even more important if your A1c readings tend to be higher than 7.

PASTE PRACTICE LOGO HERE
AND PHOTOCOPY PAGE

DIABETES EVALUATION

To: _____

Patient: _____ DOB: _____

Date of exam: _____ Duration of diabetes: _____

Best-corrected visual acuity: OD: _____ OS: _____

	RIGHT	LEFT
No retinopathy	❑	❑
Mild background diabetic retinopathy	❑	❑
Moderate background diabetic retinopathy	❑	❑
Severe background diabetic retinopathy	❑	❑
Diabetic retinopathy with macular edema	❑	❑
Proliferative diabetic retinopathy	❑	❑

Recommended follow-up: ❑ 3 months ❑ 6 months ❑ 12 months

_____
Signature of consultant optometrist

Comments

_____

_____

_____

Thank you for entrusting your patients to us for their eye care.