Increasingly, cataract surgery is moving away from being viewed as solely a medically necessary reparative surgery and toward the category of visually restorative refractive surgery. In fact, for years we have been choosing intraocular lenses (IOL) to obtain a certain refractive effect, tailoring the approach to specific patient needs. This refractive goal choosing is where ODs can contribute at a high value.

As often back-end, comanaging physicians in the care of cataract patients, not only should ODs have training for postoperative care, but they should have knowledge of presurgical discussion on the IOL selection method and have confidence to assist in reaching excellent refractive outcomes.

When longtime patients leave their OD practice for a cataract consultation, ODs have scores of refractive data—from spectacle prescriptions to habitual wear, to patient preferences and hobbies, to contact lens history and ocular dominance. ODs have valuable knowledge on the front end, leading up to surgical discussions for aim and desired outcomes. Familiarity with the patient and data is priceless for predicting the happiest long-term refractive outcome for the patient—which is the unified end goal for both ODs and MDs.

Here, I will discuss basics of the components important for choosing IOL power, with a brief review of common lenses and refractive goals. Although there are various strategies for best calculation of IOL power...
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Life with COVID-19 makes a new normal

By Benjamin P. Casella, OD, FAAO
Chief Optometric Editor
Practices in Augusta, GA, with his father in his grandfather’s practice
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706-267-2972

I haven’t been on Earth for a long time, but I don’t recall anything like this. The novel coronavirus and COVID-19 pandemic have created, at least temporarily, a new normal for our society and life on this planet.

Status quo
At home, we are practicing social distancing as best we can. We are eating at home. Our kids are out of school for at least two weeks, likely longer. Washing hands is a must, and we are taking special precaution with regard to contact with older members of our extended family.

In my practice, we are following CDC guidelines and are available for emergencies only for the foreseeable future. At the time I wrote this editorial, the House had not yet taken on the Senate’s $2 trillion COVID-19 relief package, and I hope to make use of it so I can keep paying my staff if this drags on for months.

A few weeks prior to writing this editorial, I never thought I’d be having such a conversation, at least not seriously.

I would love to know how long this will last—just like you. As with any disease, searching the internet is of limited benefit with respect to knowing actual facts about this pandemic. There are conflicting soundbites from talking heads on TV—not to mention that it’s an election year. However, the world’s peer-reviewed literature about the COVID-19 pandemic is literally in its infancy.

Looking ahead
So, what am I to do? Good question. I’m left with exercising common sense in clinical and personal life. That common sense hopefully extends to filtering what news about the path of COVID-19 is likely to play out.

I have friends living abroad—one in The Netherlands and one in Spain. Both are young and not considered high-risk. Interestingly, both say that the U.S. needs to adopt a strict protocol regarding halting progression of the virus itself.

A few weeks prior to writing this editorial, I never thought I’d be having such a conversation, at least not seriously. In a very short amount of time, there is just a new normal. I may be overthinking things, but I can feel it in the air when I walk down Broad Street in Augusta. This is just so different.

You and your families are in my thoughts and prayers during this time of uncertainty. So, how are you dealing with the pandemic on a daily basis? What extra steps are you taking? Reach out to us on social media and let us know. In the meantime, stay safe.

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Every week, leading professionals in the optometric field write blogs for Optometry Times® on eye care. If you haven’t read them, you’re missing out on the latest and greatest in glaucoma, retina, dry eye, refractive surgery, contact lenses and practice management, just to name a few topics. Head over to OptometryTimes.com/topic/blog to check it out for yourself and catch up on the best ideas in modern optometry.
Glaucoma

How to manage the angle closure spectrum

Results from the EAGLE and ZAP clinical trials provide answers to lingering questions

By Jennifer Currier, OD, FAAO; Taras Litvin, OD, PhD, FAAO; and Andrew Mick, OD, FAAO

Glaucoma is a neurodegenerative disease characterized by optic nerve damage causing progressive and permanent vision loss. It is estimated to affect 76 million people worldwide, increasing to 112 million by the year 2040. Primary-angle closure glaucoma (PACG) accounts for 25 percent of all glaucoma globally, but is responsible for nearly half of all glaucoma-related blindness.

**Classification**
The angle closure spectrum includes three stages (Table 1). Primary-angle closure suspect (PACS) is defined as having at least 180° of iridotrabecular contact (ITC) with an intraocular pressure (IOP) below 21 mm Hg and no peripheral anterior synechiae (PAS). Primary angle closure (PAC) has the same amount of iridotrabecular contact with an IOP above 21 mm Hg or the presence of PAS. PACG exists when the criteria for PAC is met and the presence of PAS. PACG is seen when there is evidence of glaucomatous optic neuropathy.

**Risk factors**
Risk factors include age, Inuit and Asian race, family history, female sex, shorter axial length, smaller anterior chamber depth, and lens parameters. Increased prevalence of relative pupillary block and thus greater risk of PAC is seen as lens thickness increases throughout life.

Women carry three times the risk of men in developing PACG due to anatomical differences such as smaller anterior chamber depth and axial length in women. A longer life span in women also contributes to the risk.

Over three-quarters of those affected with PACG worldwide live in Asia, including 3.1 million people blind in at least one eye due to PACG living in China. Prevalence studies conducted on different Asian-American populations show higher rates of the angle closure spectrum compared to non-Hispanic whites.

Despite the disproportionate number of Asians diagnosed as being on the angle closure spectrum, a study of over 2 million managed-care patients in the United States found a 1.35 percent prevalence of PACG in Caucasians over the age of 40.

**Diagnosis**
Gonioscopy remains the most important diagnostic test in assessing angle structure and correctly classifying the angle closure spectrum. While imaging technologies such as ultrasound biomicroscopy and optical coherence tomography are less subjective and have the ability to quantify angle parameters, only indentation gonioscopy using a four-mirror lens can differentiate between PAS and appositional closure.

Despite its importance, a recent review of open-angle glaucoma referrals showed that 74 percent did not specify angle status and nine percent of patients referred for uncontrolled open-angle glaucoma were actually on the angle closure spectrum.

**Pathogenesis**
Angle closure occurs when aqueous outflow is blocked by appositional or synechial contact of the iris against the trabecular meshwork.

While multiple mechanisms for PAC exist, pupillary block is the most common cause. Pupillary block occurs when a pressure gradient between the anterior and posterior chambers exists, due to the blockage of aqueous flow as a result of iridolenticular contact at the pupil. This pressure differential causes the peripheral iris to bow forward, narrowing the peripheral angle.

Additional factors are the location of the iris insertion into the ciliary body, relative position and thickness of the ciliary body, iris volume, and crystalline lens size and position.

Prolonged periods of iridotrabecular contact result in synechial formation and functional damage to the trabecular meshwork.

Other etiologies of PAC include plateau iris configuration and phacomorphic mechanisms. In plateau iris configuration, the iris insertion and ciliary body position are abnormal, resulting in a narrowed peripheral angle.

The exact approach depends on the stage of the disease, risk factors, and ocular comorbidities. The treatment for symptomatic acute angle closure crisis (AACG) remains immediate IOP lowering medical therapy and placement of an LPI. Similarly, there has been a longstanding consensus on the need to treat non-acute high-pressured PAC and PACG, although the intervention has been

**TAKE-HOME MESSAGE** Gonioscopy remains an important diagnostic procedure in classifying patients on the angle closure spectrum. Patients who develop acute angle closure crisis should be treated immediately to lower IOP, followed by a prompt LPI. Study results have shed light on how to manage angle closures.

<table>
<thead>
<tr>
<th>Classification of eyes on angle closure spectrum</th>
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<tbody>
<tr>
<td>IOP ≥180° of ITC</td>
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<tr>
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<tr>
<td>Primary angle closure suspect (PACS)</td>
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<tr>
<td>Primary angle closure (PAC)</td>
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<td>Primary angle closure glaucoma (PACG)</td>
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**Management**
Management goals for the angle closure spectrum are elimination of its underlying cause and control of IOP to prevent optic nerve damage. Treatment options include observation, laser peripheral iridotomy (LPI), laser iridoplasty, lens extraction, medical therapy, and glaucoma surgery.

The exact approach depends on the stage of the disease, risk factors, and ocular comorbidities. The treatment for symptomatic acute angle closure crisis (AACG) remains immediate IOP lowering medical therapy and placement of an LPI. Similarly, there has been a longstanding consensus on the need to treat non-acute high-pressured PAC and PACG, although the intervention has been
A recent study showed what about the ability of an LPI to reduce the risk of developing PAC or PACG in patients with PACs compared to observation:

1. All the patients in the observation group progressed compared to none in the LPI group.
2. No patients in either group progressed.
3. Although the risk of progression was reduced by 50% with LPI, less than 5% of subjects in both groups progressed.
4. None of LPI group progressed compared to 50% in the observation group.

The following statement is TRUE regarding patients on the angle closure spectrum undergoing LPI:

1. In the majority of cases, iridocorneal angles widen.
2. Only about 50% of eyes show significant widening of iridocorneal angle.
3. Approximately 25% of eyes continue to show areas of iridotrabecular contact.
4. Both (a) and (c).

Patients treated by LPI should be followed on a regular basis because:

1. Rise in IOP is possible due to increased resistance to aqueous outflow as a result of the trabecular meshwork damage presumably resulting from previous episodes of PAC.
2. Potential for progressive narrowing of iridocorneal angle as a result of non-pupil block mechanisms.
3. Potential for progressive optic neuropathy.
4. All of the above.

Fellow PACS eyes of patients with unilateral AACG carry significantly higher risk of AACG compared to the overall risk of AACG in PACS eyes.

1. True.
2. False.

Evidence from the EAGLE trial provides support for clear lens extraction in the following groups of patients:

1. Presbyopes with PACG.
2. All patients with PACG.
3. Presbyopes with PAC and high IOP.
4. Both (a) and (c).

The following are risk factors for the angle closure glaucoma, EXCEPT:

1. Male sex.
2. Shorter axial length.
3. Increased iris volume.
4. Family history.

Anterior segment neovascularization is a primary angle closure mechanism:

1. True.
2. False.

REFERENCES

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How to build a lifestyle and nutritional firewall against viruses like COVID-19

Have a plan to combat immune senescence in your senior patients at risk for the disease

By Stuart Richer, OD, PhD


Each flu season, tens of thousands die, especially those with pre-existing health challenges. Yet as of this writing, we have seen only 302 U.S. coronavirus deaths.1

For the United States, there remains an “unknown denominator” because reliable testing kits were largely unavailable during the first 4 months of the COVID-19 outbreak. That is, a small percentage Americans, thus far, have been tested for the pathogen.2 Regardless of the potential for increased virulence, resistance, and proliferation of this virus, following recommendations for social distancing and hygiene will flatten the curve. However, optimizing the immune system by reducing fear and stress, and improving lifestyle while optimizing nutrition is more important than ever.

