By Whitney Hauser, OD

When ODs think about dry eye, they quickly associate classic demographics: Over-40 menopausal female patients taking a high number of medications or individuals with autoimmune disease. But are ODs overlooking a younger, seemingly healthy demographic?

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Journal articles and medical conferences have certainly increased awareness that dry eye is a pathology that can affect patients of all ages, although it is rare to see dry eye in healthy pediatric patients. ODs have made progress in monitoring the vision and health components of children at birth, but optometric efforts need to expand in scope to include the anterior segment and to be encouraging as children become more independent in caring for themselves.

Early in my career, I fell under the same pitfalls that I suspect many of my colleagues also did: I superficially treated dry eye symptoms, particularly in adolescent and young adult patients. As my own awareness and understanding of the chronic nature of dry eye increased, my propensity to be more aggressive in treating it with...
Dry eye: How to treat kids, teens

This condition is on the rise in a seemingly healthy demographic

By Whitney Hauser, OD

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*Based on retrospective analysis of 26 patients (52 eyes) with subjective refractions ranging between +5.00D to -6.00D and ≤ -1.00 D cylinder] **CVI data on file 2019. Retrospective analysis; N=55 subjects (110 eyes); DV Rx +1.25D to -3.25D, ADD powers +1.25 to +2.50DS. App Store is a service mark of Apple Inc. Google Play and the Google Play logo are trademarks of Google LLC. ©2019 CooperVision B13701 07/19
How an externship polished me as an OD

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 t was a special Optometry’s Meeting for me this year. I am humbled and very grateful to all (and there are many) who made me a candidate and recipient of the American Optometric Association’s 2019 OD of the Year. My family and I truly felt the love the entire time we were in St. Louis.

One great and unforeseen addition to a wonderful week was bumping into one of my mentors and an individual I’m honored to call a friend. I ran into Dr. John Essinger and his wife Ruth-on Wednesday of the conference. We ducked into the front lobby of the AOA’s new headquarters (which is fantastic) and got to catch up for a few seconds.

Our brief conversation brought back great memories. Dr. Essinger and Dr. James Fisk afforded me the opportunity to externalize with our private practice when I was a fourth-year student at the UAB School of Optometry.

Business of optometry
Looking back, I think all fourth-year students should have the opportunity to perform an externship in a private-practice setting. In the right sce-

The lessons I learned during this internship have turned into key facets of my optometric cerebellum

nario, it can afford a multifaceted learning experience that is priceless to the young clinician. The business of eye care—optical, insurance, staff—can be daunting to anyone. To me, it can be daunting on a good day.

As an optometry student with a liberal arts degree, it would be an understatement to say I could have used as much training in eyecare business as I could attain. Learning from common-sense experience is something we all could use, and I feel fortunate to have had access to it at a young age.

In addition to being witness to contemporary and innovative patient care, I got to experience the joys and tribulations of day-to-day optometric life besides the clinical side. The lessons I learned during this externship have turned into key facets of my optometric cerebrum which have many times driven my decision making in clinical and business aspects of optometry. Who could ask for a better result from an externship than to have it morph into a legacy of sorts?

I didn’t know it was possible to learn so much and have so much fun at the same time. Such a seemingly false dichotomy seems uncommon, and I’m here to tell you it happened as described. The successful emulation of Drs Essinger and Fisk would mean being a great doctor of optometry in addition to a great human, and I look back at my time at their practice with gratitude, joy, and lots of love.

From the Chief Optometric Editor

Dr. Stuart Richer shares insights from ARVO 2019. See page 20 for more.
3 updates to treating Sjögren’s syndrome and dry eye

Check out the latest and most important updates in the treatment for Sjögren’s syndrome and dry eyes, such as new guidelines, a potential new medication, and taking another look at the Sjögren’s biomarker test.

OptometryTimes.com/Blog/SjogrenDryEye

Examine evaporative dry eye disease exposure in your patients

An estimated 30 million people around the world experience dry eye disease. Jade Coats, OD, explains how to recognize and address the underlying cause(s) of evaporative dry eye influences in your patients before more serious and chronic problems occur.

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Achieving so-called “board autonomy,” which means not having to petition for a legislature to grant board autonomy to a profession, is a conversation worth continuing.

Practice how you are taught to practice. What a concept!

Industry
The eyecare industry has seen changes over the past 10 years as well. Here are some highlights.

EssilorLuxottica. Need we say more? A highly significant merging of two companies in the history of the ophthalmic materials industry (literally on the order of tens of billions of dollars—or shall we say euros?) was a huge story for our readers a couple of years ago.

With subsidiaries such as LensCrafters, Pearle Vision, Sunglass Hut, Eyemed, Transitions Optical, Ray-Ban, Costa, and Kodak Lens, these companies independently controlled a significant portion of ophthalmic goods and managed care. What many ODs wanted to know was how this gigantic merger would affect their day-to-day lives, and I’m still wondering the same. Of course, it takes time for such mergers to happen, and the effects are often trickledown in nature.

 Valeant Pharmaceuticals International acquired Bausch + Lomb back in 2013. B + L retained its name, thus becoming a division of Valeant. With subsidiaries such as LensCrafters, Pearle Vision, Sunglass Hut, Eyemed, Transitions Optical, Ray-Ban, Costa, and Kodak Lens, these companies independently controlled a significant portion of ophthalmic goods and managed care. What many ODs wanted to know was how this gigantic merger would affect their day-to-day lives, and I’m still wondering the same. Of course, it takes time for such mergers to happen, and the effects are often trickledown in nature.

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Vision care plans

Remember that little thing passed by the 111th Congress known as the Patient Protection and Affordable Care Act, or known colloquially as Obamacare?

Healthcare reform (or, should we say, healthcare payment reform) was and still is top of mind for many Americans, and the AOA ensured that ODs had a seat at the table. ODs made a successful and concerted effort to ensure that access to care laws were upheld and that children’s vision was deemed an essential benefit.

A decade later, proponents both for and against this law are still throwing tomatoes at each other. Lawmakers are still pledging to do something about the incredible costs of healthcare in the U.S. How will the state of healthcare affairs look in another 10 years? Who knows? Maybe by then we’ll be talking more about how to keep people healthy to begin with.

New schools and colleges of optometry

The last decade or so has seen several new schools and colleges of optometry open their doors. The doctor of optometry degree seems to have increased in popularity—and rightfully so given the aging population and subsequent and expected demand on healthcare as a whole.

There has been a hallway discussion regarding whether or not more schools were needed and what the end result would be for the profession. As long as the governing bodies that be keep with the rigorous standards which must be met to earn the OD degree, we are going to be just fine—even better.

We, at Optometry Times, even broke a story—an exclusive story—back in 2015 regarding a new online OD degree program. That’s right. You could now earn your OD degree right from the comfort of your own living room in your pajamas. No more orthoptics tests with a professor breathing over each of your shoulders as you sweat. No more running from the parking lot in the pouring rain just to make it into clinic with your equipment all soaked. No more patient encounters with that one attending who quizzed you on glomerular filtration rate right in front of your patient. All rendered obsolete.

This story was, of course, published on April Fools’ Day. We like to think we yanked at least a few optometric chains with this one.

We changed, too

When we first started this publication, the print product was all you got.

Now readers are able to access Optometry Times content on our website, via our app, and through email newsletters and several social media outlets… in addition to the paper copy you may or may not be holding right now.

These past 10 years with you, our readers, have been wonderful since we have gotten to know one another. The challenges of starting a new publication, fostering its development, and striving to bring you, the hard-working clinician with no shortage of advice has been an incredible experience for all of this in mind for the next 10 years and beyond.

As far as we have come, it should be noted that, just as it was 10 years ago, we still have no therapeutic modality which should come before lowering IOP in the treatment of glaucoma.

Along the lines of combatting ocular allergies, Novartis introduced Pazeo (olopatadine, which is seven times stronger than the original Patanol (olopatadine) introduced all those years ago. Just as it was 10 years ago, cataracts still happen, and we still don’t have the holy grail of an IOL that accommodates like your lens did when you were 15 years old. Science is moving at a rapid pace in this arena, however, and scientists continue to uncover ways to make IOLs accommodate and even be altered after surgery. We press on.

Anniversary

Continued from page 6

Further on the point, the concept of telehealth has gained approval of LipiFlow (now owned by Johnson & Johnson Vision), a thermal pulsation device designed to improve meibomian gland function. Further, with advances in meibography over the last decade, we are able to better visualize this major contributor to dry eye disease. I, for one, had forgotten just how long those glands were until I saw a meibography image of them.

Alcon also launched iLux in 2019 for the treatment of meibomian gland dysfunction.

It utilizes light-based heat and compression to improve glandular function. Intense pulsed light (IPL) therapy combined with meibomian gland expression has also garnered much more attention as a treatment of dry eye, and recently launched Sight Science TearCare has joined the ranks of meibomian gland treatment.

Allergan announced its launch of the True Tear nasal neurostimulator device in 2018, a thought-provoking technique for treating dry eye without having to rely on drops.

Glaucoma was no stranger to innovation in the first 10 years of Optometry Times, either.

Minimally invasive glaucoma surgery (MIGS) devices and procedures have changed the face of surgical glaucoma management over the last several years.

As well, the approval and subsequent launch of two new glaucoma medications, we were presented with new and different mechanisms of action for lowering IOP. Vyzulta (Bausch + Lomb), a nitric oxide donating prostaglandin analog, was approved in 2017, as was Rhopressa (Aerie Pharmaceuticals), a Rho kinase inhibitor.

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ODs have and must continue to embrace technology for what it is: newer, better ways to supplement our patient care, not replace it
Poor eyesight and hearing loss costs billions, new UK report shows

By Alex Delaney-Gesing
Associate Editor

A lack of accurate data is contributing to a £58 billion bill for vision and hearing loss in the UK, according to a report published calling on the government to support the first-ever national survey of the UK population’s sensory needs.

It is estimated that around 2 million people in the UK are affected by partial sight loss—which is expected to rise to 2.4 million by 2024. The number affected by hearing loss—also rising—is estimated at 11 million.

Researchers and charities have launched a campaign for the first-ever UK National Eye-health and Hearing Study (UKNEHS). The study includes 25,000 participants undergoing an eye and hearing examination as well as completing a standardized general questionnaire.

“If the UK is serious about reducing the levels of preventable visual impairment and hearing loss, then we must have the data that the UKNEHS will provide,” says Lord Colin Low, co-chair of the All Party Parliamentary Group (APPG) on Eye Health and Visual Impairment, in a press release. “If we don’t fund this kind of research we are saying that we accept that people living in the UK will lose their vision and hearing due to preventable causes, and that it is OK for them to live with hearing and vision loss that is treatable.”

“The UKNEHS is of vital importance to current and future generations if we are serious about providing quality, evidence-based services in these areas”

The information will be broken down by gender, socio-economic group, and geographical area to give a comprehensive view of the UK’s health and hearing status.

The study will determine the prevalence and causes of vision impairment, blindness and hearing loss in the UK population aged 50 and over.

The study will also measure the detection and treatment coverage rate of major eye diseases and associated conditions, such as diabetes, in order to understand the effectiveness of current services.

“The UK has not invested effectively in collecting population data for vision and hearing loss,” says Sir Michael Rawlins, professor and chair of the Executive Board of the UKNEHS, in a press release.

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How climate change affects allergies

Quality, quantity of allergens are shifting worldwide, so geographic and family history are key

Summer is certainly here. How do I know? My allergies have been on high alert since February, which has made regular life rather challenging for this good doctor.

My interest in seasonal allergies stems from my childhood. I was bedridden as a youth for many days with household remedies such as ice-cold compresses and a worn-out body giving in to slumber out of sheer necessity. It was a different time as compared to today.

Childhood allergies

Pharmaceuticals targeted at this segment—in the mid- to late 1980s—were in many cases missed opportunities with the likes of Seldane (terfenadine, Sanofi-Aventis) and Hismanal (astemizole, Janssen Pharmaceuticals).

My pediatrician attempted to find me the next best thing that would come to market, making me a guinea pig of sorts.

Each of the aforementioned medications was voluntarily withdrawn due to ineffectiveness (I can fully attest) in addition to potentially causing fatal heart conditions—when in combination with macrolides or ketocanzole—such as ventricular arrhythmia, QT prolongation, or cardiac arrest, which I was lucky to avoid.14

Fast forward to 1993, relief came for me in the form of Claritin (loratadine, Schering-Plough). Looking back, this time period was a renaissance in allergy biochemistry.

Mistakes were clearly recognized in producing this compound, as well as the next generation of H1 antagonists including Allegra (fexofenadine, Sanofi-Aventis), Zyrtec (cetirizine, McNeil Consumer Healthcare), and Xyzal (levocetirizine, Chattem). Incidentally, for those using Allegra, the organic molecular structure was altered in those lessons learned back to the fexofenadine formula that is not a potassium calcium blocker via cytochrome p450 metabolism (which was the chief causative feature of Seldane’s cardiotoxicity as the prodrug terfenadine).3,7

Going fishing

Every day coming through the turnstiles at our various practice locations, I see patients who have relocated from around the United States and around the world, from the Caribbean, Peru, El Salvador, Ghana, India, Jordan, and many others that exhibit what I refer to as “fish-out-of-water allergy syndrome.”

One patient after another will state, in similar terms, how he did not have any problems in his home country but now has been finding himself with traditional allergy symptoms since arriving stateside.

A prime example is a 7-year-old female of Indian ancestry presenting as a second opinion after being seen on vacation in a local province back in her parents’ home country. She was prescribed a local generic version of bepotastine (Bepreve, Bausch + Lomb) with what appeared to be at the time an adverse event considering the marked periorbital erythema and conjunctival injection/papillary responses in both eyes.

What was learned throughout my continued journey with this patient over the past several months is that she morphed rapidly from a traditional case of seasonal allergic conjunctivitis (as was originally diagnosed by a physician brethren from India) to vernal keratoconjunctivitis.4,9

The patient began to illustrate significant giant papillary conjunctivitis (GPC) along with the hallmark Horner-Trantas dots without evidence of shield ulcers.

Her only saviors from the misery have been a combination of steroids (prednisolone acetate 1% [Pred Forte, Allergan]), cold compresses, Children’s Claritin, and Pazeo (olopatadine 0.7%, McNeil Consumer Healthcare). Interestingly, ketone-derived steroids have been more effective than Durezol (difluprednate 0.05%, Novartis), which is an ester base. I have not broached with her parents the subject of immunomodulation in reference to biologics such as tacrolimus (Prograf, Astellas Pharma) and cyclosporine due to her age and relative stability at this time.10

Although somewhat atypical for age and gender, the location is more likely than one would expect. Areas of high pollution and excessive surface temperatures like the Indian subcontinent tend to lend credence to the disease state without a clear path for atopic genetics elucidated in the literature.11

Here is the catch: In this case, the patient was born in the United States.

Pollen tsunami or vortex

Climate change is affecting humanity in a manner not seen before in our history. Eyes are watering. Noses are sneezing. Flowers are blooming at exhaustive and longer duration rates.12
Xiidra is the only lymphocyte function-associated antigen-1 (LFA-1) antagonist treatment for Dry Eye Disease\textsuperscript{1,2}

Indication
Xiidra\textsuperscript{®} (lifitegrast ophthalmic solution) 5\% is indicated for the treatment of signs and symptoms of dry eye disease (DED).

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

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

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

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

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

References:
1. Xiidra [Prescribing Information]. Lexington, MA: Shire US.  

For additional safety information, see accompanying Brief Summary of Safety Information on the adjacent page and Full Prescribing Information on Xiidra-ECP.com.
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Xiidra® (lifitegrast ophthalmic solution) 5% is indicated for the treatment of the signs and symptoms of dry eye disease (DED).

DOSE AND ADMINISTRATION
Instill one drop of Xiidra twice daily (approximately 12 hours apart) into each eye using a single-use container. Discard the single-use container immediately after using in each eye. Contact lenses should be removed prior to the administration of Xiidra and may be reinserted 15 minutes following administration.

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

ADVERSE REACTIONS
Clinical Trials Experience
Because clinical studies are conducted under widely varying conditions, adverse reaction rates observed in clinical studies of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice. In five clinical studies of dry eye disease conducted with lifitegrast ophthalmic solution, 1401 patients received at least 1 dose of lifitegrast (1287 of which received lifitegrast 5%). The majority of patients (84%) had <3 months of treatment exposure. 170 patients were exposed to lifitegrast for approximately 12 months. The majority of the treated patients were female (77%). The most common adverse reactions reported in 5-25% of patients were 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.

Postmarketing Experience
The following adverse reactions have been identified during postapproval use of Xiidra. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Rare cases of hypersensitivity, including anaphylactic reaction, bronchospasm, respiratory distress, pharyngeal edema, swollen tongue, and urticaria have been reported. Eye swelling and rash have been reported.

USE IN SPECIFIC POPULATIONS
Pregnancy
There are no available data on Xiidra use in pregnant women to inform any drug associated risks. Intravenous (IV) administration of lifitegrast to pregnant rats, from pre-mating through gestation day 17, did not produce teratogenicity at clinically relevant systemic exposures. Intravenous administration of lifitegrast to pregnant rabbits during organogenesis produced an increased incidence of omphalocele at the lowest dose tested, 3 mg/kg/day (400-fold the human plasma exposure at the recommended human ophthalmic dose [RHOD], based on the area under the curve [AUC] level). Since human systemic exposure to lifitegrast following ocular administration of Xiidra at the RHOD is low, the applicability of animal findings to the risk of Xiidra use in humans during pregnancy is unclear.

Animal Data
Lifitegrast administered daily by intravenous (IV) injection to rats, from pre-mating through gestation day 17, caused an increase in mean preimplantation loss and an increased incidence of several minor skeletal anomalies at 30 mg/kg/day, representing 5,400-fold the human plasma exposure at the RHOD of Xiidra, based on AUC. No teratogenicity was observed in the rat at 10 mg/kg/day (460-fold the human plasma exposure at the RHOD, based on AUC). In the rabbit, an increased incidence of omphalocele was observed at the lowest dose tested, 3 mg/kg/day (400-fold the human plasma exposure at the RHOD, based on AUC), when administered by IV injection daily from gestation days 7 through 19. A fetal No Observed Adverse Effect Level (NOAEL) was not identified in the rabbit.

Lactation
There are no data on the presence of lifitegrast in human milk, the effects on the breastfed infant, or the effects on milk production. However, systemic exposure to lifitegrast from ocular administration is low. The developmental and health benefits of breastfeeding should be considered, along with the mother’s clinical need for Xiidra and any potential adverse effects on the breastfed child from Xiidra.

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

Geriatric Use
No overall differences in safety or effectiveness have been observed between elderly and younger adult patients.

NONCLINICAL TOXICOLOGY
Carcinogenesis, Mutagenesis, Impairment of Fertility
Carcinogenesis: Animal studies have not been conducted to determine the carcinogenic potential of lifitegrast.

Mutagenesis: Lifitegrast was not mutagenic in the in vitro Ames assay. Lifitegrast was not clastogenic in the in vivo mouse micronucleus assay. In an in vitro chromosomal aberration assay using mammalian cells (Chinese hamster ovary cells), lifitegrast was positive at the highest concentration tested, without metabolic activation.

Impairment of fertility: Lifitegrast administered at intravenous (IV) doses of up to 30 mg/kg/day (5400-fold the human plasma exposure at the recommended human ophthalmic dose [RHOD] of lifitegrast ophthalmic solution, 5%) had no effect on fertility and reproductive performance in male and female treated rats.
Climate change
Continued from page 10

In a recent 20-year retrospective study looking at global indices of pollen loading and density in the northern hemisphere, it was found that temperature increase has a definitive link to aeroallergenicity. This might not be that shocking from a logic standpoint; however, the trend facilitates a butterfly effect across the globe in reference to another indicator: carbon dioxide.

And it is not just quantity—it is quantity, too. Carbon dioxide concentrations have remodeled the molecular signaling observed in allergic peptides on pollen. As these peptides grow in density on the granules, the potency conveyed could potentially elevate the severity of the immune system’s response.

Carbon dioxide concentrations have remodeled the molecular signaling observed in allergic peptides on pollen

As higher emissions in the atmosphere have escalated from the preindustrial age to modern times, plants such as ragweed suck up this compound at massive rates, thereby increasing the season and pollen spewed out in the various allergy wind columns. And it is not just quality—it is quantity, too. Carbon dioxide concentrations have remodeled the molecular signaling observed in allergic peptides on pollen. As these peptides grow in density on the granules, the potency conveyed could potentially elevate the severity of the immune system’s response.

Keep tissues close, drops closer

Through the clouds of spiraling pollen, there are a few important pearls. Top of the list is asking historical questions surrounding geography and past family history. Another is to become more aggressive in coupling steroid therapy with mast cell stabilizer/antihistamines. Finally, get to know a local allergist. “Pollen fever” is here to stay, so stay ahead of the curve.

REFERENCES
Research initiatives offer treatment options for diabetes patients

Advancements of three clinical trials have made significant impact in eye care

The Diabetic Retinopathy Clinical Research Network (DRCR.net) supports the identification, design, and implementation of multicenter clinical research initiatives focused on diabetes-induced retinal disorders.1

Principal emphasis has been placed on clinical trials, with additional support of epidemiologic outcomes and other related studies.

DRCR.net currently includes more than 115 participating sites with over 400 physicians throughout the U.S., has initiated more than 25 studies, enrolled over 9,000 study participants, and has been responsible for some of the most important, care-changing clinical trials related to diabetic retinopathy (DR) and diabetic macular edema (DME) performed over the past 15 years.

DRCR.net was founded in September 2002 through a cooperative agreement with the U.S. National Institutes of Health to pool clinical research data from disparate retinal specialty practices with the goal of determining clinically meaningful and statistically significant treatment options for both DR and DME in the most expeditious fashion.1

The most important clinical trials by DRCR.net include Protocols S, T, and I. These have significantly changed the way proliferative diabetic retinopathy (PDR) and DME are managed.