Immune processes and adjustment behaviors powerfully regulate each other.3 Thus, it is plausible that healthy food, quality sleep, sunshine, exercise, music, meditation, pets, and supplementation result in improved immune performance. Conversely, stress has been shown to lower immune competence in patients with cancer.4

Meta-analytic reviews have summarized results from the large number of studies using the “stress/non-stress” paradigm, revealing consistent immune changes in the presence of psychological stressors.5, 6

Overly stressed individuals exhibit poorer sleep, exercise less, and have poor dietary habits, as well as habitual drug and alcohol use, all of which depress immune competence.7, 8

Central activation of the sympathetic nervous system, even via non-adrenergic pathways such as sleep deprivation, has been shown to have a role in the regulation of inflammation and innate immunity in astronauts in hyper-stressed environments.9

We know that the brain controls immune responses. Stress also increases the need for vitamin C.10

Build natural immunity

Even in the polluted Chinese city of Wuhan, it is reported that 81 percent of individuals who were infected had only mild disease: non-pneumonia and mild pneumonia.11 The good news is that Americans are likely already developing antibodies on their own without the aid of a vaccine.12 Functional foods and dietary supplements may enhance this natural immunity to overcome immune senescence.

Improve immunity by reducing simple sugars from the diet. Choose nutrient-dense plant food, vegetables, and vegetable juices and vitamin C/bioflavonoid-containing fruits. Sugar feeds bacteria (like strep) that grows.

Sunlight and vitamin D3

The potential for co-infection is always present. The over-arching governor is the Earth in winter solstice tilting away from the sun with our immune system crashing. It is then that infectious disease erupts. Mass vitamin D nourishment is preferred, from vitamin D rich foods such as cold-water fish and mushrooms. However, fish algae in the absence of sunlight might not significantly raise vitamin D blood levels. Therefore, evaluate and optimize patients’ 25 OH vitamin D liver reserve status with a blood draw or finger blood spot test.

Protective effects of vitamin D are strongest in individuals with profound vitamin D deficiency at baseline, although those with higher baseline 25 (OH)3D concentrations also experience benefit.13

House-bound elderly patients of color, those living in northern latitudes or not exposed to natural sunlight, and at-risk patients are the patients to be concerned about.14

Zinc and more to help

The hallmark of an infection is a cough, probably bronchial. The immune system will not kick in to infection by invigorating the thymus gland to produce T competent memory T-cells that produce antibodies to produce naïve T white blood cells that will become T cells until about the sixth or seventh day. The hallmark of an infection is a cough, probably bronchial. The immune system will not kick in to infection by invigorating the thymus gland to produce T competent memory T-cells that produce antibodies to produce naïve T white blood cells that will become T cells until about the sixth or seventh day.

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Zinc is the gatekeeper of immune function and Zn mono-methionine optimizes T-cell immunity.15 The body will not produce adequate T-cells for long-term immunity without zinc; 10 mg for children; 30 mg for adults.15 Advise patients not to take more or the body will excessively bind up zinc.16 Polyphenols such as quercetin and resveratrol have robust anti-viral properties.17, 18, 19

Choose foods or supplements that build the master intracellular antioxidant in all living cells: glutathione (GSH; Figure 1). Note that vitamin C is a master GSH booster. It is suggested that at-risk groups take 500 mg of vitamin C q4 to 6 hours.

TAKE-HOME MESSAGE

Currently, there are no FDA-approved vaccines for COVID-19. However, there are several immune-boosting measures one can take to combat the virus, such as increasing intake of vitamin D, A and C, zinc, probiotics and elderberry, among others.

Immunity enhancement

- Vitamin D3: Check 25 OH D blood test
- GSH and sulfur: Onions, garlic, NAC, MSM, lipoic acid, avocado, pinto beans, asparagus
- Selenium: 1 brazil nut per day, multivitamin
- Bovine colostrum
- Bee pollen, propolis, royal jelly
- ZN acetate lozenges (cold: first 48 hours)
- ZN glucose tolerance (cold)
- ZN carnosine lozenges (N. pylo)
- Medicinal mushrooms (Rishi, Lion’s Mane)
- Probiotics and fermented foods
- Vitamin C: Sodium ascorbic acid tablets; multivitamin; vegetables, fruits
- Vitamin A: Multivitamin, sweet potatoes, spinach, apricots, red bell peppers, kale, eggs
- Fish and fish oil (Omega 3 fats): Sardines
- Quercetin: Red onions, red apples
- Elderberry syrup with zinc
- Tumeric (500 mg to 1000 mg)

Daily nutrition and supplementation

As a general principle, in addition to minimizing junk food and promoting nutrient dense food, ODs may prescribe a high-potency, broad spectrum daily multivitamin. Optimal immunity requires A, C, D, E, B2, B6, folic acid, iron, selenium and zinc.17

But it also requires prebiotics, probiotics and symbiotics for an optimal microbiome, as the gut lining represents 70 to 80 percent of the immune system.18

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Vitamin C
For elderly individuals or those with pre-existing medical conditions, evidence confirms vitamin C’s effectiveness when used in excess of recommended allowances.21,22

Patients with acute viral infections show a depletion of vitamin C and increasing free radicals and cellular dysfunction.23,24

The immune system of such patients should be treated with vitamin C, oral or intravenous (IV), for neutralizing free radicals throughout the body and inside cells, maintaining physiological functions, and enhancing natural healing.

ODs should use this information to begin further research on modulating immunity and form their opinions based on existing and unfolding knowledge.25,26 not fear.27

REFERENCES
How to survive a lease termination

ODs should take four important steps when it comes to planning an exit strategy

By Richard Hom, OD, FAAO, PhD

A ny doctor at any sublease could be subject to a termination notice. Paying attention to possible warning signs and trigger events will alert doctors to the possibility of termination. No TSLD ever believes that termination will actually occur. Some will experience hopelessness, depression and despair. The antidote is an exit strategy and plan. Wise TSLDs will design their exit plans and strategies long before any warning sign or trigger event.

TSLDs must be prepared to update their plans and strategy if the lessor begins to signal that the relationship is souring. Warning signs include a worsening relationship with the TSLD, optical department manager, and the host store management. There may also be greater oversight by the optical department and supervision of area doctors for coverage of the office, patient satisfaction scores, and compliance with host store policies. The most important warning sign, though, is a steady decline of exam or optical revenues.

Certain events can trigger a negative change in relations with a leaseholder. In response, the TSLD may lessen the coverage of the office by failing to cover or to retain a fill-in doctor, especially on Saturdays. The TSLD may be warned for refusing to accept all vision insurance plans, ignoring patient complaints about customer care, and perceived unreasonableness of exam fees. Couple these signs with personality conflicts with onsite optical staff and their supervisors and a recipe for sublease termination is complete.

An exit strategy has the primary objective of escaping a termination with as little financial pain as possible. Economic benefits can come from budgeting for a new office or a new job. Working against a TSLD is a combination of sublease terms and lack of property rights and assets from the sublease practice. Without a property or ownership right, a TSLD cannot sell or transfer a sublease even if the optical corporation selects the same doctor. The corporate optical department has the sole authority to appoint or choose the next sublease holder. Furthermore, the TSLD’s current sublease will likely not have the same terms as the newer sublease. The sublease may contain customized or negotiated terms on hours of coverage, rent, equipment, and office that are not transferable. In most cases, upon termination the doctor gets nothing. The doctor, though, may bounce back quickly if a well-constructed exit plan is present. The level of recovery is wholly dependent on the exit plan. An effective exit strategy should be as clear as possible, and ideally in place for at least six months before termination.

Following are steps in creating and launching an exit plan.

Step 1: Carefully read the sublease agreement

In most cases, components of the sublease agreement will influence the exit plan. Even in termination, the TSLD must cover the office, see patients, and act responsibly during the sublease notice period. The notice period can block an early exit to accept a new job or to open a new practice. Sublease clauses sometimes prevent the TSLD from moving the phone number to a new office or the removal of medical charts from the office.

Non-compete clauses are also an obstacle, and the enforceability of these clauses is interpreted differently state by state. Some states recognize the non-compete clause and hold the TSLD fully accountable for geographical limitations for the duration of the clause. Alternatively, some states may consider excessive geographic restrictions or length as unenforceable. TSLDs should check their state’s interpretation of these non-compete clauses.

Step 2: Prepare the exit plan

There are typically two alternatives or strategies for the TSLD: open another office—on a new sublease or an independent office—or seek an associate position elsewhere. Evaluate each for advantages, disadvantages, and the chances for success.

The first alternative takes careful planning and marshaling of resources. There are several potential impediments to opening a new practice. Choice locations may be hard to find if the notice period prevents a quick move. Also, startup costs may be too high for most.

If the TSLD is seeking a sublease at another corporate optical entity, the TSLD may have to overcome assumptions by the new optical entity about the reasons for termination of the previous lease. There may be a historical bias related to a sublease termination at another optical entity.

The first alternative is affected by the relatively competitive environment of the local marketing area. Optical and host stores have the resources to select the best location for their stores even with numerous competitors. The name recognition of an optical department may outweigh the reputation of the TSLD, thus lowering the number of patients who will follow the TSLD. Those patients who do follow the TSLD are the backbone for any new practice. Even 10 percent of former patients following the TSLD to the new location will boost morale and set a foundation for growth.

The second alternative requires finding an opening when the TSLD is free of his contract. Finding an available opportunity frequently requires a search wider than the immediate area of the old sublease, which may result in the need to relocate or endure a long commute. In an urban or suburban area, the number of practices may be more plentiful than in a rural region. In many cases, a stable full-time opportunity may take months to find.

Under all circumstances, the TSLD will need the emotional support of spouses or significant other relationships. The time commitment in private practice is likely to be much higher than any sublease.

Step 3: Be explicit about results

Without an accurate description, the steps needed to reach the result are not clear. Think about the result as similar to choosing an undergraduate college. There are “reach” and “safe” colleges. Like choosing a college, the exit plan should also encompass “reach” and “safe” outcomes. The “reach” outcome differs from the “safe” outcome because of differences in the probability of success.

If a “reach” outcome is achieved, the TSLD can celebrate when it happens. On the other hand, the “safe” outcome brings only a sigh of relief because everyone expects the accomplishment of the safe outcome. The preparation for a “reach” outcome is elaborate for most people and less so for a “safe” one. Either outcome can minimize the pain of termination.

Construction of the exit plan is key to success. The plan should be logical and descriptive. Use any tool that is available to depict relationships among elements, time, and resources needed for completion. Will one step require approval from a previous step? Could a step be started even if another step is not finished (non-linear steps)? List the time to complete each step. Use the last date of the notice period as the launch date and work backward to the beginning of the exit plan.

Step 4: Sum up the financial picture

Include all money market funds and stocks that can be converted to cash quickly. If there is another household wage earner, discuss how that individual can assume the role of principal wage earner. If the TSLD is the sole earner, then saving up to six months of living expenses is prudent. The costs should include housing, food, transportation, and medical costs. Relevant expenses vary widely depending on the doctor, geographical area, family size, and financial commitments.

The successful exit from a terminated sublease must encompass not only a review of the sublease agreement but also weighing the alternatives of opening a practice and employment. The execution of the plan depends on a complete description of the desired outcome and the resources available to pursue and complete the exit plan and strategy. Lastly, the agreement of family and significant others is crucial for the success of any outcome.
Why patient occupation matters with dry eye disease

Asking patients about occupation can lead ODs into new diagnosis territory

By Katherine Mastrota, MS, OD, FAAO, Dipl APO

For me, dry eye history is at the core of developing a profile for my ocular disease patients. One of the most important questions I ask is about the patient’s occupation. How and where does the patient spend his waking, work hours? Inside, outside, office, operating room, art studio, classroom, nail salon, supermarket, kitchen, health club, airplane, factory, laboratory, hair salon, arena, fire station? I care for housekeepers, cooks and bartenders, doormen and concierges, executives and dishwashers, desk agents and room servers. My patients work in the hospitality industry in the finest venues in New York City. Each environment impacts their ocular surfaces in different ways. The dryness of the hotel room, the heat in the kitchen, the hours on the computer, the cleaning agents and particles from linen, rugs and towels are elements to be considered as challenges to tear film integrity.

Look at the research

An electronic medical records-driven, data analytics report was built to understand the incidence, demographics, types, and risk factors of dry eye disease (DED) in patients presenting to an ophthalmology hospital network in India. This observational study of 1,458,830 patients presenting between 2010 and 2018 included patients with recent onset of symptoms as defined by TFOS Dry Eye Workshop. Study results indicated that age, gender, residence, occupation, and socio-economic status have significant impact on development of DED.

Odds ratios (OR) are a measure of association between exposure and outcome. The OR represents the odds that an outcome will occur, given a particular exposure. When compared to the odds of an outcome occurring in the absence of that exposure, an OR >1 indicates increased occurrence of an event. Other high-risk factors for DED include age (OR 3.7 to 13.5), urban residence (OR 1.6), professional work (OR 1.52); homemaking (OR 1.42), retirement/unemployment (OR 1.24) and socio-economic affluence (OR 1.6 to 3.2) were identified as high-risk factors for developing DED.

A separate study in the Netherlands proposed that environmental factors play an important etiological role in dry eye and investigated the relationship between types of occupations and symptomatic dry eye. Some 40,501 employed people working ≥8 hours a week were included from the population-based cohort. Logistic regression was used to determine the association. The results of this study suggest professionals (e.g. legal, health, and business and administration professionals), OR 1.14, and clerical support workers, OR 1.14, had the highest risk of dry eye of all 10 major occupation groups. Building workers and metal and machinery workers, also showed elevated risk of dry eye with OR 1.12. Skilled agricultural workers (OR 0.57) and elementary occupations carried the lowest risk.

More specific occupational dry eye risk studies exist. For example, a recent study describes ocular surface and tear film changes in workers exposed to organic solvents used in the dry-cleaning industry. Such workers are commonly exposed to different occupational hazards and chemicals that may affect their eye health in particular. Organic solvents used in dry cleaning are associated with changes in ocular surface and tear film, generating irritation symptoms commonly present in evaporative dry eye. Study authors speculate that eye symptomatology was stimulated by the organic solvent exposure.

Sick Building Syndrome

Sick Building Syndrome (SBS) is important to consider for patients who are based in particular working locations. There are physical, biological, chemical, and psychosocial contributors to SBS. These factors facilitate the emergence of SBS symptoms, creating negative effects for occupants including nasal, ocular, oropharyngeal, and cutaneous irritation. On the contrary, healthy building concepts, or those that are built for workers’ well-being, sidestep working condition concerns because they maintain internal air quality and thermal control, maximize the use of daylight, and provide a workplace that is compliant with the occupants’ ergonomics.

Strategies to improve SBS concerns include proper ventilation system design, careful room layouts arrangement, sanitation frequency, mold/dampness reduction, installation of external devices on openings such as sunshades, development of green buildings, and visual/physical access to nature.

A green building refers to both a structure and processes integrated into the building’s lifestyle that are environmentally responsible and resource-efficient: from planning to design, construction, operation, maintenance, renovation, and demolition. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

These studies underline the importance of asking about patient occupations when assessing for dry eye. Screening for symptomatic dry eye in high risk occupations such as building workers and indoor occupations with high screen use is relevant from an occupational health and work productivity perspective. Environmental modifications and palliative therapies should be discussed and introduced to these patients as part of dry eye management strategies.

REFERENCES


One of the most important questions I ask is about the patient’s occupation

KATHERINE M. MASTROTA, MS, OD, FAAO
Director of Optometry, New York Trades Council, Hotel Association of New York City, Health Center, Inc.

TAKE-HOME MESSAGE

Asking patients to disclose occupation information should be standard in any OD’s practice. Why? A person’s occupation discloses a lot of useful information, such as level of education, socioeconomic status, potential lifestyle habits, occupational hazards, and most importantly, probable causes of disease.

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Dry eye in the digital age

Remember the ubiquitous nature of digital dry eye disease in your practice

By Ernie Bowling, OD, MS, FAAO

The days when computer use was restricted to office work are long past. Modern computer use has extended to the classroom, home, and for most all activities. Excessive computer use has led to an increase in health-related problems in video display terminal (VDT) users, particularly in students and younger age groups. Foremost of concern for optometrists is digitally-related dry eye disease (DED). I am sure ODs are seeing more dry eye in their offices, reaching veritable epidemic proportions, and the patients suffering from dry eye disease are growing ever younger. So let’s discuss dry eye in this cohort. Most of what you will read you have likely already seen. I want to emphasize the prevalence of dry eye and why all ODs should be actively searching for dry eye in their practices.

Rise of digital device use

Since the advent of the internet, there has been an almost viral expansion of accessibility to it. Consider the percentage of global population with internet access:

- 16 percent in 2005
- 30 percent in 2010
- 51 percent in 2017
- 58.8 percent in 2019

Digital dry eye is directly tied to digital device use. Ninety percent of American adults report using digital devices greater than two hours a day.2 Sixty percent of Americans use digital devices for at least five hours a day.3 Some 71 percent of Americans use digital devices for over seven hours a day.4 Some 67 percent of people use three or more devices simultaneously.5 Some 27 percent of users report experiencing dry eye.6 Older subjects and people spending more than four hours a day on VDTs are at major risk for developing DED.7 ODs see the effects of digital use on our younger patients. Starting in infancy, children gravitate to the glowing screen in their parents’ hands; school-aged children are required to complete assignments online; and adults shop, socialize, and work using screens. Add in entertainment, and the hours people spend in front of a screen are staggering. It is not a surprise that current research suggest that screen time may play a significant role in dry eye. Children are raised with digital devices. About 70 percent of adults report their children spend more than two hours a day on digital devices.8 Some 23 percent of children report playing on digital devices as their favorite activity.9 Teens spend more than eight hours per day on digital devices.10 Children age eight to 12 are getting six hours a day of screen time.11 Approximately 10 percent of youth report dry eye symptoms.12 A 2016 study found that children who spend more time on their smartphones have more dry eye symptoms.13 This same study also found outdoor activity appeared to be protective against pediatric dry eye disease.

Effects of device use

Research shows ocular pathophysiologic effects from digital device use. Both book reading and computer use result in decreased blink rates and increases in partial blinks. ODs have known that reading reduces the normal blink rate, but digital device use reduces that blink rate even further. Ocular dryness is often accompanied by alteration in conjunctival epithelial cell morphology and conjunctival goblet cell density.14 Digital device use reduces blink rate to five to six blinks per minute.15 Patients have higher incomplete blink rates when reading from digital devices (7 percent) vs. 4 percent when reading from hard copy.16 Blink rate, blink amplitude and tear film stability are compromised during VDT use.17 Visual fatigue is greater with LCD displays vs. e-ink and hard copy.18 Eye dryness is common after prolonged computer use with the prevalence ranging from 30 percent to 68.5 percent.19 Low mucin 5AC concentration in the tears with prolonged VT use.20 The oxidative stress marker hexanoyl lysine (HEL) was significantly increased at four hours of smartphone use than at baseline and at one hour of smartphone use.21

Contact lenses and devices

Contact lens wear is a risk factor for abnormal tear physiology, and contact lens wearers are 12 times more likely than emmetropes and five times more likely than spectacle wearers to report dryness symptoms.22 Add in computer use and the numbers increase even further. Some 83 percent of male and 87 percent of female contact lens wearers reported at least one dryness symptom compared to 68 percent of male and 73 percent of female non-contact lens wearers among computer users.23 And those dryness symptoms were more prominent among contact lens wearers using digital devices for three to six hours than among those using devices for less than three hours.24

Dry eye diagnosis

ODs understand the differences between the 2007 and 2017 DEWS definitions of dry eye.25 Hyperosmolarity is one common component of the two definitions. The etiophysiologic distinction between aqueous deficiency and evaporative dry eye is not included in the 2017 definition of dry eye, but inflammation is. The new definition reflects research showing an inflammatory component to dry eye disease, and tear film osmolarity and neurosensory abnormalities play significant roles.

Perhaps the most powerful part of the current definition is the reference to the loss of homeostasis of the tear film. Because the eye is so critical to survival, much of its function centers around maintaining or regaining the physiologic balance necessary for sustained stable vision, such as protecting and repairing the ocular surface from damage or disruption. When the delicate homeostatic balance of the ocular surface system is disturbed, it triggers an activation of a progressive stress response resulting in the production of pro-inflammatory cytokines and matrix metalloproteinases.26 Meibomian gland dysfunction (MGD) is recognized as both a cause and a contributor to dry eye.27 It is an obstructive and inflammatory disease resulting in insufficient and abnormal production of tear lipids. While most associate MGD with excessive tear evaporation, its role in tear dysfunction is far more complicated. Meibomian gland lipids have tear stabilizing functions beyond serving as an evaporative barrier.28

An unstable tear structure leads to surface exposure and, in more severe cases, frank damage. Maintaining integrity and function of the ocular surface is so critical that the eye is equipped with mechanisms such as increased mucin production to maintain and regain homeostasis. Obstruction is the most recognized cause of MGD and resulting tear lipid insufficiency.29 As meibum stagnates and becomes saturated and thickened, pressure within the glands mounts and production is down-regulated. Gland clearance has long been recognized as a treatment for MGD.30 Performed appropriately, this includes the application of heat to help melt congealed meibum and mechanical expression.

Although DEWS II offers the most comprehensive view of dry eye to date, its complexity can be daunting for many clinicians, especially in diagnosing and managing the condition. So, let’s back up for a moment.

In 2006, a group met to discuss the state of dry eye disease. The results of their work was published in August 2006 and preceded the DEWS report.31 This group, often referred to as “The Delphi Panel” or the “Dysfunctional Tear Syndrome Study Group” was polled for its most commonly used tests for evaluating a patient with probable dry eye. Their top four: fluorescein staining, tear break-up time, Schirmer’s test, and rose bengal staining. These are tests any clinician can perform in her office and are part of any dry eye protocol.

See Digital dry eye on page 14

Take-home message

With the increased usage of digital devices in both adults and children, ODs should be actively searching for dry eye in their practices and screen all patients. ODs are able to do this with the tools already available to them.
Xiidra is the only lymphocyte function-associated antigen-1 (LFA-1) antagonist treatment for Dry Eye Disease\(^1,2\)

**Indication**

Xiidra\(^\circledR\) (lifitegrast ophthalmic solution) 5% is indicated for the treatment of signs and symptoms of dry eye disease (DED).

**Important Safety Information**

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

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

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

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

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

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**References:**


**There’s no FDA-approved therapeutic equivalent.**\(^2,4\)

Check out patient resources, insurance coverage, and more at [Xiidra-ECP.com](https://www.xiidra-ecp.com).
Digital dry eye
Continued from page 12

Since 2006, there has been an explosion of dry eye testing. How have testing patterns changed over a decade later?