Protocol S

Protocol S showed that intravitreal injection of the vascular endothelial growth factor (VEGF) inhibitor, ranibizumab (Lucentis, Genentech) is non-inferior to panretinal photocoagulation (PRP) for prevention of severe vision loss and regression of neovascularization in patients with PDR.

Predictably, subjects receiving anti-VEGF therapy maintained significantly better visual field and night-vision than those receiving PRP.2

Patients receiving injections were also significantly less likely to develop severe, center-involved DME (CI-DME) and more likely to experience resolution of any pre-existing DME.

Although anti-VEGF therapy for PDR is not a one-off treatment—and requires patient adherence with careful follow-up and repeat injections—Protocol S has established injections as a potential alternative to PRP, as well as a definitive complementary strategy that allows for fewer laser burns and better visual function.2

Protocol T

Protocol T compared the relative efficacy of the three available anti-VEGF drugs for patients with CI-DME.3

At two years, ranibizumab, aflibercept (Eylea, Regeneron), and bevacizumab (Avastin, Genentech) were each shown to be highly effective for reducing retinal thickening and improving visual acuity.

Aflibercept proved to be slightly superior to bevacizumab in patients with 20/50 or worse baseline vision (about five additional Early Treatment Diabetic Retinopathy Study [ETDRS] letters—roughly one additional line of improved visual acuity).

Interestingly, one-year data from Protocol T showed significantly better vision with aflibercept compared to both other agents when evaluating subjects who entered the study with vision of 20/50 or worse.

This has potential real-world significance for monocular patients, amblyopic patients, or those who present with difficulty driving or performing work activities due to CI-DME.

It also is notable that post-hoc analysis shows persistent DME was less likely with aflibercept than bevacizumab after two years of follow-up.4

Although ODs are not likely going to determine which specific anti-VEGF agents ophthalmologists use, they should remind retina specialists that aflibercept may be the best choice for restoring visual function more expediently in patients with worse vision, especially when compared to bevacizumab.

Nonetheless, Protocol T has established off-label use of bevacizumab as the most reasonable and economical first-line agent for patients with CI-DME.

Protocol I

Protocol I studied the use of intravitreal ranibizumab with prompt or deferred focal/grid laser treatment over the course of two years versus only focal/grid laser therapy for the treatment of CI-DME. This demonstrated the superiority of anti-VEGF therapy and showed that most patients required fewer injections over time compared to patients with wet age-related macular degeneration (AMD).5

Post-hoc analysis of Protocol I (the so-called “early analysis”) also revealed that visual acuity gains after the first three injections were predictive of final visual acuity improvement up to three years later.

From a practical standpoint, this means that poor responders might be augmented with or switched to alternative therapies sooner, whether intravitreal steroids, laser, or a different anti-VEGF agent.

However, a suboptimal response at 12 weeks did not preclude meaningful vision improvement in Protocol T (≥ 10-letter gain) in many eyes at two years, with 25 to 32 percent achieving mean visual acuity of 20/25 to 20/32 after two years of ongoing therapy, often with the same drug.6

Protocol V

Results of Protocol V became available May 2019.7 They will have significant impact on the way DME is managed when patients have good visual acuity prior to treatment.

This study assessed the best course of action for patients with CI-DME and good visual acuity at baseline (20/25 or better), a not-infrequent scenario. The trial followed 702 eyes randomized to observation, extra-foveal focal/grid laser, or aflibercept injections over two years. Patients who developed vision loss (at least a five-letter reduction) in the first two groups were switched...
over to aflibercept treatment as needed.

The study showed no significant difference between the three groups at two years, with 16 percent, 17 percent, and 19 percent of eyes developing a five-letter or more loss of visual acuity in the aflibercept, laser, and observation groups, respectively (p = 0.79 for all comparisons).

Aflibercept therapy was initiated in 25 percent of eyes randomized to laser and 34 percent of eyes randomized to observation.

This trial demonstrates that the majority of observed and treated eyes did not, in fact, experience significantly worse vision over two years, and that such patients may be safely monitored—initiated on anti-VEGF therapy only as needed—and maintain excellent visual acuity in most cases, saving money and reducing the patient burden of on-going treatment.

As the authors note:

“Each aflibercept injection has an average Medicare cost of $1,850, and all intravitreal injections carry a small risk of endophthalmitis (<0.1%). Thus, reducing anti-VEGF treatment in these eyes while maintaining good vision has clinical and economic advantages for patients and public health.”

The only secondary outcome in which treatment with anti-VEGF therapy was significantly better than observation was the percentage of eyes with 20/20 or better visual acuity at two years (77 percent versus 66 percent, p = 0.03). Interestingly, most enrolled subjects had reasonably good metabolic control throughout the study (mean HbA1c=7.6 percent), suggesting that good blood glucose control may be of utmost importance when CI-DME is present in the context of good vision.

Wrapping up

Another finding was that patients with central retinal thicknesses outside of the normal range (301 to 399 μm in 33 percent to 43 percent of all enrolled eyes) had and maintained good visual acuity irrespective of treatment arm.

Figure 1 shows an example of a patient with CI-DME and good visual acuity.

REFERENCES


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common diagnosis in children under age 5. Smartphone otoscopes have been found to be effective in high-resolution imaging of the TM, and the subsequent medical management of AOM.1,2

Research has also shown preference for smartphone otoscopes over the traditional otoscope by physicians, patients, and parents.3 With smartphone otoscopes, parents can share views with board-certified pediatricians and help to improve outcomes for their children.

**Smartphone imaging principles**

Although smartphones are not specifically designed for medical imaging, innovations in mobile applications and attachments are being developed to improve smartphone imaging capabilities.

- **Digital imaging and communications in medicine (DICOM) calibration** is critical in the future for storing and viewing quality medical imaging in electronic health records (EHR). Privacy concerns are better regulated with good quality imaging standards.
- **Proper calibration in different mobile devices—such as tablets—allows for optimal viewing of medical images important for accurate diagnoses.**
- The number of pixels is not always important for understanding medical images. Rather, the closer a smartphone is to an object being imaged, the smaller the pixels should be in order to maximize visualization of the object.2

**Smartphone use as a direct ophthalmoscope**

Portable fundus cameras have been around for decades, but the universal use of smartphones by ODs and patients has created a large market for portable, inexpensive attachments—enabling smartphone use as direct ophthalmoscopes. A smartphone’s autofocus capability accounts for a patient’s refractive error.

- **Polarizing filters and photo-absorbing walls** increase the contrast to improve visualization of the retinal structures.
- **Newer smartphones** allow for high-resolution direct ophthalmoscopy with an unmodified smartphone. *JAMA Network* has a series of videos demonstrating the technique to take direct ophthalmoscope selfies with an unmodified iPhone X.7

**Smartphone use for glaucoma imaging**

Fundus photography of the optic nerve can be used to screen patients for potential disease and to use subsequent images to monitor for progression.6

- **With optic nerve photography, an OD can identify swollen nerves, disc pallor, optic pits, and rim/ cupping asymmetry—all of which are all essential in the proper diagnosis and management of a patient.**
- **There is no doubt about the importance of optic nerve imaging in glaucoma.** The Ocular Hypertension Treatment Study (OHTS) noted that stereoscopic optic nerve photos were essential in picking up disc hemorrhages and that disc hemorrhages were a significant risk factor for the development of glaucoma.8
- **The presence of disc hemorrhages in ocular hypertensives increased glaucoma risk by six times, yet detection of them on fundus examination often falls short. In the OHTS, only 16 percent of disc hemorrhages were identified via funduscopy alone.9**

6x increased glaucoma risk with the presence of disc hemorrhages in ocular hypertensives

16% of disc hemorrhages were identified via funduscopy alone

The European Optic Disc Assessment Trial (EODAT) found that the identification of glaucoma via fundus photographs showed a high sensitivity for identifying diseases (80 percent), and that for expert observers, the difference between monoscopic and stereoscopic photography was minimal.10

**Smartphone imaging in practice**

It is not uncommon for people to have their smartphones tally the number of steps they take or measure their heart rates. It seems likely that in the near future ODs will be using data collected by patients via integrated EHR systems where patients can upload data to their own medical records.

- **Optic nerve selfies for glaucoma detection and monitoring** are not different. As mobile phone cameras and apps improve, so will ODs’ ability to obtain better quality images, including possible red-free and stereoscopic images from smartphones.
- **By having patients take optic nerve selfies periodically, ODs can better monitor our glaucoma suspects or glaucoma patients who are progressing by imaging their optic nerves three to four times more per year than traditional approaches. This may allow ODs to pick up on subtle changes or hemorrhages that may indicate disease progression.11**

**Future smartphone uses**

As innovative technologies in the modern practice of clinical optometry become more convenient, retinal selfies may become powerful tools as patients advocate to more directly participate in their own optometric care.

The longitudinal review of high-quality medical images of the optic nerve and retina—both by patients themselves (selfies) and professionals in eyecare practices—offers new frontiers in the 21st century optometric practice. As mentioned, attention to privacy concerns and the appropriate use of these technologies (artificial intelligence [AI],12 and smartphone optic nerve and retinal imaging) are essential to improving patient outcomes and creating a more interactive approach to primary eye care.

**REFERENCES**


Dr. Wong is a Diplomate of the American Board of Optometry and a member of the AGA Ethics committee and ASCO Ethics SIG. He is a past president of the Maryland Optometric Association, and an appointee to the American Medical Association’s Physician’s Consortium for Performance Improvement-PCPI’s Technical Advisory Panel for Eye Care Metrics. He lectures on the topics of medical ethics, technology and innovations in eye care, ocular disease, mobile health apps, and contact lenses. [taw@georgetown.edu](mailto:taw@georgetown.edu)
Measurements matter in cataract surgery, the new refractive procedure

Precise pre-op and surgical techniques can lead to successful outcomes for patients

Prior to laser vision correction, ODs carefully examine the cornea. They evaluate the tear film, meibomian glands, curvature of both the front and back of the cornea; and measure overall corneal thickness.

Now that cataract surgery is recognized as a refractive surgery, the same evaluation is necessary for cataract patients.

New classification
At the start of my career, cataract surgery was not a refractive procedure; it was just becoming a safe medical procedure.

Today, cataract surgery benefits from precise measurements of the length of the eye and curvature of the cornea, and precise placement of the intraocular lens (IOL) to achieve a desired refractive outcome. The removal of visually disruptive cloudy lens seems almost secondary.

Once a visually significant cataract has been identified in a motivated patient, the task of setting expectations begins. All clinical facts need to be gathered before the discussion of premium lens can start.

Findings as benign as posterior vitreous floaters can create visual disturbances that may impact the success of multifocal IOLs and should be pointed out to patients prior to surgery. Additionally, pupil motility and iris defects can signal pseudoexfoliation (PXF), which is important to know prior to surgery.

The cataract patient should undergo a similar work-up of the ocular surface and its supporting structures as a contact lens patient or a laser vision correction patient. The significant difference is that positive findings do not prevent the procedure—they simply guide the IOL selection and temper expectations.

Initial examination
Begin by evaluating structure before moving on to function.

I first image the meibomian glands using meibography. Showing patients meibography images and the absence of glands gets their attention to the importance of maintaining a healthy ocular surface.

Next, I evaluate the lid margin documenting erosion, telangiectatic vessels, and capped meibomian glands. By pressing on the meibomian glands, evaluate the quality of the meibum from absent, inspissated, or cloudy to an olive oil consistency.

Noting how many glands produce meibum determines the productivity of those glands. There are treatments such as iLux (Alcon), LipiFlow (Johnson & Johnson Vision), and intense pulsed light (IPL), along with supportive therapy of hot compresses and omega-3 supplements.

Fluorescein and lissamine green dyes provide information on both the structure and function of the tear film. Evaluate both cornea and conjunctival staining along with measuring tear break-up time (TBUT). An unstable tear film not only affects the quality of vision after the surgery but also the accuracy of the measurements that determine IOL power.

Study outcomes
In the Prospective Health Assessment of Cataract Patients’ Ocular Surface (PHACO) study, more than 50 percent of patients who were evaluated for cataract surgery had a TBUT of <5 seconds, and 75 percent had corneal staining.1

Hyperosmolar patients also had a greater variability in their keratometric measurements and a subsequent IOL power calculation of greater than 0.50 D difference.2 Therefore, the refractive “surprise” may be the simple result of a poor corneal surface.

As indicated, the corneal curvature plays a crucial role in the refractive power of the eye and determining IOL power. In fact, corneal astigmatism determines the power for a toric IOL. The corneal astigmatism is often similar to the refractive astigmatism—but not always.

In my experience, refractive spheres can have a significant amount of corneal astigmatism and—if not identified and addressed—can lead to postoperative refractive astigmatism. The optical quality of the cornea affects postoperative results. Therefore, corneal scars, epithelial basement dystrophy, and other corneal dystrophies need to be identified and have their potential impact on a patient’s vision discussed prior to surgery.

Additionally, keratoectasia can have a significant impact on the quality of vision after surgery. Pre-operative tomography can reveal forme fruste keratoconus (FFKC) and eyes that are not suited for corneal surgery to “fine tune” a final refractive outcome. Those patients with even subtle corneal irregularities can experience poor postoperative quality of vision and less satisfaction, especially if they have a multifocal implant.3

In a study of 19 patients with mild keratoconus, refractive astigmatism was significantly reduced with the implantation of a toric IOL and the spherical equivalent was within ±0.50 D in 68 percent of the eyes.

Of note, the corneal astigmatism and total higher-order aberrations (HOA) were not significantly different.4 Therefore, a rigid contact lens fitting postoperatively may still be complex.

Conclusion
Today’s technology has transformed cataract surgery into a refractive surgery. The precise measurements and surgical techniques allow a skilled surgeon to provide successful refractive outcomes.

Nevertheless, there are limitations that need to be identified and discussed prior to surgery. When properly evaluated, IOLs can provide patients with a quality of vision they have not experienced before, often without the aid of glasses or contact lenses. Those successful patients require evaluation and consultation from their referring doctors.

REFERENCES

50% of patients evaluated for cataract surgery had a TBUT <5 seconds

Br. Owen has served as the president of the Optometric Cornea, Cataract and Refractive Society (OOCRS) and sits on its board of directors. He participates in clinical research and lectures on laser vision correction, cataract surgery, dry eye, and contact lenses.
OD research at ARVO 2019

Optometrists represent at prestigious annual international scientific meeting

By Stuart Richer, OD, PhD

It is difficult to take it all in, let alone summarize the information gained by attending an Association of Research in Vision and Ophthalmology (ARVO) annual scientific meeting.

I think every OD should attend at least one ARVO meeting in their careers, and the earlier the better. This year’s meeting in Vancouver saw a record-setting 11,000 attendees from more than 75 countries.

A brief review of topic themes of papers, posters, and presentations is listed below.

Spaceflight neuro-ocular syndrome

Spaceflight-associated neuro-ocular syndrome (SANS) syndrome affects about 40 percent of astronauts on long-duration spaceflights as assessed by one or more findings:

- Optic disc edema
- Hyperopic shifts
- Globe flattening
- Cotton-wool spots
- Choroidal folds

Quantitative ocular coherence tomography (OCT)-based metrics of optic nerve head morphology during long-duration spaceflight suggest that intracranial pressure (ICP) during spaceflight is not pathologically elevated. Yet optic nerve head changes, consistent with edema, developed in over half of their cohort of n=150 astronauts. The headward fluid shift associated with weightlessness induces optic disc edema independent of pathologically elevated ICP.1

Researchers from Kentucky Colleges of Optometry and Osteopathic Medicine explain why astronauts develop pathologies more often in their right eyes after returning from long-duration spaceflights.

They propose that a contributing factor is greater intraocular pressure (IOP) OD versus OS when astronauts are in a nonstandard body position, as expected in an environment with low gravity.

IOP increased OD relative to OS during head down tilt with a 19 percent increase at a 45° head tilt, while no differences were seen in the supine position.

Researchers attribute this to anatomic variations in internal jugular vein distension and drainage, contributing to both the increased IOP and optic disc edema.2

Detect TBI using virtual reality

Back on earth, traumatic brain injury (TBI) is a real and present danger for motorists and pedestrians as well as civilians of all ages engaged in sports and soldiers.

Patients with TBI, even mild TBI, often show impaired stereopsis not appreciated during a conventional eye exam. Measuring stereopsis in different positions of the visual field with virtual reality glasses seems to be an effective new tool for fast concussion assessment.

Looking through computer-tethered virtual reality glasses, German scientists displayed four balls with differing stereo offset presented in nine different positions of the visual field. The task was to evaluate third-degree fusion (stereopsis) in all gaze positions by selecting the closer ball using a gaming controller.3

This technology is being used to train athletes. Ocular healthy athletes improved their stereo vision over six weeks in disparity threshold, reaction time, gain, and percentage of correct answers.4

3-D head-mounted displays provide potential for improving visual functions such as contrast sensitivity, visual crowding, and visual attention.

Scientists at UC Berkeley School of Optometry and Baylor College of Medicine Department of Neuroscience further explored the potential of 3-D video games to improve stereopsis. Playing these games for short periods of time improves depth perception by 33.5 percent in healthy young adults.

Notably, their most recent experiments have shown these types of video games to have a special benefit for triggering the plasticity of stereo vision in patients with ambiopia.5

Tear test for Alzheimer’s disease

Tear biomarkers have been identified for several ocular diseases as well as neurological diseases such as Parkinson’s disease, and multiple sclerosis.

A group from the University Eye Clinic and Departments of Psychiatry & Neurosurgery at Maastricht University Medical Center, Netherlands, evaluated the tear biomarker level of total-tau and amyloid-beta 42 (Aβ42) in 25 patients with AD, mild cognitive impairment, or subjective cognitive impairment and n=9 age-matching healthy controls.

Although the sample size is small, their results suggest tear total-tau and Aβ42 have reasonable discriminatory power for the AD state with potential for utility as a clinical diagnostic marker.6

Driving and fall risk

At ARVO 2019, several presentations focused on driving and fall risk. These two topics are of clinical importance to optometrists adapting to examining an increasingly aged population.

Driving is a complex task involving cognitive, motor, and vision measures such as novel tests of central motion sensitivity and contrast sensitivity (CSF) that are significantly associated with driving performance among older adults with and without visual impairment.

However, standard worldwide vision licensing tests are not predictive of driving performance.

Australian researchers, including Joanne M. Wood, BSc, PhD, from the Queensland School of Optometry, are moving toward identifying unsafe older drivers using a comprehensive performance model, important in those with visual impairment.7

Is there a biomarker for predicting night vision difficulties during an eye examination? Our group at the James A. Lovell Federal Health Care Cen-
ter found self-assessed global low luminance performance correlates with macular pigment optical density even in patients without retinal disease. Researchers from Australia have given much thought to another concern of elderly beyond driving: fear of falling. This concern potentially contributes to activity restriction, physical deconditioning, psychological distress, and reduced quality of life. Not surprisingly, higher levels of anxiety about falling are commonly found among older patients with age-related macular degeneration (AMD) and associated with their central vision loss. Yearly declines in CSF were linked to increased levels of their concern about falling. The researchers’ findings highlight the need for monitoring “fall risk concern” among older people with AMD, particularly those with progressive vision loss. Regular assessment of CSF could assist in identifying those at greatest risk of fall risk concern.

**Validation of home CSF test**

Another poster confirmed the utility of a new simple home (or office) CSF test known as the CamBlobs. Researchers from the School of Optometry at the University of Montréal demonstrated that CSF measured with the CamBlobs chart agrees with the validated Mars chart in a group of multiple sclerosis patients with optic neuritis. CamBlobs can be self-administered by patients at home as a self-monitoring tool. 11.  Fluorescence imaging ophthalmoscopy

The retina contains components (fluorophores) which glow back after illumination with light. Researchers from Bern, Switzerland, as well as at the University of Utah/Moran Eye Center presented several posters on this new imaging modality. Fluorescence lifetime imaging ophthalmoscopy (FLIO) images show how long fluorophores glow (fluorescence lifetimes), providing vital information about the metabolism and health of the retina. The Ber group analyzed 141 healthy eyes of subjects with a broad age range (21 to 91 years) to construct a normative data base. The Moran Eye Center group is likewise evaluating patients with various disease states. Longer fluorescence lifetimes measured in older subjects indicate a change in composition of the retina over time. As with autofluorescence imaging, human lens status must be considered when analyzing FLIO. 12.  Artificial intelligence

There were no less than 23 special topic presentations concerning artificial intelligence (AI), both novel applications and refinements (such as diabetic retinopathy). Myriad and growing potential applications are nothing short of breathtaking. See the specific AI topics:

- LASIK and PRK 13
- Collaborative management of cataracts 14
- Predicting chronic kidney disease (CKD) from retinal images 15
- Visual screening with smartphones 16
- Enhancing clinical trials 17
- Glaucoma diagnosis 18
- Distinguishing cavernous hemangioma and neurilemmoma 19
- Infectious keratitis with slit-lamp images 20
- Diabetic retinopathy using SDCT and SDOCT 21

- Automatic detection of diabetic retinopathy 22
- Predicting myopic macular degeneration 23
- Classification of subclinical keratoconus using Scheimpflug and SD OCT 24
- Immune related factors of intraocular disease 25
- Fully automated feature-based segmentation of diabetic retinopathy 26
- SD OCT and novel deep learning algorithms in Singapore 27
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**REFERENCES**


Subjective and objective findings help ODs decide how to help pediatric patients

By Angela Howell, OD, FCOVD, FAAP

Accidents are bound to happen in all populations, especially with active children. Active listening, case history, and clinical findings differentiate between accident and abuse. Analyzing subjective and objective findings will allow the OD to make the decision if an accident or abuse occurred.