A 2017 study surveyed 101 ophthalmologists, including 43 corneal specialists, regarding dry eye diagnosis. Their top three most common “traditional” dry eye tests performed and the percent of each test performed by the doctors:

- Corneal fluorescein staining (8 percent)
- Tear break-up time (78 percent)
- Anasthetized schirmer’s test (51 percent)
- Conjunctiva lissamine green and/or rose bengal staining (< 25 percent)

The top three most common “newer” dry eye tests performed:

- Tear osmolarity assessment (23 percent)
- MMP-9 testing (17 percent)

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- MMP-9 testing (17 percent)
A 74-year old black female with diabetes was evaluated as part of her follow-up for non-proliferative diabetic retinopathy. While she did not admit to new visual complaints, visual acuity was correctable to 20/60 in her right eye and 20/25 in her left, which was stable from the previous visit (Figures 1 A and B).

Note the distinct differences in the color-fundus photography which is due to artifacts interfering with image capture. Optical coherence tomography (OCT) was ordered and revealed significant disturbances of the retinal layers in each eye but to a greater extent in the right eye. (Figures 3 and 4).

Of note is that there appeared to be a corrugated contour to the retinal surface of each eye on the volumetric scan of the OCT. This corresponds with the projected undulations of the vitreous. However, the cross-sectional views do not support this nor did the clinical observation.

Analysis of the cross-sectional images of the right eye reveals thickened hyaloid membrane as well as irregularity of the separated vitreous gel. In addition, there is the presence of at least one cystic space (horizontal sample) in this eye.

The topographic representation of the retina suggests overall thickening that may not be apparent in the cross-sectional scan samples. The volumetric representations in each eye are revealing in that there is evidence of vitreo-macular traction (not adhesion), which probably contributes to the reduced visual acuity.

Clinically, it is difficult to assess the relationship between the vitreous and macula, especially in the right eye of this patient. It is important to know the vitreo-macular interface status because continued attachment between retina and vitreous among patients with diabetic retinopathy may be an ominous sign. Conversely, documentation of complete vitreous detachment offers a more benign prognosis regarding the vascular complications of diabetic retinopathy.

REFERENCES

TAKE-HOME MESSAGE This case example highlights how continued attachment between retina and vitreous among patients with diabetic retinopathy may be an ominous sign. Conversely, documentation of complete vitreous detachment offers a more benign prognosis regarding the vascular complications of diabetic retinopathy.
PUT YOUR PATIENTS WITH DIABETIC RETINOPATHY (DR) ON THE PATH TOWARD MANAGING THEIR DISEASE AND

SET THE COURSE FOR SUCCESS IN DR

Brought to you by REGENERON
DIABETIC RETINOPATHY: A GROWING PROBLEM THAT YOU CAN HELP MANAGE\textsuperscript{1-4}

Through early detection, monitoring, and timely referral, you play a pivotal role in managing your DR patients’ vision\textsuperscript{2-4}.

If you see or suspect DR:

Educate your patients about the severity of DR, especially when left untreated\textsuperscript{3,4}.

- Your early and frequent discussions about disease progression, treatment options, and referral will empower patients, which could help them avoid significant vision loss\textsuperscript{3,4}.

According to the AOA, you should refer patients with\textsuperscript{3}:

- Severe nonproliferative DR (NPDR) within 2 to 4 weeks
- Proliferative DR (PDR) within 2 to 4 weeks
- High-risk PDR with or without macular edema within 24 to 48 hours

Ensure patients have followed up with a retina specialist who can treat DR.

Monitor your patients with DR\textsuperscript{3,4}.

The AOA recommends frequent monitoring of patients\textsuperscript{3}:

- At least every 6 to 8 months in patients with moderate NPDR and more frequently for patients with greater disease severity\textsuperscript{3}.

Refer patients to a retina specialist who can treat DR\textsuperscript{3,4}.

Regeneron is committed to helping you partner with your patients for comprehensive care of DR, as well as for care of other retinal diseases. To learn about a treatment option and receive more information and patient support materials, please visit [YourDRPatients.com](http://YourDRPatients.com).

AOA = American Optometric Association.

RETINA

Gene therapy: The future is now

By Steve Silberberg, OD

It was only a distant hope as recently as a few years ago that scientists would be able to manipulate the human genome to cure or treat systemic and ocular diseases. After all, it was only 2003 when the announcement came that the Human Genome had been fully sequenced.1

That has changed in the last several years. Eye care received tremendous news when Spark Therapeutics announced in December 2017 the Food and Drug Administration (FDA) approval of Luxturna (voretigene neapворот-czyl).

Luxturna is the first FDA-approved gene therapy for a genetic disease, Leber’s congenital amaurosis (LCA). As of this writing, it is the first and only pharmacologic treatment approved for any inherited retinal disease (IRD).

Luxturna’s mechanism of action is to repair the defective biallelic RPE65 gene mutation. The RPE65 protein is a vital component of the visual cycle. When light impinges on the photoreceptors in the retina, 11-cis-retinal (a form of vitamin A) is converted into all-trans-retinal.

A series of reactions occurs, ultimately converting the original light hitting the photoreceptors into an electrical signal carried by the axons of the ganglion cells. RPE65 is vital in the cycle because it helps convert all-trans-retinal back to 11-cis-retinal so the visual cycle can begin again.

The University of Michigan W.K. Kellogg Eye Center announced in early 2019 that the first two cases treated with Luxturna were a success.3 Bilateral treatment was accomplished over several weeks in two children. Results of the treatment as far as visual gain and slowing or stopping the progression of LCA is not yet available.

Gene therapy and the eye

Eyecare practitioners and their patients are fortunate that the human eye is a perfect place for initial gene therapies to be trialed and, now, come to fruition.

Firstly, the eye and specifically the retina is easy to access and view with the instruments and surgical techniques available. It is also a small area relative to other organs.

The most important factor in the eye is “immune privilege.” This essentially means that the response to inflammation in the eye is muted compared to other tissues in the body. The eye limits the inflammatory immune response so that vision isn’t harmed or compromised by swelling and other normal inflammatory responses.

Another factor is that the rods and cones of the retina do not divide during life, so the genetic therapy does not have to be concerned with new generations of cells.

There are many ongoing studies, some in Phase I/II and III, for IRDs.4 It is a fertile area of research because often these diseases involve defects in just one gene, unlike many other common ocular diseases such as glaucoma and macular degeneration. Three main delivery systems are now in use in studies in the United States and around the world.

AAV vector delivery

Luxturna achieves its goal of inserting the functional gene into the defective cell genome using a process called adeno-associated virus (AAV) vectoring.4 This technique effectively involves inserting the functional gene into the AAV. In Luxturna, AAV2 is used. Injection under the retina allows the virus to infect all the relevant cells and introduce the wild-type RPE65 gene into the nucleus to be expressed properly.

The majority of gene therapies under investigation utilize this technique. The immune-privileged nature of the eye prevents the vector from disseminating systemically and the immune system from reacting to its components.

The main disadvantage of AAV vectoring is the small amount of DNA it can carry.

CRISPR-Cas9 genetic-editing technique

CRISPR is an acronym for “clustered regularly interspaced short palindromic repeats.” Imagine having a “GPS-quality” technique to target a specific genetic defect, remove it, and replace it with the proper gene. That is essentially how CRISPR-Cas9 works.5

A scaffold of RNA binds to DNA at a precise complementary location that is predetermined, and the pre-designed sequence “guides” Cas9 to the right part of the genome. The Cas9 protein is an enzyme that cuts foreign DNA. The RNA guiding mechanism ensures that the Cas9 enzyme cuts at the correct point in the genome.

Scientists can use the DNA repair machinery to introduce changes to one or more genes in the genome of a cell of interest. Because CRISPR has a strand of RNA that guides the target DNA into the enzyme, the system is extremely precise, while other gene-editing methods work off a much rougher map. Studies are ongoing using this method to genetically treat IRDs.

Stem cell gene therapy

Stem cell therapy involves the use of living cells to deliver therapeutic genes into the body to correct genetic defects and tissue that has died or become non-functional.6

Lymphocyte or fibroblast stem cells are removed from the body, and the therapeutic gene is introduced into the cell. Alternatively, embryonic stem cells can be harvested. In the laboratory, the cells are genetically modified. After demonstrating that they produce the proper protein or chemotactic factor(s), they can grow and multiply and, finally, are infused back into the patient.

The addition of the therapeutic genes outside the patient allows the process to be well controlled. Researchers can select and work only with those cells that both contain the correct gene and produce the therapeutic agent in sufficient quantity.

There are ongoing studies, mostly in Phase I and II, for conditions such as dry macular degeneration, retinitis pigmentosa (RP), choroideremia, and Stargardt disease.7

Studies show the way

There are dozens of studies ongoing at various institutions worldwide trying to develop treatments or cures for a variety of inherited eye diseases, including those that are rare or commonplace.

The highlighted studies just scratch the surface of this fertile field. Some are in Phase III trials, which means that they may be just a few years from clinical practice. Others are more blue sky but paint the picture of what might be achieved with gene therapy.

Choroideremia gene therapy

Choroideremia is an X-linked disease affecting about 50,000 people, almost exclusively males, in the U.S. It occurs in childhood and results in progressive vision loss, first affecting night or low-light-level vision. It is caused by a lack of RAB escort protein-1 (REP-1), produced by the CHM gene. This protein allows the removal of waste from photoreceptors, allowing them to stay healthy.

Phase III trials are now underway in the U.K. In Phase I/II trials, visual acuity was maintained or improved in 90 percent of trial participants. The technique used is AAV—healthy copies of the CHM gene are delivered to affected cells, compensating for the mutated copies.8
Retinitis pigmentosa

RP is a complex disease with more than 70 known genes and thousands of genetic defects. About 2 percent of patients with RP have the RPE65 defect that is being treated with Luxturna for LCA. Phase I and II studies by Spark Therapeutics have demonstrated improvement in acuity in small cohorts.

A French Company, Horama, started Phase I/II clinical trials also using the AAV2 approach for people with RP caused by PDE6B mutations. The three-year trial will enroll a total of 12 patients, and is designed for people afflicted with the common autosomal recessive (AR) form of RP in which both alleles are affected.

Another study showing promise for the AR form of RP is in Phase I trials. It too uses the AAV2 technique. The treatment consists of a corrective MERTK gene, which is delivered to retinal pigment epithelial (RPE) cells by an AAV.²⁴

Allergan, in conjunction with GenSight, is undergoing Phase I/II using its GS030 therapy, Oto-genetics in which a light-sensing gene therapy is inserted to enhance visual stimulation. The system is designed to restore vision for people who are blind from RP and potentially other retinal conditions, such as Usher syndrome, Stargardt disease, and dry age-related macular degeneration (AMD).²⁵

Wet macular degeneration

With gene therapy, wet AMD patients may be able to avoid monthly anti-vascular endothelial growth factor (VEGF) injections. Scientists at the Center for Genome Engineering, within the Institute for Basic Science (IBS), report the use of CRISPR-Cas9 in performing “gene surgery” in the layer of tissue that supports the retina of living mice.¹³ By editing the VEGF gene, a longer-term cure than anti-VEGF injections can be achieved.