Case reports of ocular trauma from accidents and abuse are presented with subjective and objective findings and clues that help the practitioner discern one from another.

By the numbers

Children youth, and teens experience high levels of victimization. Crimes against young people can range from abuse and neglect to assaultive violence and homicide. There were 686,000 child maltreatment victims or 9.2 percent of all child maltreatment victims or 9.2 per 1,000 children in 2012.1

In 2012, 44 percent of all child maltreatment victims or 9.2 per 1,000 children were victims of neglect to assaultive violence and homicide. There were 686,000 child maltreatment victims or 9.2 per 1,000 children, respectively.1

An estimated 1,593 children died as a result of maltreatment in 2012. Forty-four percent of these children were under a year old. Eighty percent of child fatalities were caused by the child’s parents. Twenty-seven percent of fatalities were caused by the mother alone, 8.6 percent of all homicide victims were children and youth under the age of 18—of that number 52.8 percent were aged 17 to 19 years.1

The big picture

When patients and parents of pediatric patients complete intake forms and speak with staff, pieces of patients’ stories may not add up.

In addition, when ODs’ subjective and objective findings may not be congruent. The ocular tissues can tell a story of motion and injury that may not be supported by the story that was told. Some conditions, like concussion, may not have clear objective findings and will need further diagnosis.

As mid-level health care providers, ODs are obligated to report suspected abuse or neglect. Abuse could be physical, verbal, or neglect of needs. ODs will see bruises to eye and adnexa during patient care. History and observations must support clinical decisions. A robust-looking child wearing a dirty baseball uniform with a black eye who says he was hit with a baseball presents differently than a skinny kid who says he fell into a doorknob.

Other signs of physical abuse include bruises of different ages. Naturally occurring bruises are on the knees, elbows, and bony extremities. Questionable bruises may show up as small finger-size marks from squeezing too tightly or larger marks from blows from a hand, fist, or foot from being kicked.

Bruises to orbital rim, eyelids, and adnexa, and subconjunctival hemorrhage may show after a choking episode. Note that these conditions could show up in a healthy child after a bout of coughing or vomiting.

Retinal hemorrhages are a key finding in shaken baby syndrome.2 There are non-abusive findings for a retinal hemorrhage in a child. Leukemia, sickle-cell disease, and diabetic retinopathy would be differential diagnoses.3

Observe the cleanliness of child, as well as her face, clothing, hands, and fingernails. Look at weight and overall appearance—the child should look well-nourished and healthy.

Beware of stories that do not add up. A child may say, “I fell and hit my eye.” When asked or even prompted, the child may later say something different.

Abused children may not answer truthfully when someone else, especially the abuser, is in the room. If an OD has suspicions about the origin of physical findings, attempt to speak with the child out of earshot of others.

Ocular signs of child sexual abuse include:

- Pubic lice on the eyelashes and adnexa
- Presentation with sexually transmitted diseases like chlamydia or gonorrhea
- Streff’s syndrome

Red flags for abuse that may present in the exam room include:

- Excessive crying
- Doing poorly in school
- Fear of certain people, things, or activities
- Anger and/or aggression

Consider that abuse for girls often takes place prior to puberty because the offender does not want to risk pregnancy. The patient’s case history may lead the OD to report for investigation.

What ODs can do

If an OD suspects that a child is being harmed, report concerns to the appropriate authorities—local child protective services (CPS) or the police department.

The role of the physician includes preventing child abuse and detecting and treating victims of physical abuse when it occurs. The physician’s ability to recognize suspicious injuries, conduct a thorough physical examination, and evaluate the validity of the caregivers’ explanations for injuries is important in detecting child abuse.

The American Academy of Pediatrics (AAP) recommends that physicians ensure that a patient who is a victim of child physical abuse receives proper medical assessment, stabilization, and referrals.

1. B

8.5 percent psychological maltreatment
2.3 percent medical neglect
Neglect (29.7 percent and physical abuse (24.6 percent have the highest percentage of children aged two years and younger. Teens age 12 to 14 have the highest risk of sexual abuse (26.3 percent).1

Girls and boys are victims of abuse at a rate of 9.5 per 1,000 children and 8.7 per 1,000 children, respectively.1

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to investigative agencies and necessary follow-up services, which include patient and family referrals to appropriate psychological professionals. Brief cases below outline potential abuse cases and how they were handled.

Case 1
A 5-year-old male presents with left exotropia. His visual acuity is OD 20/20, OS NLP. The patient has a history of his biological father punching him in the left eye. Plus, the child was hospitalized from the beating and accompanying head injury.

The patient experienced traumatic cataract and complete retinal detachment of the left eye resulting from this beating. The father was convicted of child abuse, and the child was removed to protective services.

Case 2
A 10-year-old boy presents to clinic with painful left eye. His visual acuity OD 20/20, OS 20/80. His left eye showed a 5 mm corneal abrasion and anterior chamber 2 percent hyphema. His history indicated being shot with a Nerf gun at close range by a playmate.

He was managed with homatropine 5% and Maxitrol (neomycin, polymyxin B, dexamethasone; Novartis). Bed rest was advised because hyphema is at risk for re-bleed within the first week.

Considering accident versus abuse or neglect, it is unclear if lack of eye protection would constitute neglect.

Case 3
An 11-year-old girl from Nigeria presents with her father for routine exam. Father calls her stupid and berates her. Doctor wants to dilate her, and child cries and refuses. Father forgets to report.

Is that enough to call the police and take the child away? It is not, unless the parent was convicted of child abuse and subsequently gave birth to his sister while in prison. Both children are in the custody of their maternal grandmother who is raising them as a single parent.

The patient’s visual acuity is 20/20 OD, OS, and OU. His refractive error OU is low plus. Binocular findings show reduced near point of convergence, poor fixation on pursuits, and undershot all meridians with head and body movement on saccades.

Glasses for hyperopia and accommodative concerns were prescribed. Vision therapy for tracking and convergence challenges was initiated.

Conclusion
ODs should follow their guts. If you or an OD thinks something is not right with a child or family, be cautious.

Develop relationships with local-school personnel; there may be other reasons to get a principal or school counselor to involve authorities. An OD’s observations and input may be another piece of the puzzle.

Also develop relationships with police and child abuse investigators. Be sure to respect the doctor-patient relationship while addressing concerns.

Child abuse and neglect are prevalent. Ocular signs and symptoms may be managed and reported appropriately. As primary-care providers, ODs may be more accessible and available to help with keeping children safe.

REFERENCES
How to treat dry eye in the pediatric and young adult population

Continued from page 1

As an optometrist, I approach nutrition from a reinforcing perspective. I keep the discussion simple and conversational by asking my patients if they think they have a perfect diet (this usually gets a laugh from parents). I then explain that nobody can have a perfect diet, and that some of the nutrients we need are not consumed in the typical diet, such as plant-based black currant seed oil. However, we can provide our body with needed nutrients that will potentially manage the symptoms and prevent irreversible damage with high-quality supplements, such as HydroEye (ScienceBased Health) which has demonstrated efficacy in improving dry eye symptoms, EyePromise EZ Tears (ZeaVision), Bio Tears (BioSyntrx), and others.  

While it is easy to say that adults should monitor and limit screen time for children (there’s an app for that!), ODs must also accept that screens are a necessary part of the world they live in. Realistically, ODs are unlikely to convince their patients to significantly reduce their use of screens; however, educating them on the possible effects of screen time, such as reduced or incomplete blinking, is a great place to start.  

I like to teach the 20-20-20 rule: Every 20 minutes, screen users should look up for 20 seconds and focus on an object at least 20 feet away. In addition, we can remind patients to make a conscious effort to blink completely and simply open and close their eyes throughout the day.

**Treating young patients**

The multifactorial nature of dry eye requires consideration of inflammatory and obstructive components, the impact of blepharitis, and the patients’ biofilm.

Foundational treatment begins with good lid hygiene, and young children can benefit from learning and establishing proper hygiene routines with gentle products. Any patient presenting with blepharitis should establish a regimen with a product such as HypoChlor hypochlorous lid wapes (OCuSOFT) and perhaps warm compresses such as a Bruder mask.

Additionally, I often prescribe the use of artificial tears, such as Refresh Relieva (Allergan). Drop instillation tends to provoke a visceral response in patients of every age, and especially young patients. Therefore, it is very important to avoid creating a negative experience for both parents and child because parent don’t want to wrestle their children at every dosing. A positive association means compliance is far more likely.

I recommend pediatric patients lay down flat, get comfortable, and close their eyes like they are sleeping. With the eyes closed, drop the medication right at the lateral canthus, then ask patients to open the eyes to allow the tear to roll in. This is a nontreating process, and children usually feel immediate soothing effects and develop a positive association with drop instillation.

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**Expert opinion**

OD, was founder of DryEyeCoach.com and director of clinic affairs for TotalECP.

**How to treat dry eye in the pediatric and young adult population**

**Diagnostic testing**

Regardless of the patients’ age, looking for dry eye signs from a clinical perspective appears much the same from behind the microscope.

In my experience, children and teens are generally tolerant of quick and painless testing, such as osmolarity or meibography, so go ahead and run these tests.

**The screen factor**

Everyone has heard that environment is to blame for virtually everything, and dry eye is likely just one more negative environmental manifestation—specifically the exponential increase of screen time for Americans of every age.

Starting in infancy, children gravitate to the glowing screen in their parents’ hands; school-aged children are required to study and complete assignments online; and adults shop, socialize, and work using their beloved screens. Add in entertainment, and the hours people spend in front of a screen are staggering.

It is not a surprise that current research suggests that screen time may play a significant role in dry eye.1  

While it is easy to say that adults should monitor and limit screen time for children (there’s an app for that!), ODs must also accept that screens are a necessary part of the world they live in. Realistically, ODs are unlikely to convince their patients to significantly reduce their use of screens; however, educating them on the possible effects of screen time, such as reduced or incomplete blinking, is a great place to start.

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Supplemental omega fatty acids have been shown to...
to reduce inflammation and improve the overall quality of tears. There is a growing body of evidence that shows that the omega-6 gamma-linolenic acid (GLA) is highly effective for treating patients with dry eye. When combined with omega-3 fatty acids, such as eicosapentaenoic acid (EPA), they decrease pro-inflammatory arachidonic acid and prostaglandin E2. A randomized, placebo-controlled study shows that nutritional supplements containing EPA and GLA reduce inflammatory biomarkers, improve corneal surface smoothness, and improves symptoms of dry eye.

Although swallowing a pill may be difficult for very young patients, it is quite feasible for children in their tw eens and teens. In addition, I have found that the young adult population is generally open to and even seeking natural methods for treating pathology.

By the time children are able to swallow a supplement, they have usually reached the size of a small adult, so I keep the dosing as recommended by the manufacturer. While not all patients immediately jump on board with nutraceuticals, at least they are made aware that there is a nutrition-based approach to treating dry eye if they wish to pursue it in the future.