Scientists have developed a treatment to suppress choroidal neovascularization (CNV) by inactivating the VEGF gene using CRISPR-Cas9.²⁶

In a Phase I clinical trial, a gene therapy called Retinostat delivered by injection under the retina has proven safe. The gene continues to make the proper proteins for at least one year after injection, which uses the AAV vectoring technique.²⁷

Treatment without injections

Patients and practitioners alike would rejoice if present therapies as well as future gene therapies could be delivered without the use of injections. The problem, of course, is that most therapeutic gene therapy administered in an alternative manner would be eliminated because of tear dilution and rinsing. The corneal epithelium is almost impenetrable to hydrophilic macromolecules.¹⁴

However, researchers are working on a solution. The ability to administer anti-VEGF thera
tpies via eye drops is a possibility. The University of Birmingham in the UK is partnering with I.U.S. company Macregen to deliver this technology. One molecule that has shown great potential to penetrate the cornea and deliver drug to the retina is Penetratin.²⁸

Optometry’s role today

The role of the OD has accelerated over the last few decades. The responsibility in how ODs manage certain patients has now changed forever. Any patient with an IRD should be referred for at the very least genetic profiling and approved FDA treatment in the case of LCA patients. Patients may qualify for ongoing studies if treatment is not approved.

Two resources for referring patients:
- The Center for Genetic Eye Diseases, Cole Eye Institute Cleveland Clinic Foundation www. igedr.com

OD should speak to their patients to explain there is hope and offer basic genetic counseling. As more mainstream genetic treatment treatments become available for diseases such as AMD, glaucoma, it may soon be the standard of care in optometry.●

REFERENCES


At-home therapy can alleviate contact lens discomfort

Warm compress supports healthy functioning of meibomian glands in contact lens wearers

By Anna A. Tichenor, OD, PhD, FAAO

Despite advances in contact lens designs and materials, discomfort remains the top reason for discontinuation of lens wear, with dropout rates estimated at 15.9 percent in the U.S. When considering that an estimated 40.9 million people in the U.S. aged 18 or older wear contact lenses, the magnitude of contact lens discomfort becomes quite clear.

Over the years, understanding of the physiological mechanisms that create this problem has expanded. This has enabled investigators to measure the effectiveness of treatment and improve care. With these goals in mind, a team of researchers at University of Alabama at Birmingham, School of Optometry, conducted a study on the effects of moist heat eye compress therapy, specifically on contact lens wearers. The report was recently published in Contact Lens and Anterior Eye and is summarized here.¹

Patients who have MGD face even greater problems because the lipid layer is already unstable

Study design
The purpose of the study was to investigate the effect of moist heat compress treatment on contact lens discomfort in subjects with contact lens-related dry eye (CLDE). During the four-week, single-center, open-label trial, 51 subjects were randomized to one of three treatment groups: application of a Bruder Compress twice per day (Group 1), application of a Bruder Compress once per day (Group 2), or warm washcloth application twice per day (Group 3). Subjects were previously diagnosed with CLDE using the Contact Lens Dry Eye Questionnaire long form (CLDEQ).

To help ensure compliance and daily data collection, subject diaries were kept. Clinical assessments included tear film break-up time, lipid layer thickness, and meibomian gland evaluation.

Reasons to try moist heat
No matter how healthy an eye is, contact lens wear disrupts the tear film because when the lens is placed on the eye, it splits the tear film in two: a pre- and post-lens tear film. In addition, a contact lens-disrupted tear film tends to exhibit an increased rate of evaporation. When this happens, contact lens surface wetting is compromised and the eye may not be adequately lubricated.

Beyond these expected challenges, patients who have meibomian gland dysfunction (MGD) face even greater problems because the lipid layer is already unstable. Indeed, MGD is a leading cause of dry eye and is known to contribute to contact lens discomfort. For this reason, treating MGD is essential in contact lens wearers.

There are many ways to treat MGD, but several target symptoms of malfunctioning glands rather than the root of their dysfunction. Although warm compress therapy may seem low-tech, it remains an effective treatment to improve secretion of meibum from the meibomian glands in patients with and without MGD, as was demonstrated in our study.

| TABLE 1 | Effect of treatment on comfortable wear time |
|-------------------|-------------------|-------------------|
|                   | Uncomfortable Wear Time (hours) | Total Increase in Comfort (hours) |
|                   | Baseline (mean ± SD) | Visit 3 (mean ± SD) |   |
| GROUP 1: Compress 2x Daily Group (n=17) | 4.2 ± 1.8 | 2.8 ± 1.6 | 1.4 |
| GROUP 2: Compress 1x Daily Group (n=17) | 5.5 ± 2.7 | 3.3 ± 2.4 | 2.2 |
| GROUP 3: Washcloth Group (n=17) | 6.8 ± 3.4 | 5.1 ± 2.8 | 1.7 |

Proven benefits
Earlier research shows that the application of localized heat to the meibomian glands improves meibum secretion, which led to warm compresses becoming an established and commonly prescribed therapy. In our study, the average increase in hours of comfortable wear time from baseline to Visit 3 (Week 4 of treatment) was 1.4±1.5 for Group 1, 2.2±3.2 for Group 2, and 1.8±2.5 for Group 3.

Interestingly, our study did not show a statistically significant difference in those who used the Bruder Moist Heat Compress twice a day (Group 1) versus once a day (Group 2). This is an important finding because it may make compliance with effective levels of therapy more attainable.

The inclusion of patient diaries in this study allowed us to calculate average compliance with therapy during the four-week study period. We found that average compliance for using the Bruder Moist Heat Compress once daily was 90.2 percent. Compliance dropped to 86 percent for use twice daily and to 79.6 percent for the washcloth group.

Also, patients who used warm washcloth therapy had more uncomfortable contact lens wear time on average when compared to subjects in Group 1 (p=0.02) at Visit 3. The average improvement in comfortable wear time in all subjects using the Bruder Moist Heat Compress was 1.8 hours.

Ocular surface signs and symptoms
In this study, symptom improvement was much more noticeable than improvement in signs, such as meibomian gland score, tear film break-up time and lipid layer thickness average and minimum. This may be due to the average baseline clinical parameters of subjects because none had severe ocular surface disease; instead, subjects were more reflective of patients ODs would select to initially treat with compresses and tears versus prescription-based therapies. However, subjects using the Bruder Moist Heat Compress showed a higher pro-
portion of glands secreting meibum after treatment than subjects who had used a washcloth (p<0.01). When assessing symptoms, the average SPEED score improved from baseline (μ=11.7, SD=4.4) to Visit 3 (μ=7.6, SD=5.2) which was statistically and clinically significant (p<0.01). Similarly, average OSDI score improved from baseline (μ=28.0, SD=16.4) to Visit 3 (μ=16.7, SD=13.6) which was also statistically and clinically significant (p<0.01). No safety concerns were encountered.

Conclusion
It is imperative that ODs do all they can to support healthy functioning of the meibomian glands, especially in contact lens wearers. As this research demonstrates, warm compress therapy is an effective, viable first step in treatment prior to contact lens refitting. Warm compresses may also reduce the contact lens dropout rate and have a significant impact on a patient’s quality of life while wearing contact lenses by increasing comfortable wear time.

REFERENCE

Dr. Tichenor conducts research in the fields of dry eye and contact lenses. She has no financial disclosures. annatich@iu.edu
10 new treatments in eye care

OCT angiography, multifocal toric lenses, drug deliveries among many exciting new treatments

By Mile Brujic, OD, FAAO

As optometry continues to evolve, it is critical for proactive practitioners to stay abreast of new developments that will help them provide improved clinical outcomes. This article highlights 10 new treatments in eye care that every optometrist should know.

1. SURFACE TREATMENTS

Tangible HydraPEG (THP; Tangible Science) is a relatively new surface treatment for gas permeable (GP) contact lenses. It has been available on SynergEyes Duette lenses, and it is present on the surface of Simplify soft contact lenses. Plus, THP is available on most Optimun (Contamac) and Boston (Bausch + Lomb) materials.

THP is a polymer that encapsulates the lens, improving wettability of the surface through water retention. This increases the lubricity of the surface, providing a more comfortable wearing experience for the patient. Additionally, because the surface is hydrophilic, it repels lipid deposits on the surface of the lens.

With the benefits of this new coating, it is important to understand how these lenses need to be cared for because some of the rules for caring for GP lenses without THP do not apply. As an example, lenses coated with THP shouldn’t be cleaned with abrasive cleaners because such cleaners will strip the coating off of the lens. Five solutions are approved to be used for GP lenses with THP:
- Boston Simplus (Bausch + Lomb)
- Tangible Clean (Tangible Science)
- Unique pH (Alcon),
- Clear Care (Alcon)
- Clear Care Plus (Alcon)

Some GP wearers have a habit of rinsing their lenses with water. Although this is not recommended with any GP lens, it is contraindicated for lenses with THP on their surface.

Soon, Tangible Science will launch Tangible Boost, a monthly soaking solution formulated to re-build the coating that may have naturally worn away over time with normal cleaning and conditioning of the lens.

2. GLAUCOMA MEDICATIONS

Prostaglandin analogues have been a first-line therapy for glaucoma patients for two decades. Prostaglandin analogues increase outflow of aqueous from the anterior chamber through the uveoscleral pathway. They provide a significant reduction in intraocular pressure (IOP) while featuring a convenient once-daily dosing regimen.

Recently there have been several additions to the armamentarium to care for glaucoma patients. Xelpros (latanoprost 0.005%, Sun Pharma) is a recent addition to the family of prostaglandin analogues. What makes this formula different is the presence of a benzalkonium chloride (BAK)-alternative preservative. This medication is preserved with potassium sorbate and is intended to be dosed once in the evening.

Vyzulta (latanoprostene bunod, Bausch + Lomb) is a new class of medication. The active pharmaceutical is a nitric oxide-donating prostaglandin analogue. In addition to increasing uveoscleral outflow, the nitric oxide that is donated from the latanoprost molecule increases trabecular meshwork outflow, facilitating additional IOP-lowering by working on two outflow pathways. It is dosed in the evening.

Rhopressa (netarsudil 0.02%, Aerie) is a rho kinase inhibitor. Rho kinase is an enzyme that promotes actin-myosin contraction in the trabecular meshwork. When rho kinase enzymatic levels are high, it can act to decrease the aqueous outflow through the trabecular meshwork. By inhibiting this enzyme, it facilitates additional outflow through the trabecular meshwork and thus reducing intraocular pressure. It is dosed once a day.

Another new medication, Rocklata (netarsulid 0.02%, 0.005% latanoprost, Aerie), is a combination drop containing a rho kinase inhibitor along with a prostaglandin analogue. This drop is intended to be dosed once daily.

3. MULTIFOCAL TORIC CONTACT LENSES

ODs are fortunate to have several specialty soft lens designs that allow presbyopic astigmatic patient to successfully wear contact lenses. Benefits to these lenses are that they are custom made and can be modified for patients’ unique needs. Part of the challenge that exists with these designs is that they require the practitioner to order the lenses. If the first lens that comes in isn’t ideal for the patient, another order is then required.

Recently a soft multifocal toric lens has been introduced that is available as a standard design in offices. Fitting a standard design gives the practitioner the ability to fit patients immediately with a proven design.

Ultra Multifocal for Astigmatism (Bausch + Lomb) features the company’s 3-Zone Progressive and OpticAlign designs. The lens is made of silicone hydrogel samfilcon A material and is 46 percent water. Ultra Multifocal for Astigmatism is available in sphere powers from +4.00 D to -6.00 D with cylinder powers of -0.75 D, -1.25 D, and -1.75 D. Axes availability is 10° to 180° in standard 10° increments. The lens is designed with a low and a high add powers. The low add is intended for presbyopes who have add powers up to +1.50 D. The high add is intended for presbyopes who have greater than +1.50 D add.

4. OFFSET MULTIFOCAL OPTICS

It has been well established that a patient’s line of sight has a significant influence on the optical alignment of multifocal lenses. Line of sight is often not directly through the center of the pupil but rather is nasally located within the pupil. This creates an interesting challenge for some patients. If the difference between the line of sight and the pupil’s geometric center is low, standard multifocal contact lenses may be an appropriate option of vision correction for these patients. But if large discrepancies exist, there may be better options.

Multifocal lenses that have the optics of the lens decentralized nasally in order to better align with the patient’s line of sight are called nasally offset lenses. These lenses are currently working on multifocal lens designs with offset optics to help optimize vision for these patients.

5. OTHER CONTACT LENS ADVANCES

Other contact lens advancements are noteworthy to discuss.

Recently, Johnson & Johnson Vision incorporated Transitions technology into its Acuvue Oasys contact lenses and refer to the incorporated design as light intelligent technology. Just as ophthalmic lenses are activated with this technology when exposed to ultraviolet radiation dark-
enning the lenses, so are Oasys lenses. It provides patients the opportunity to recognize the benefits that changing ophthalmic lens provides but in the convenience of a contact lens.

Another recent advancement is Eyeries, an advanced doctor locators that provides patients the ability to look online for same-day appoint- ments for doctors who are signed up for the service. Recently Eyeries launched a daily disposable contact lens that is exclusively available through doctors’ offices in an attempt to help control the quality of medical devices prescribed to patients.

In November 2019, CooperVision’s MiSight was the first contact lens approved by the U.S. Food and Drug Administration (FDA) for slowing the progression of myopia. MiSight is a daily disposable lens and will be available in the near future.

Another noteworthy contact lens technology is in the area of scleral lenses. As ODs know, the solution that is utilized to fill the bowl of a scleral lens must be preservative free because the solution will be in close proximity to the cornea for an extended period of time. Nutrifill (Contamac) is a new filling solution that was recently FDA approved.

Nutrifill is a balanced solution containing calcium, potassium, magnesium, sodium, and phosphorous. This fill solution has been engineered to be osmotically balanced to the natural tear film, providing a physiologically balanced environment for cornea.

6 MEIBOMIAN GLAND TECHNOLOGIES

Procedures to re-normalize the function of the meibomian glands and ultimately re-es- tablish a normal lipid layer are critical to offer patients for meibomian gland dysfunction. There are several technologies that provide the practitioner an opportunity to provide the benefits of this treatment to their patients.

LipiFlow (Johnson & Johnson Vision) is a 12-min- ute procedure that warms the meibomian glands from the posterior surface of the lids. While heat is applied to the posterior surface of the lids, intermittent pressure is applied to the front surface of the lids. The simultaneous heat and pressure allows evacuation of obstructed meibomian glands.

iLux (Alcon) is another advanced meibomian gland warming and evacuation procedure. It involves warming the lid through the outer surfaces of the upper and lower lids. Pressure is applied to the lids to evacuate the meibum from the glands. The glands that are being evacuated can be viewed through a magnifying lens that is focused on the lid margin as the procedure is being performed.

TearCare (TearScience) is a meibomian gland warming and evacuation procedure in which smart lids are placed on the upper and lower lids. There is a simultaneous warming of the lids at 45°C for 15 minutes. After the warming occurs, the meibo- mian glands are evacuated with forceps designed to optimally work with the lid margins.

8 HYPOCHLOROUS ACID

HyPOCHLOROUS ACID is released from neutrophils as an essential part of the immune sys-tem. HyPOCHLOROUS ACID kills microorganisms by neutralizing inflammatory toxins released by pathogens. It is benefical for the management of lid margin disease by helping prevent excessive biofilm formation on the lid margin.

Over the last several years, a number of hyPOCHLOROUS ACID formulations have been developed and available to eye care providers and patients. Currently available hyPOCHLOROUS ACID formulations are:

- Avenova (0.01%, Nova Bay)
- HypoClear (0.01%, Contamac)
- HypoChlor (0.02%, OcuSoft)
- TheraTears Sterilid Antimicrobial Eyelid Cleanser (0.01%, Akorn)
- Bruder Hygienic Eyelid Solution (0.02%, Bruder)
- Hyedrate Lid and Lash Cleanser (0.015%, Eye Love)

9 OCT ANGIOGRAPHY

Optical coherence tomography (OCT) has revolutionized the way that ODs view ocular tissues. It allows for viewing cross-sections of the retina and optic nerve, providing crit- ical diagnostic information to manage a plethora of ocular conditions.

Recently, angiography capabilities have become available within the OCT software platform. OCTA allows the clinician the ability to see blood vessels within the retina. This offers clinicians new per- spectives of the vasculature bed within the retina. This is useful for macular degeneration patients to help rule out neovascularization and in glau-coma to help understand early reduction in vascu- larization around the optic nerve with early glau- comatous damage.

Additionally, new insights into the diabetic patients are now giving us a better understanding of the foveal avascular zone (FAZ). Early increases in the FAZ in diabetics may represent the earliest forms of diabetic retinopathy and cap- illary dropout.

10 NEW DRUG DELIVERY

The vast array of pharmaceuticals available to treat ocular conditions provides the practitioner with a large armamentarium of choice. With that said, manufacturers are constantly exploring ways to better deliver these medications to their target tissue. Cyclosporine 0.05% was previously discussed as one of these options which has been formulated in a nanomi- cular technology.

Loprednol is now being formulated to be more targeted for penetration into tissues. Two new formula- tions are noteworthy to discuss here.

Inveltys (lotepradol etabonate 1%, Kala) is FDA approved as a bid dosing regimen for postoperative inflammation and pain following ocular sur- gery. The delivery mechanism features sub-micron particles (0.4 µm to 0.6 µm) leading to greater tissue and aqueous humor penetration.

Lotemax SM (lotepradol etabonate 0.38%, Bausch + Lomb) is FDA approved for postoperative inflammation and pain following ocular surgery. The delivery mechanism features sub-micron particles (0.4 µm to 0.6 µm) leading to greater tissue and aqueous humor penetration.

Both newer medicines are accompanied with a higher concentration of active medication. In this case of Lotemex SM, the concentration of loprednol has been reduced from its predecessor, Lote- max Gel (Bausch + Lomb), which contains 0.5% active medication.

Stay aware

With the advancements in optometry, it is criti- cal for practitioners to stay abreast of changes in eye care. In doing so, optometrists will have a larger armamentarium of diagnostic and treat- ment options to help care for patients.

Dr. Brujic is a partner of Premiere Vision Group, a successful three location optometric practice in Northwest Ohio. He practices full scope optometry with an emphasis on ocular disease management of the anterior segment and spe- cialty contact lenses. Dr. Brujic has received honorary in the past two years for speaking, writing, participating in an advisory capacity, research or meet- ing support from: ABB Optical, Akorn, Alcon Laboratories, Allergan, Art Opti- cal, Bausch + Lamb Health, Bausch, Contamac, CooperVision, CSeye, Euclid, Eyenexx, Johnson & Johnson Vision Care, Luneau, Novartis, OcuSoft, Optovue, Sight Sciences, Sun Pharm, Tanglelight Science, Telgense, TruFiren Optics, Val- ley Cornea, Visionary Optics, Maxvision, Wacman Optical, Weaver, Zeiss and Zee Vision.
Rose-colored sunglasses. Preliminary research at the University of Utah suggests that specially tinted lenses may help some people with photophobia. Anecdotally, many photophobic patients prefer an FL-41 tint on their sunglasses instead of green or yellow. The FL-41 tint, which has a pinkish look to it, is a mixture of colors that blocks the blue-green wavelengths.

"We randomized patients with Blepharospasm to wearing FL-41 sunglasses for two weeks and then to wearing plain sunglasses for two weeks," said Dr. Katz. "The patients filled out questionnaires at the end of each period. We found that patients with blepharospasm definitely preferred wearing lenses with the FL-41 tint to wearing conventional sunglasses. So there does seem to be some therapeutic benefit."

In a new study, the researchers have used electromyography to measure blink frequency, duration and amplitude in blepharospasm patients while they read for five minutes at a time with regular eyeglasses, glasses with a light gray tint or glasses with an FL-41 tint. The results are still being analyzed, but Dr. Katz said they appear to provide more objective evidence that FL-41 does reduce blepharospasm.

"FL-41 lenses are non-invasive, they have no side effects and they're not expensive," Dr. Katz added. "So it's a cheap, easy way to improve the lives of these patients, who in some cases are very disabled by their disease. Be sure glasses block blue-green. FL-41 lenses are available in optical shops, but Dr. Digre cautioned that some so-called FL-41 lenses are not the real thing. "You really have to know whether the lenses are real or not," she said. "Some lenses can look like FL-41, but they don't act like it. We have done spectral analysis of our lenses to make sure they are blocking the right light."

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BPI® Diamond Dye 460/510 is a new addition to the therapeutic tint line-up of BPI® Blue Filter Vision 450, Diamond Dye 500/550 and BPI® Diamond Dye 540. BPI® Diamond Dye 460/510 is a cut-off tint which blocks light of wavelength shorter than 460nm when tinted light and values up to 510nm when tinted more darkly. This tint blocks violet/blue in this spectral range very well, and should be helpful in protecting the eye from these light colors, which have been implicated with macular degeneration. This tint does not inhibit seeing the traffic signal colors - it passes the European traffic signal recognition requirements, so it can be used while driving. Since the blue sky is darkened to a gray green when viewed through this tint, sport shooting enthusiasts will find this tint an aid in spotting skeet targets against the sky.

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and the residual refractive outcomes, all involve a generally standard order of operations.

The general term for eye measuring for IOLs is “biometry,” which encompasses the measurement of the two most important variables: axial length (AL) and keratometry (K).

**Axial length**

Axial length (in mm) measurement is a crucial step in IOL power calculations. If the length errs by 0.1 mm, it equates to an approximately 0.27 D error in the spectacle plane\(^1\)—therefore, accuracy is a necessity. There are two main methods to measure AL: ultrasound and optical biometry.\(^2\)

Most basically, ultrasound measures the transit time it takes to deflect off multiple surfaces of the eye anteriorly from the front and back of the cornea, the front and back of the lens, and posteriorly to the retina. The axial length is calculated from the front of the cornea to the retina.\(^3\) This ultrasound method can be performed via immersion (essentially a water bath over the cornea) or contact (probe directly on an anesthetized cornea), and was a mainstay until optical biometry came onto the scene in 1998.\(^1\)

Optical biometry, without water or direct contact on the eye, has great accuracy; however, it measures to the retinal pigment epithelium (RPE) as opposed to the retina with the ultrasound, so the AL is a bit longer.\(^2\) This distinction can be important if comparing measurements. Preferences vary among surgeons; adept use of either ultrasound or optical biometry can provide comparable results.