**Pearls and recommendations**

Dry eye is a chronic and progressive disease that can eventually cause corneal damage, discomfort, and visual impairment. Ask questions and review personal and familial history for known dry eye triggers. Always look for dry eye in patients of all ages, even if you are not expecting it to be present. The sooner ODs can identify and treat the disease, the better for young patients.

Do not be averse to treating pediatric patients and allow them to take ownership of their health. Talk directly to them with the parent overhearing the conversation versus working around the child and going straight to the parent. Explain and show children how to wash around their eyes, apply lid solutions, and to be mindful to close their eyes while washing their faces. Set up pediatric patients (and their parents) to have a positive treatment experience, and consequently better compliance, by using proper drop instillation techniques and gentle products.

Be willing to accept rejection. Sometimes as eyecare providers, ODs are concerned that their patients will not agree to do what they recommend, but ODs still need to have these conversations and provide families with education about the disease. Eventually, they may circle back around and return for treatment.

**A “no” to treatment does not mean “never.”**

**REFERENCES**


Dr. Hauser is the founder and senior consultant for Signal Ophthalmic Consulting and founder and CEO of DryEyeCoach.com. She serves as an advisory board member for TearLab and Paragon Biotick. She consults or speaks for Johnson & Johnson Vision, Shire, Lumenis, Allergan, Alcon, Bruder Medical, Biotissue, Sight Sciences, EyeVance, Kala, Sun Pharma, Blistex, ScienceBased Health, Oculus, and Bausch + Lomb. In her free time she likes to scout out espresso spots and hang out with her three kids.

**IN BRIEF**

**Glaukos and Avedro announce definitive acquisition agreement**

SAN CLEMENTE, CALIF—Glaukos Corporation and Avedro, Inc. announced that the companies have entered into a definitive merger agreement under which Glaukos will acquire Avedro in an all-stock transaction.

The transaction—subject to Avedro stockholder approval and other customary closing conditions and regulatory approvals—has been approved by the board of directors of both companies. It is expected to be completed in the fourth quarter of this year.

The acquisition will help establish Glaukos’ new corneal health franchise as well as expand its research and development capabilities. “Avedro has in place many of the same strategic attributes Glaukos used to pioneer MIGS, including proprietary paradigm-changing solutions, extensive clinical validation, broad reimbursement, and first-to-market status,” says Thomas Burns, Glaukos president and CEO. “Our combined organizations can possess the essential expertise, scale, and reach to maximize these opportunities, drive further commercialization of Avedro’s bio-activated pharma ceuticals, and establish another synergistic and durable Glaukos franchise to fuel potential near- and long-term growth and shareholder value.”

Once combined, the addition of Avedro’s 66-percent year-over-year revenue growth in the first half of 2019 is expected to generate revenue growth acceleration for Glaukos beginning in 2020, as well as potential revenue synergies beginning in 2021, according to the companies.

Under terms of the merger agreement, for each share of Avedro owned, Avedro shareholders will receive an exchange ratio equivalent of 0.365 shares of Glaukos stock. Upon closing, Glaukos shareholders are expected to own approximately 85 percent of the combined company, and Avedro shareholders are expected to own the remaining 15 percent.

**As my own awareness and understanding of the chronic nature of dry eye increased, my propensity to be more aggressive in treating it with the younger patient population grew as well**
Controversies in pediatric refractive development

Ponder how often and at what age to measure refractive error, as well as when or if to correct

By Timothy E. Hug, OD, FAAO

The development and treatment of refractive errors in children have been the subject of debate over many decades. Current theories on the emmetropization process, wherein the human visual system regulates the development of refractive error, point toward the first 18 months of life. Data indicates a trend toward low hyperopia by 12 to 18 months of life, regardless of the newborn’s refractive starting point.1 Stability in refractive error is evident between the ages of 2 to 5 years with a trend toward hyperopic regression.2 Beyond age 6, the progression of myopia has become a clinical concern.

Clinical controversies arise when discussing the management of pediatric refractive errors—the most basic is how often should refractive errors be measured/monitored and for which age groups. Also, when should correction for these refractive errors be prescribed, and what consequence does prescribing have on refractive error development? Finally, is not intervening an option for best acuity or best binocular development?

From a clinical management perspective, consider these controversies in the following three age groups: infant (0 to 18 months), toddler (2 to 5 years), and childhood (6 to 14 years). Consider normal refractive development in each age group and what to do when normal refractive development does not occur or when the visual system shows signs of distress with the refractive error it has.

Infant (Birth to 18 months)

For the infant eye, the process of emmetropization may be linked to the accommodative system. If, for example, the 3-month-old has a high hyperopic refractive error, the “extra” accommodative effort to maintain a clear retinal image may, through an accommodative signal, alter the axial length growth to compensate.

In a three-month-old with a myopic refractive error, the lack of accommodative effort may signal the eye to stop the axial elongation process, allowing the refractive error to reach low hyperopia by 18 months.

If this is the case, then clinically, the refractive error in this age group may be constantly changing and would need close monitoring, such as cycloplegic refractions at four- to six-month intervals, up until age 18 months.

Animal models have shown an induced refractive error (through wearing glasses designed to create blur) results in changes to the axial length, adapting to the new induced refractive error.2

Is the same true when prescribing glasses for human infants during the emmetropization process? Does prescribing glasses interrupt the emmetropization process?

Now consider signs of visual distress, such as strabismus or nystagmus, and the visual system’s abnormal emmetropization.

Perhaps the abnormal emmetropization is secondary to an abnormal visual system. Does the provider prioritize emmetropization or visual development?

Children born prematurely (<31 weeks, <1500 g) have a risk of developing retinopathy of prematurity (ROP), and, depending on the severity of the disease, may require treatment with laser photocoagulation. As a result of laser treatment and the abnormal formation of the premature eye, these patients often develop significant myopia in the first six to nine months of life, which may need correction for proper visual development. In contrast, early studies using avastin for ROP treatment do not show a myopic shift. However, these studies are targeting a specific (milder) stage of ROP.3

Is prescribing for the clinically significant myopia controversial? Is there a risk of interfering with the emmetropization process, or has the ROP and/or treatment disrupted this process already, leaving the visual system vulnerable to unchangeable refractive errors for which the clinician must intercede?

Clinical Examples Consider the nine-month-old, former premature infant with ROP, post laser treatment, with a refractive error of -6.50 D in each eye. Although the infant’s visual demand at this stage of life is mostly near, prescribing for this myopic refraction is needed to stimulate proper visual development and proper accommodative demand/response to near targets.

Consider the seven-month-old with moderate hyperopia (+7.50 D OU) manifesting an esotropia of 30 prism diopters. When the refractive error was corrected, the esotropia was controlled, indicating this esotropia was early onset accommodative esotropia.

In these two cases, the visual system demonstrated distress with its uncorrected refractive condition and responded positively when compensated.

Pediatric refractive error development can be thought of in three stages: infancy (birth to 18 months), toddler (2 to 5 years), and childhood (6 to 14 years). Controversies in the measuring, development, and prescribing for refractive errors can create confusion for the practicing clinician. This article will review these topics and with case examples offer the clinician models for intervention in their developing pediatric patients.

Take-home message Pediatric refractive error development can be thought of in three stages: infancy (birth to 18 months), toddler (2 to 5 years), and childhood (6 to 14 years). Controversies in the measuring, development, and prescribing for refractive errors can create confusion for the practicing clinician. This article will review these topics and with case examples offer the clinician models for intervention in their developing pediatric patients.

Does this compromise the emmetropization process? If so, is the preservation of vision and binocularity a fair trade for having to wear glasses for long term?

Infant Summary The emmetropization process appears to be an active process based on accommodative feedback which helps regulate and guide the infant visual system toward a refractive error of low hyperopia by age 18 months.

Atypical refractive errors need close monitoring through cycloplegic refractions. If the refractive error is creating distress that compromises visual or binocular development, then correction of the refractive error should be considered without worry to the emmetropization process outcome.

Toddler (2 to 5 years)

If the emmetropization process is successful, the toddler should have a refractive error of low hyperopia. The resultant (residual) refractive error may lead to visual compromise.

Consider the toddler with a refractive error of +5.00 D whose visual demand increases with age. Uncorrected hyperopia of this magnitude could lead to accommodative esotropia or bilateral amblyopia (if the visual system trades clarity in favor of low accommodative response). Evidence suggests moderate uncorrected hyperopia (> +3.50 D) can lead to difficulties learning in the classroom.4

Hyperopia in moderate to high amounts may lead to the development of accommodative esotropia. Hyperopia in patients with accommodative esotropia seems to regress less with some studies showing hyperopic regression of 0.10 D per year.5,7

Is this because of interference with emmetropization? Or is this a different model of the visual system that we do not fully understand?

If a toddler has developed anisometropia, consider prescribing because there is little evidence of this disrupting refractive error development. In fact, moderate amounts of anisometropia can lead to amblyopia in this age group and must be treated.

Myopia in this age group (>3.00 D) may represent a disruption in the emmetropization process but most likely does not represent incomplete
I met with a young professional patient the other day who, like so many others, was excited about the opportunity to wear contact lenses. I knew that a monthly replacement lens would be a great option for his vision and lifestyle needs, and also how important good lens care would be. Of course, we can all be… well, forgetful sometimes — which is why I introduced him to CLEAR CARE® PLUS for his daily lens cleaning and disinfection. CLEAR CARE® PLUS is highly effective against a wide range of organisms,1,2 supports outstanding lens comfort,3,4 and maybe most importantly, is easy to use.5 For patients new to contact lenses, this translates to safe and enjoyable lens wear from day one!

The reasons why I chose CLEAR CARE® PLUS for this patient are the same reasons why I recommend it every day. With its five simple steps, CLEAR CARE® PLUS is a great option for new and experienced lens wearers alike. Patients are always pleasantly surprised by how easy CLEAR CARE® PLUS is to use,6 and are excited to try it for themselves. The lack of a rub step with CLEAR CARE® PLUS (a required but often neglected step among multipurpose solution [MPS] users7) simplifies the lens care routine. In addition, CLEAR CARE® PLUS’ bubbling action provides a visual reminder to patients to use fresh solution every time. Similar to what I see in practice, study data show that CLEAR CARE® PLUS’ design supports significantly greater lens care compliance than MPS.6,7 My experience with CLEAR CARE® PLUS is also that enthusiasm for the product does not end when people leave the office — my patients continue to use CLEAR CARE® PLUS long after my initial recommendation, a sign of just how much they like using it.

A practice-wide approach to patient education about lens care is important to supporting patients’ success, and the resources and tools that Alcon offers help make this possible. My office staff loves being able to walk patients through the simple steps for CLEAR CARE® PLUS use — and patients really value hearing it from someone other than their doctor. The same resources that help me talk about CLEAR CARE® PLUS in the exam room (“How to Use CLEAR CARE® PLUS” video and the Patient Tip Card with coupon) also help my staff take an active role in setting patients up for success.

For any patient not in daily disposable contact lenses, I recommend CLEAR CARE® PLUS lens care. It is highly effective,8 and, thanks to the inclusion of Alcon’s HYDRA Glyde® Moisture Matrix, supports outstanding lens comfort.9 Just as importantly, I love the simplicity of using CLEAR CARE® PLUS — it makes educating patients easy and helps ensure that they are taking advantage of its efficacy and comfort benefits. With CLEAR CARE® PLUS, I know that I am giving my patients the opportunity to enjoy simple, effective lens care every day.

References
emmetropization. Prescribing for myopic refractive errors in this age group allows for clear distance vision and for the accommodative demand/response to begin development.

**TODDLER SUMMARY** The active process described as emmetropization appears to be complete by age 18 months. In patients age 2 to 5 years, treatment for the refractive error can be performed without worry of interruption of this process. Prescribing for refractive errors that create visual distress, amblyopia, or the development of accommodative esotropia is essential for this age group.

While there is a trend toward regression of hyperopia in toddlers, keep in mind patients with accommodative esotropia regress 0.10 D per year on average. Retreatment in infants is more predictable and can often be evaluated annually.

**Childhood (5 to 13 years)**

An ongoing controversy in managing childhood refractive errors is the concept of regulating the progression of myopia development. Many treatment strategies have been suggested over the years, with the most current evidence-based interventions being atropine, multifocal contact lenses, corneal reshaping with orthokeratology lenses, and outdoor time.

In all treatment models, myopia continues to progress, but at a slower rate than if no treatment was performed. Myopia progression rates have been reported to be approximately 1.00 D per year.

Many interventions show a trend for limited effect when introduced after one to two years of treatment, and early atropine studies showed a regression of the treatment effect once therapy has been discontinued. However, with atropine 0.01%, treatment effect is maintained after discontinuing treatment.

Multifocal contact lenses have also been shown to be efficacious in slowing the progression of myopia, but at a lower efficacy rate compared to atropine 0.01%. In addition, orthokeratology remains a popular option for many practitioners. However, research evaluating the rate of myopia progression after discontinuing orthokeratology lenses shows more rapid increase in axial length compared to patients who have remained in spectacles.

There is limited evidence to identify the ideal candidate for myopic progression treatment because all myopes do not progress at the same rate. Careful consideration should be given to parent/family goals for myopia progression treatment. Education regarding treatment outcomes, including continued need for correction for myopia even after treatment, and length of treatment needs to be addressed.

**CHILDHOOD SUMMARY** Refractive errors in this age group can be treated as needed, with limited controversy, and annual exams can be the monitoring timeline of choice.

Myopia progression occurs in this age group, and while treating the progression in children may be controversial, these supplemental treatments may be an option for families who are educated about the risks and benefits and can also make an informed decision.

**Summary**

Animal models of emmetropization have focused on inducing a refractive error and observing the animal’s physiologic response to this as the animal’s visual system tries to emmetropize by changing corneal curvature, axial length, or lenticular thickness. When managing pediatric refractive errors, the emmetropization process looks far different. During the first 12 to 18 months of life, the infant visual system attempts to regulate the corneal curvature, lenticular thickness, and axial length to create a refractive error of low hyperopia. Prescribing glasses in this age group may disrupt the process but can save both visual and binocular development. Prescribing in this age group is not the same as inducing a refractive error in animal models.

In toddlers, there is limited evidence of an active process, and prescribing for moderate hyperopia, anisometropia, and astigmatism is necessary for vision and learning.

In childhood, myopia progression occurs, but there is limited understanding of which patients progress the most and which patients are the best candidates for myopia progression treatment. Family goals and discussion of outcomes may help determine who wishes to consider treatment.

**REFERENCES**


Dr. Hug graduated from the University of Houston College of Optometry. He is also program director of the residency in pediatric optometry at Children’s Mercy Hospital in Kansas City, MO. In his free time, he enjoys water sports and hanging out with his three children. hugh@cmh.edu
How to guide patients in the use of digital devices

Parents are looking for guidance from eyecare providers on gaming and social media activities

By Glen T. Steele, OD, FCOVD, FAAO

The use of handheld digital devices for gaming and social media has shown a marked increase in the past two years. Children who are teenagers in 2019 did not grow up having video games with the intensity, the close distance, nor the wider periphery necessary to be successful in the game as the 7- to 10-year-olds face today. The heightened use of their “fight or flight” process, and increased engagement of peripheral awareness and scanning when following posts on social media is potentially having a significant effect on their development and function.1-6

Ocular effects

Because gamers have a significantly heightened push into peripheral awareness at the closer distances, accommodation and visual acuity are diminished. It is becoming the norm to hear vague complaints of not being able to see as well at distance or near and for them to show inconsistent and variable responses on testing that requires central function. The outcomes are not consistent with the refractive assessments. Pupils show a significantly larger size than typically, are less reactive to light, and show less accommodative response to near targets on Just Look! Retinoscopy (near dynamic retinoscopy)—an observation of the manner in which a patient uses “looking” when engaged in a nearpoint task. It assesses patient response rather than refraction.

The most frequent observation I see in an eye examination is an initial assessment of pupil size of children of not being able to see as well at distance or near and for them to show inconsistent and variable responses on testing that requires central function. The outcomes are not consistent with the refractive assessments. The National Institute of Health has estimated that youth spend an average of five to seven hours per day on screens during “leisure time.” What effect does prolonged activation of the sympathetic nervous system have in infant and child development and in function and performance as children enter school? Numerous studies are beginning to show that children who utilize devices from an early age develop language more slowly, do not have the fine motor skills necessary for writing, and have a markedly shorter attention span when reading.4,6,8-12

Reduced fine stereo

Eckhard Hess wrote in Scientific American in 1965 that: “Dilation and constriction of the pupils reflect not only changes in light intensity but also ongoing mental activity. The response is a measure of interest, emotion, thought processes and attitudes.” These were demonstrated on a very short-term basis and were temporary. The current observations are the result of prolonged activity and are persistent rather than temporary. If this sympathetic response is shown to be consistent during testing, what else could be going on throughout the rest of the body and brain?

Social media (Facebook, Instagram, Twitter, YouTube) also leads to similar concerns as shown in gaming—a reduction of focus and increase emphasis on periphery. For example, we have all experienced a “brief period of blur” when we look away from the screen after intense device usage. Furthermore, the visual process in young and developing children is in a constant state of growth and sophistication. Does this lead to a disruption in vision development? A large pupil is not the cause of a problem. It is merely a reflection of what is going on internally. The patient is simply developing her own defined formed pattern of development.

Research results

Other things that have not been adequately investigated in the current literature include the following:

- Heart rate
- Blood pressure
- Direct and consensual pupil responses
- Respiratory responses
- Decreased sensitivities to touch, sound, and smell

During nearpoint testing, the patient will attempt to engage focusing (more than accommodation) in which case against motion will be seen on Just Look! Retinoscopy—near dynamic retinoscopy. The reflex will be even darker as the OD assesses effort. More effort will be required as the patient tries to focus from a persistent sympathetic mode.

FIGURE 1

A. Typical pupil size
B. Pupil size of a child who uses his phone four to six hours a day or longer.
one hour per day whereas children who use devices less than an hour a day experience less anxiety and depression.1,4,12,14
The World Health Organization strongly suggests that limiting social media use to about 30 minutes per day may lead to significant improvement in well-being. This does not take into consideration required device use school and work.13
A March 2019 article in Journal of American Medical Association Pediatrics suggests that “higher levels of screen time at 24 and 36 months were significantly associated with poorer performance on developmental screening tests at 36 months.”8
The significance of this article to me is the marked increase in device use by 2- and 3-year-olds who show poorer performance on development screening tests by age 3.

Advice to families
I address the increased device use trend with children by giving the patients and parents a choice: Continue in this pattern and play video games well, or follow the 20-20-20 rule: Every 20 minutes, take a 20-second break while looking 20 feet away. Total time is dependent on many factors, including involving work requirements.

For school-aged children with large pupils (>7 mm), change the rule to 10-10-10 with a maximum of two hours total per day device usage.

For pre-school children with large pupils or older children with >7 mm to 10 mm pupil size, change the rule to 5-5-5 with a maximum of one hour total per day device usage. In patients who have a persistent sympathetic response with a concurrent reduction in the accommodative response, consider the use of low plus lenses for all nearpoint activities. When the persistent sympathetic response is exaggerated and there is little response to lenses, vision therapy should be considered in addition to the low plus lenses.

Finally, babies and young children need a solid foundation in visual development, and digital devices seem to be a disruptor in the process of overall development. I recommend beginning at the first visit providing advice on family/parent responsibility with games and device use. Optometrists have a responsibility to be in a guidance role with patients and families in order to raise the awareness of the concerns involved in social media and gaming to even include the “addiction” to such devices.

REFERENCES

Dr. Steele cofounded InfanSEE in 2005. He has served as president of College of Optometrists in Vision Development (COVD), chair of the ADA InfanSEE and Children’s Vision Committee, and international ambassador of Southern Educational Congress of Optometry (SECO) International. In 2012, SECO established the Developmental Vision Endowed Scholarship in his name, which recognizes students who are dedicated to working with vision therapy and amblyopia patients.

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The possible connection among kids, devices, & myopia

An increase in myopia might be linked to an increase in device usage

By Raman P. Sah, BOptom

Myopia is experiencing an epidemic rise worldwide, most dramatically among younger people (college educated and high school graduates) in East and South Asia where the prevalence has reached almost 100 percent in some demographics.1-6

Myopia is now one of the leading causes of vision impairment and blindness.7 The prevalence of myopia has increased steadily during the last half of the 20th century and into the 21st century in most parts of the world and is estimated to affect 50 percent of the world's population by 2050 (Figure 1).1,2,11

The increasing prevalence of myopia has emerged as a global health concern because of sight-threatening pathologies like myopic macular degeneration, choroidal neovascularization, cataract, and glaucoma associated with high myopia.12

Myopia mechanism

Despite creating a major health burden, the exact mechanisms of myopic eye growth and its progression, particularly in juveniles, remain unknown.23

Hyperopic eyes of human infants and of infant monkeys made hyperopic with negative trial lenses experience coordinated growth, resulting in longer eyes and a refractive trend toward emmetropia (emmetropization).12-24 Juvenile myopia can be considered a failure of emmetropization or a possible reactivation of the emmetropization mechanisms in later childhood in response to chronic hyperopic defocus produced by habitual near viewing and accommodative lags.12

The second hypothesis could reflect eyes successfully adapting to the modern (near) environment. The high prevalence of myopia among populations that spend a lot of time doing near vision tasks (school children, high school and college students, and those in religious seminaries) further support the hypothesis that hyperopic defocus (central or peripheral) generated by accommodative lags during near work could stimulate eye growth.16,20

Technology’s role

Technological developments have occurred during the same general time period as the epidemic:

- The number of digital information sources (Internet host sites) climbed from about 100 in 1980 to 1 billion by 2012.29
- In the early 2000s, the number of worldwide smartphone users were reported to be 1.85 billion (190 million in U.S.) and are projected to rise to about 3 billion (272 million in U.S.) by 2020.20,21
- Total worldwide cellphone subscription rate has exceeded the 7.5 billion worldwide population, passing over 8 billion in 2018.22

New research

In a recent study, my colleagues and I examined the accommodative accuracy of emmetropic and myopic children as they viewed targets displayed on devices. We used a sensitive autorefractometer (WAM-5550) to monitor refractive states of children (sampling frequency=5Hz) as targets were moved from distance (4 m) to near (20 cm).