**Keratometry**

Keratometry (in D), or the measure of the corneal power, is a very important component of the IOL calculation. Its parameters are the curvature of the anterior corneal surface expressed comparatively from the steepest to flattest meridians, usually in diopters but can also be in millimeters of the radius of curvature.\(^4\)

Keratometry is not necessarily a straightforward process, and there are multiple ways to measure. Using a manual keratometer was historically the method of choice for many years and likely the method ODs learned (or are still learning) in optometry school—and still many rely on measuring using that device. Many surgeons and ODs alike now also use an autorefractor, and still others rely on topography taken by optical biometry machines.\(^1\) These various devices sometimes measure different portions of the cornea—some measure a very central area, some a larger diameter, and some the most central island.\(^5\) Often, measuring with multiple instruments and comparing to a full topography, where flat and steep areas can be visualized, may be the most accurate.

**IOL constant**

The term “IOL constant” is a bit cofounding, as the number is neither a true constant nor does it relate only to the IOL.\(^2\) At its core, the number is an abstract “fudge factor” that adjusts IOL predictions for possible errors arising from biometry measurement devices, patient population, and surgical technique.\(^1\) Each manufacturer (i.e., Zeiss, Alcon, etc.)

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**TAKE-HOME MESSAGE**

ODs have a vast amount of data that can add value before restorative refractive surgery, in choosing the IOL selection method and aims, as well as postoperatively.
Adept use of either ultrasound or optical biometry can provide essentially comparable results

The top three formulas each work best for a specific axial length: Hoffer Q (>21.5 mm), SRK/T (>26.0 mm) and, for the interval in between, there are many formulas, although the Holladay 1 formula is preferred for its small edge of accuracy. Of course, there are modifications to these formulas and others not listed that are indicated for various reasons (e.g., post-myopic or -hyperopic refractive surgery eyes or demand calculations not listed here).

IOL design and manufacture

Much like glasses, lenses are held to the ANSI Z80.1 standard, and IOLs are held to the standards stated in ISO 11979-2, leaving little room for error. IOLs range from around −5.00 D (for very myopic eyes) to over +40.00 D (very hyperopic eyes), with most falling within the range of +17.00 to +22.00 (Alcon).

Within the spectrum of IOLs, the most common are monofocals, aiming for a single fixed distance. These are both spherical and toric: the toric ranging in dioptric astigmatism correction between 1.03 D to −4.11 D in the corneal plane and can be rotated to any axis. Toric IOLs, much like toric contact lenses, are marked on the axis, which can be seen after dilation (see Figure 2).

Next are multifocal lenses, which can correct adds from roughly up to +4.00 D in the lenticular plane, with some requiring the use of the dominant or non-dominant eye much like multifocal contact lens fitting.

IOLs come in yellow UV-protectant and clear UV-protectant varieties, with some retinal specialists preferring the yellow lenses, believing that they have superior blue-blocking protection. Although studies have shown that patients with a yellow-tinted lens in one eye and clear lens in the other do not notice the difference, surgeons generally try to match the tint. New on the market is a multifocal toric lens, which has found varying levels of success.

Calculating the IOL power using the above formulas and variables is well and good; however, these calculations can be completed only after optimal refractive goals have been established, which is where ODs can truly shine.

Does the patient want symmetrical distance correction in both eyes? Or, has she been a low myope her entire life and has, for the past few decades, enjoyed reading with her glasses off and would prefer to stay that way, wearing light distance glasses for driving? Is he an artist who would like an intermediate distance aim—ideal for a drafting table or painting—without glasses? Perhaps she is right-eye dominant and has successfully worn monovision contact lenses for the last 30 years? Maybe she would then enjoy distance in the right eye and an intermediate or reading correction in the left? Is it a patient who likes the latest and greatest technological innovation and may be interested in multifocal IOLs? Or a multifocal toric?

Years of examination, relationship building, and life insight can make choosing the aim a much easier feat and can direct the post-op refraction to higher probability of happiness and success if the OD, MD, and patient are on the same page and know the expected outcome. This is where ODs can also shine with insight on the front-end decision-making—not just postoperatively.

## References

Safety and efficacy of myopia progression therapies in children

By Ernie Bowling, OD, FAAO

The desire to control myopia progression in children has been around for quite a long time. For good reason: the prevalence of myopia is increasing and many visual and pathological complications come from high myopia. There are many interventions designed to inhibit myopia progression. But of the therapies at our disposal, are some better than others? It is an important question to answer for both ourselves and our patients.

Meta analysis
A recent study published in BMC Ophthalmology addressed that very question.1 Researchers from Greece and the United Kingdom performed a synthesis of systematic reviews and meta-analyses of published literature investigating the efficacy and safety of multiple myopia interventions vs control conditions. Their target was myopic children and adolescents less than 18 years of age without ocular comorbidities, including strabismus and amblyopia.

Primary outcome measures regarded myopia progression as a mean change in refractive error measured in diopters and axial elongation measured in millimeters. The outcomes assessed included change in refractive error and change in axial length from baseline to one year and from baseline to two years.

Ortho-k showed effectiveness in retarding myopia development compared to other kinds of lenses

Forty-four unique primary studies contained in 18 eligible reviews published between 2002 and 2017 involving 6400 children were included in the analysis. Of the 18 studies, four studies investigated atropine, four analyzed orthokeratology, two focused on outdoors exposure, one examined the efficacy of acupuncture, and two investigated the use of multifocal lenses. The remaining five examined multiple interventions for myopia control.

Atropine more effective
The findings of this study suggests atropine eye-drops appear to be more effective for myopia control compared to spectacles or contact lenses. Their findings mirror the consensus published by the World Society of Pediatric Ophthalmology and Strabismus (WSPOS), which reported that atropine is the most beneficial intervention for myopia progression control.2 The findings from this study showed no dose dependence and no difference in the efficacy of atropine across different doses in the range of 0.01% to 1%. However, the five-year results from the Atropine in the Treatment Of Myopia (ATOM2) study supported binocular daily application of 0.01% atropine as the safest and most effective concentration for restricting myopia.3

Ortho-k shows efficacy
Orthokeratology also demonstrated effectiveness in retarding myopia development compared to other types of lenses, but orthokeratology side effects have resulted in this treatment presenting higher dropout rates compared to other myopia interventions.4 Peripheral add multifocal contact lenses also appear to be effective, showing no refractive changes in a year and has a low reported risk for infectious keratitis.

Time outdoors
Increased outdoor exposure is yet another myopia-controlling intervention for which the mechanism of action has not been clarified. A systematic review and meta-analysis analyzing up-to-date evidence showed outdoor exposure appears to provide protection from myopia onset in non-myopes but does not result in restriction of myopia progression in already myopic individuals, according to one study.5 On the other hand, a randomized controlled trial reported a beneficial effect of outdoor exposure in both nonmyopic and myopic individuals.6

Refractive error undercorrection
Under correcting the full refractive error has been used with debatable results. One study showed that full correction reduces progression of myopia compared to under correction over a two-year period of treatment.7 But a more recent study on 121 Chinese children proposed that no correction at all was effective in slowing myopic progression and axial elongation compared to prescribing the full correction.8

Summing up
The data from this review suggests atropine followed by orthokeratology and multifocal soft contact lenses demonstrate efficacy in controlling myopic progression. It remains unclear if atropine or orthokeratology could lead to a permanent long-term effect on myopia control. Possible rebound effects upon treatment cessation also need to be assessed.

This review can give practicing optometrists insight in treating patients seeking myopia progression control. The topic is going to gain even more attention in the future, so it is in everyone’s best interests to be aware of available therapies.

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Ernie Bowling received his Doctor of Optometry and Master of Science in Physiological Optics from the University of Alabama School of Optometry.
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What the COVID-19 relief package means for ODs

Continued from page 1

- Providing a one-time, up to $1,200 check to individual taxpayers (or up to $2,400 for married filers), that phases out beginning at $75K in adjusted gross income for single filers and at $150K for married filers, based on the taxpayer’s 2018 filed tax return; check amounts increase an extra $500 for every child. This will directly benefit most employees at optometry clinics, as well as ODs who personally qualify.

- Broadening telehealth regulations for Medicare beneficiaries to include new patients during the COVID-19 crisis.

- Authorizing the U.S. Treasury to provide small businesses with an advance tax credit during the crisis instead of waiting to be reimbursed quarterly for fulfilling the new paid sick and family medical leave requirements that were part of the Families First Coronavirus Act (i.e., Phase Two). Further, employer liability is limited to $5,110 in aggregate for sick leave, $2,000 in aggregate to care for a quarantined individual or child due to COVID-19 for each employee, and $10,000 aggregate for each employee under all leave. Re-hired employees who were laid off after March 1, 2020, are also provided paid sick and family leave.

- Creating a temporary “Pandemic Unemployment Assistance Program” through December 31, 2020, providing access to unemployment benefits for both self-employed ODs and independent contractors, as well as part-time workers, who are unable to work as a direct result of the emergency.

- Providing an emergency increase in unemployment compensation benefits by adding $600 per week in federal dollars to existing state benefits for up to three months and providing funding to pay the cost of the first week of unemployment benefits through December 31, 2020, for states that choose to pay recipients as soon as they become unemployed instead of waiting the current requirement of one-week period.

- Providing a refundable payroll tax credit for 50 percent of wages paid by employers to employees during COVID-19 for employers whose operations were fully or partially suspended due to a COVID-19-related shutdown order, or whose gross receipts declined by more than 50 percent when compared to the same quarter in the prior year.

- Waiving the 10 percent early-withdrawal penalty for distributions up to $100K from qualified retirement accounts for legitimate coronavirus-related expenses or lost revenues attributable to the pandemic that are not otherwise reimbursed.

- Creating the Small Health Care Provider Quality Improvement Grant Program to make ODs eligible for five years of grant funds to better connect with other healthcare providers in their area to help increase care coordination, enhance chronic disease management, and improve health outcomes.

- Providing for Small Business Loan Repayment Assistance in the form of a new subsidy for certain existing loans (e.g., SBA 7(a), 504, and Microloans).

- Establishing a Ready Reserve Corps through the United States Public Health Modernization Act to assure enough trained doctors (including ODs) and nurses are available to assist in public health emergency responses.1

Many thanks to Matt Willette, AOA director of Congressional relations, and his staff, for their influence and work on behalf of optometry with this exhaustive piece of legislation.

Phase Two (aka the Families First Coronavirus Act)

This multi-billion-dollar piece of legislation was passed by Congress and signed by President Donald Trump on March 19, 2020. It includes provisions to:

- Require all healthcare insurers (both private and government-run) to cover all coronavirus testing costs in their entirety, without cost sharing, and at no cost to the patient, for those with medical coverage.

- Expand unemployment insurance coverage.

- Ensure paid sick leave for hourly employees—businesses with <500 employees were required to pay up to 80 hours of emergency paid sick leave to full-time employees (and lesser amounts for part-time employees) who miss work due to self-quarantine, to seek preventive or diagnostic care, or receive treat-

1 The new COVID-19 relief package recognizes the importance of optometry’s full inclusion in all federal health legislation and ODs’ role as physicians in the nation’s COVID-19 mobilization efforts. There are tax breaks and credits available for employers who keep staff on or provide paid leave during the crisis.
In the case of the paid sick leave and family leave wage provisions, the employee’s wages and the employer’s contribution to employee health insurance premiums during the period of leave were originally to be paid up front by the employer, then be fully reimbursed by the federal government within three months through a refundable tax credit that would count against the employer’s payroll tax. Employers originally would have also been required to submit emergency paid sick leave expenses as part of their estimated quarterly tax payments. Should actual expenses exceed the tax liability, a refund would be furnished from the IRS. However, recall the CARES Act (i.e., Phase Three) changed these requirements to provide an advance tax credit up front and cap the aggregate leave an employer is liable for to ensure employers have enough payroll cash on hand to meet these paid leave requirements. Businesses with fewer than 50 employees may be eligible to qualify for a narrow exemption regarding the paid leave requirements if the Department of Labor determines that providing these benefits would jeopardize the viability of the business.

**Phase One**

The first COVID-19 Relief Package was passed by Congress and signed by President Donald Trump on March 6, 2020. It was an $8.3 billion stimulus designed to, among other things:
- Set aside funding for COVID-19 lab tests, vaccine research, and general outbreak response.
- Allow the SBA to offer new and expanded, low-interest federal disaster loans (the aforementioned EIDL loans) which can be used for payroll expenses, accounts payable, fixed debts, and other expenses related to COVID-19. State governors must request EIDL assistance, but once the declaration is made within the state, the loans were to be available up to $2 million at an interest rate of 3.75 percent, for small businesses without credit available elsewhere.
- Provide directives to relax pre-existing restrictions on the use of remote and telehealth services for Medicare beneficiaries. These visits must be initiated by the patient (but providers are allowed to inform beneficiaries of their availability) and initially were limited to established patients only (i.e., those seen by a doctor at that tax ID number within the past three years) until the CARES Act (i.e., Phase Three) passed. In addition to online patient portals and telephone communications, platforms such as FaceTime and Skype, among other similar videoconferencing options, may be used to provide some types of “virtual check-ins” and/or telehealth services during the pandemic. Details of the appropriate coding and billing for the various options allowed are beyond the scope of this article.

Note that throughout the process, interests have been at work that would have significantly restricted optometry’s inclusion in almost every one of these pieces of legislation. Congress continues to consider additional stimulus measures, so Phase Four is likely. The AOA has sponsored additional bills in both the Senate and the House to further provide specific relief for ODs, their staff, and their practices, so get involved today to ensure their passage. As always, consult your financial advisor for specific guide-lines and recommendations on how you can best take advantage of these provisions.

**REFERENCES**

In Focus

ARBO loosens rules on online CE during COVID-19 pandemic

By Gretchen M. Bailey, NCLC, FAAO
Editor in Chief, Content Channel Director

Novel coronavirus 2019 and associated COVID-19 concerns have prompted large-gathering cancellations and social distancing. Plus, travel is severely restricted and some cities are on lockdown—and ODs have been urged to see only emergency patients.

Vision Expo East, one of the largest eyecare meetings, is no longer taking place next week in New York City. Other smaller meetings have been cancelled as well.

At press time the American Optometric Association’s (AOA) annual meeting, Optometry’s Meeting, is still scheduled for late June; however, that decision could change in the coming weeks.

ODs still need their continuing education (CE) credits to maintain licensure, and many state boards of optometry limit (or prohibit) the number of online CE hours for licensure.

To that end, the Association of Regulatory Boards in Optometry (ARBO) has modified its guidelines on Council on Optometric Practitioner Education (COPE)-approved CE.

In-person to online CE
According to an ARBO statement, planners of previously scheduled live CE activities are able to continue to offer their already COPE-approved CE if the courses are presented as online interactive distance learning.

This means that attendees must be able to have immediate live interaction with the course instructor, such as asking questions.

ARBO Executive Director Lisa Fennell says that the relaxed rules will be in place through May 31, 2020.

“Any organization or CE provider that had planned a live activity and had already submitted courses to COPE is able to present them online in an interactive way,” she says. “Attendees have to be able to interact with the instructor in real time.”

Fennell says that a temporary relaxation helps all involved.

The companies that had planned CE are going to be out a lot of money, and we want them to do what they had planned to do. This is a way to help them,” she says.

However, moving from in-person to online CE with live interaction may be a challenge for event planners. Pivoting to interactive distance learning requires additional planning and infrastructure.

Online optometry community ODwire.org, which held its sixth annual online CE conference CEwire2020 in early February, is conducting its conference again in late April to help ODs meet their CE needs.

CEwire 2020 will be held live again on April 25 and April 26, offering 60 COPE-approved CE lecture hours.

“With the COVID-19 pandemic making travel impossible and forcing many ODs to stay home from work, we want to make it as easy and safe as possible for people to fulfill their mandatory continuing education requirements in these difficult times,” says conference co-organizer Paul Farkas, OD, FAAO.

State boards must be on board
Fennell cautions ODs that state boards of optometry may not allow online interactive CE as live CE, regardless of COPE rule changes.

“State boards may limit the number of online hours or not allow them at all,” she says. They don’t recognize interactive CE as live. That’s why COPE has had rules. We went to state boards to tell them of this change, and we hope they will allow this.”

She says that some states are giving their own waivers for CE.

“I am hopeful that state boards will all follow and it won’t matter if COPE allows online interactive CE or not,” she says. “If state boards allow it, then there will not be an issue as far as COPE rules.”

ODs interested in earning online interactive CE hours should contact their own state boards to ensure that the credits will be allowed.

Says Fennel: “We wanted to help and be flexible, knowing what everyone is going through right now. ARBO will continue to monitor the situation and potentially extend it further if we have to.”

Association of Regulator Boards in Optometry (ARBO) has modified its guidelines on Council on Optometric Practitioner Education (COPE)-approved CE

Ms. Bailey has been editor in chief and content channel director of Optometry Times® since 2012. She has 20-years of industry experience and is a former contact lens and optometric technician.

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In Dispensable

X-IDE Spring-Summer 2020 collection

X-IDE explores the world of music for its Spring-Summer 2020 collection. Pulling inspiration from disparate musical genres to name the frames, these glasses reflect their urban inspiration.

Lyric sports a trendy shape with elegant curves and color combinations. It is designed for wearers of all ages. The outer edges of the front are enhanced with dual details made of glitter embellishments and plain enamel. The temple tips display tiny shimmers of light for a sophisticated, feminine feel.

Punk is an avant-garde construction in which the acetate top rim of the frame is milled on two levels—one in bright colors, and one in plain or glitter-strewn transparent colors—to produce an overlapping appearance of shapes and colors.

LOUNGE

INDIE

Lounge and Indie styles boast elastic hinges embedded in the temples. The slightly cat-eye Lounge and oval Indie are different in their seamless color blended acetate sheets along the angled edges of the front.
Digital dry eye

Continued from page 14

screen.

Check the distance from you to screen: Extend a hand, it should lie flat against the VDT. Lessen overhead and surrounding light. Increase font size on the device. Keep handheld devices at a safe distance and below eye level. Most children hold devices at 5 to 6 inches from face. Increase distance.

Blinking exercises can be beneficial, and the importance of reestablishing normal blink patterns must be reinforced. Dry eye expert Donald Korb, OD, FAAO, has long been a proponent of blink training, and it is an essential part of restoring function to the meibomian glands. I encourage patients to download a blinking app created by Dr. Korb. It is available for iOS for free in the App Store. Patients can set their own blinking reminders for their desired frequency.

Conclusion

The purpose of this article was simply to alert ODs to the ubiquitous nature of digital dry eye disease and therefore to encourage them to look for the disease in their patient population. ODs don’t need to spend thousands of dollars or go to weekend workshops to diagnose and treat dry eye. However, those are options available.

ODs have the tools in their offices and the knowledge to conduct a cursory dry eye evaluation. They just need to be doing them. Dry eye is optometry’s golden goose. Think about it: Skills and the diagnostic value and accuracy of conjunctival impression cytology, dry eye symptomatology, and routine tear function tests in computer users. J. Am. Optom. Assoc. 2014;85(6):102-8.


When I was let go from B+L and I started to question what I was doing, my mind just shifted. After owning a practice for about seven years, I was asked to come into New York City to see a Broadway show. That made her feel better about the move. So when my son got a bit older, my wife said, “What are you going to do with your son?” I always wanted to do a baseball stadium tour. As of now we have seen 16 stadiums out of the 30. It’s been a lot of fun.

What’s something your colleagues don’t know about you? I use to be an avid bowler with a 200 average.

What is your guilty pleasure food? I love stadium hot dogs. My favorite is the Dodger Dog. The foot-long with mustard, ketchup, relish, and onions—there’s nothing better than that. Maybe it’s the experience of eating the dog outside, watching baseball when magical things can happen. It just tastes better that way.

TO HEAR THE FULL INTERVIEW with Dr. Ben Chudner, listen online: optometrytimes.com/BenChudner

What are your biggest frustration with optometry? Dangerous question. [laughs] I think ODs tend to be slow to change their habits and are short-sighted; myopic, if you will. There are a lot of examples; private equity is one of them. I think doctors get very emotional quickly, they get fearful, and they are unwilling to hear about things. Telemedicine is another example. It is going to happen. It can happen to optometry or with optometry. We are fighting it because we think it’s not good yet. Unless we as a profession chose to figure out a way to help shape the direction it’s going, it is going to happen without us and we are going to be unhappy.

Where do you see yourself in 10 years? I have no idea, actually.

Industry vs. practice, Dodger dogs, purple footprints

Benjamin S. Chudner, OD, FAAO, Vice president eyecare and chief medical officer, AEG

Industry vs. practice

Industry vs. practice, Dodger dogs, purple footprints

How are private equity offers perceived in optometry?

It’s a mixed bag. At first there was a lot of curiosity and not understanding what was going to happen. As the offers got bigger and bigger, I think fear started to set in, and people were scared where this was headed. Now, I think fear is overtaking more than anything else with VSP Ventures getting involved. A lot of people look at this as an opportunity or an exit strategy. But there are plenty of doctors who are fearful as to what this means. It’s a weird crossroads that we’re in with optometry now. A lot of doctors who have built successful practices think they are worth a lot of money, and they may very well be, and you have younger ODs coming out of school with a lot of debt. It makes it very difficult for these younger ODs to buy a business that might be worth $1 million or $2 million.

Why a baseball stadium tour?

When I moved from Seattle to Rochester, my daughter was nine and my son was five. It was difficult for my daughter to leave her friends. The deal I made with her was once a year, she and I would take the train into New York City to see a Broadway show. That made her feel better about the move. So when my son got a bit older, my wife said, “What are you going to do with your son?” I always wanted to do a baseball stadium tour. As of now we have seen 16 stadiums out of the 30. It’s been a lot of fun.

What’s the craziest thing you’ve ever done? In college, I was in a fraternity that held an annual party called “the Islander.” We thought it would be cool to paint our feet purple and purple and run through the campus to leave footprints, getting people excited. Some idiots went into the newest building. Eventually security chased and caught some of us; I was not caught. That coming weekend was when incoming students visited with their parents. We had littered the entire campus with purple footprints, including the brand-new student center. The school was understandably upset. It had rained overnight, and I knew we were in trouble when I saw footprints that were not dissolving in puddles. We got the option to clean it up ourselves or pay the school to clean it. The whole next night I was on my hands and knees, scrubbing purple footprints we couldn’t even see as someone went behind us with a pressure washer.

—Vernon Trollinger

What are your guilty pleasure food?

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