We found that at near, small amounts of hyperopic defocus were present in all children. At viewing distances typically employed with handheld devices (33-20 cm), emmetropic and myopic children experienced similar lags (mean 0.54 and 0.32 D, respectively) to those previously reported with printed materials.23-25

We found no evidence that electronic displays generated elevated accommodative lags and magnitudes of hyperopic defocus. Therefore, if electronic displays are a causative factor in myopia development, it is likely due to increased duration of exposure to near targets.34

Moreover, the exposure to sunlight during time outdoors increases the release of retinal neurotransmitter dopamine which has been postulated as a preventive factor for myopia progression.30,31 With increased use of electronic devices, children may spend less time outdoors and may prefer to remain indoors.32,33

For example, estimates from 2012 indicate that in the U.S., juveniles spend 35 times more time on screens/electronic devices than in vigorous physical activity (7 hours 11 minutes per day on screens versus 12.6 minutes in physical activity).34,35

Slowing myopia progression

Consistent with the “failure of homeostasis”15 (an emmetropic eye failing to remain so with time) or alternatively a reactivation of emmetropization mech-
Our study reveals that children using personal electronic devices will experience accommodation lags (hyperopic defocus)—but despite this, at this time no direct link has been established between the usage time for handheld electronic devices and myopia development. Further research is warranted to continue to explore the relationship of modern digital devices in myopia development.

REFERENCES
34. Street-Porter J. Our kids are spending less time outdoors than prisoners—it’s time for families to rediscover the great British beach. Independent. Available at: https://www.independent.co.uk/voices/our-kids-are-spending-less-time-outdoors-than-prisoners-sits-time-for-families-to-rediscover-the-abb377411.html. Accessed 8/3/19.
Superflex Kids releases collection of funky, colorful eyewear collection

The new Superflex Kids Collection showcases round, rectangular, and cat eye shapes combined with colors and an assortment of temple patterns for kids ages 6 to 12. Glitter elements, custom laminations, special finishes, and bright color contrasts are available in a variety of shades.

For girls, the new collection features 10 new styles crafted in stainless steel and acetate.

- **SFK-204**: Exhibits a round-shaped frame with a handmade gradient acetate. This style features a dropped bridge and matte finishing in combinations of purple lilac and berry rose, along with a high-shine and polished finish in a turquoise grey color.

- **SFK-207**: Displays handmade acetate color blocks. The frame front includes bamboo sculpted temples in variations of black turquoise, aqua mint, and rose blush.

- **SFK-208**: Shows a stainless-steel rectangular frame featuring matte finishing on the front. Laser-cut polka dots are displayed on the temples in a contrasting color.

- **SFK-210**: Features a rounded square eye shape highlighted by a handmade, multicolored, and patterned acetate frame front matched to solid-color temples. This style is available in black crystal red, blue grey indigo, and grape crystal fuchsia.

- **SFK-211**: Exhibits a rounded square shape in dual coloration. The second layer of acetate is exposed around the frame edge and at the cut-out notch below the end pieces. A glitter effect appears on the second layer when light shines on it. Available colors for this style include burgundy rose, brown ivory, and grape lavender.

- **SFK-212**: Features a constellation pattern with silk-screen printing along the temples. Handmade crystal acetate is styled in shades of blue, sand, and pink.
Continued from page 33.

**SFK-213**
includes a stainless-steel front with a pearlized finish and color-blocked acetate temples in combinations of black pink, brown sand, and fuchsia white. This style features a constellation pattern with silk-screen printing along the temples.

**SFK-215**
displays a metal front cut-down along the browline and bridge and highlighted in a contrasting color. The glitter acetate temples feature a tie-dye pattern in shades matching the frame front. Available colors include black pink, indigo blue, and grey blush.

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**For boys, new styles in acetate feature a sporty look and vibrant colors.**

**SFK-205**
exhibits a rounded square shape with handmade acetate and a triple-color lamination. A metal design detail is featured on the end pieces. This style is available in black-white, navy-red, and brown-mustard.

**SFK-214**
features a classic round shape with a keyhole bridge. A four-color layer lamination with a laser-cut down groove on the temple reveals a second layer of color. Double metal pin dots are displayed on the end pieces and temples.

**SFK-216**
displays a matte stainless-steel front with acetate temples and a triple-color lamination. The temples feature a cut-down that reveals a second color. Double metal pin dots on the temples are available in colors combinations of black-blue-red, navy-lime-indigo, and black-red-green.

**SFK-209**
is a unisex style featuring a round combination frame with a metal front, pearl finish, and temples with a four-color laminated acetate. The temples feature a shaped cut-down that reveals an underneath color. With linear design elements, these frames are available in black-red, blue-brown, and brown toffee.
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Zyloware unveils collection of 12 summer styles

ZYLOWARE EYEWEAR revealed 12 new styles this summer featuring eight frame types: Sophia Loren, Randy Jackson, Gloria by Gloria Vanderbilt, Stetson, Stetson Off Road, Via Spiga, Daisy Fuentes, and Shaquille O’Neal.

Sophia Loren M296 features a metal frame in an oval silhouette. An open endpiece leads to an epoxy inset accented by a crystal embedded rectangle before transitioning into a subtle animal print design down the acetate temple. Available in two colors—cognac and brown—these frames include spring hinges and snap-in nosepads.

Randy Jackson 3059 is available in two colors: black/brown with a matte to shiny brown horn front and matte brown temple, as well as black/red, which includes a matte to shiny red horn front and matte red temples. Both colors feature linear, black gunmetal endpieces, and spring hinges.

Gloria Vanderbilt 4067 exhibits a full-rim metal frame in a modified oval shape, along with a contoured temple design. Two colors are available for this style: brown and teal. The brown variety features a shiny cognac front with brown pearl abstract temples, while the teal includes shiny teal on the frame and teal pearl abstract on the temple. The frames also include spring hinges and snap-in nosepads and accommodate progressives.

Gloria Vanderbilt 4068 features a full-rim zyl and detailing. A metal, chevron-detailed inset on the temple leads to colorful, tortoise temple tips. Two colors are available: black and eggplant. The black frames include a brushed tan and milky demi-blonde temple with blue and grey accents. Eggplant frames display a purple front, brushed purple detailing, and milky, demi-blonde temple with purple accents. Spring hinges are also included.

Stetson 365 showcases a rim zyl frame in a square shape with two color options: black and grey. Grey features a translucent zyl. Both colors feature a Stetson “S” logo in gunmetal foil. Comfort fit features include spring hinges and accommodation for progressive lenses.

Stetson Off Road 5077 exhibits a full-rim acetate, modified rectangle frame. Available colors include black or grey fronts with tortoise temples.
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**Shaquille O'Neal 151Z**

is a rectangular frame crafted from light-weight and thermoplastic material. Three color combinations are available: Black/crystal features a shiny black over crystal front; grey/orange pairs a matte grey over orange; and matte navy/crystal (300) features a blue and translucent material.

**Via Spiga Jordana**

showcases a semi-rimless gold frame with enamel overlay. Available in black, beige, and red, these frames are accented by a raised stud on the wrap-around endpiece and acetate tortoise temple tips. Other features include spring hinges, a light-weight design, and snap-in nose pads.

**Shaquille O'Neal 153Z**

exhibits a full-rim zyl, rectangle shape. These frames are available in black and navy. Black features a matte black overlaid on a crystal blue with cutout detailing that exposes blue on the temple, while navy includes a matte navy and crystal combination with cutout detailing exposing crystal down the outside temple.

**Daisy Fuentes La Gaspara**

features a square, full-rim zyl frame with braided metal temple detailing. Two colors are available: black and tortoise. Black includes a black front over milky pink with brushed gold metal, while tortoise exhibits a tortoise front over milky honey with brushed rose gold metal.
Barbecue, OD-MD communication, lifelong learning

Why ocular disease and contact lenses? I had iritis before I was a teenager. After going to the ER several times and then finally visiting an optometrist who helped me, seeing that division for medicine was big for me in saying there are other things out there and all doctors aren’t created equally nor do they know everything. While I was in optometry school in Boston, I gravitated to the front of the eye. Contact lenses just connected with me; the math, the ways you could correct vision, and the technology lit my fire. Corneal topographies and mapping and how that evolved into refractive surgery and other procedures there, is a lot going on. And a lot of opportunity to embrace technology and utilize for better care for our patients.

Why a residency in contact lenses and should more OD students go that route? Optometry needs more optometry-trained ODs. I’m biased because I help run a residency program. The level of education and dedication that goes into that year of residency is important and helpful in an OD’s career. I realized in my fourth year that I didn’t know enough, and I wanted to. I wanted to set myself up as someone who did know a lot and to give myself and my career the opportunities to continue to grow my entire career. I saw residency as a next step to pushing myself forward on the forefront of the profession.

What made you get involved again with academics? The integrated care model we have lends itself to educating others, whether within the practice or bringing in outside doctors, externs, and residents. I wanted to make other doctors better, so we reached out to schools and started doing what has evolved into an ocular disease residency program. Maybe later in my career I could see joining academia, but there are advantages to private practice and academic worlds. There are more opportunities to be busier with patient care in a private-practice setting. There are less rules from a patient care and financial standpoint. In academia, there are more hoops to jump through. I think the ship is a faster steering in a private practice than in academia, and I enjoy that.

How do you see what you do changing in the next 10 years? I think we are going to have to do more. More responsibility in eye care is going to fall onto ODs just because of the need. There is going to be a wave of patients retiring and needing more eye care, and I think there will be less ophthalmologists around as they are retiring and their residency enrollments are flat. Optometry is going to have this opportunity and necessity to fill the gap, to take on things that we are good at, and hopefully delegating more operating time to our MD colleagues so they can do better and more surgery.

Why Minnesota? Minnesotans are like salmon—we all come home to die. [Laughs] After optometry school and my fellowship, the Midwest and I have a lot of ties and I love the change of seasons. It is challenging, but some of that is life. I think that the lessons of living in the Midwest—being prepared for weather and learning how to deal with adversity—are good lessons for life.

Why do you see a different mix of ocular disease versus a suburban or urban practice? We are on the east and north east side of the metro. We have offices in both Minnesota and Wisconsin. Because of that, we see a diversity of conditions. In rural settings, we see more injuries from farm work and people who let things go for lack of access. In urban settings, patients have let things go too long because of financial or access problems because of insurance, and the disease varies. We have a large immigrant population in St. Paul from Somalia, and sometimes I will see things like trachoma, which we don’t see in the United States.

What’s your guilty pleasure food? Barbecue is something I like a lot. Brisket, pulled pork...that whole world is dear to my heart.

What’s something your colleagues don’t know about you? I like to spend a lot of time outdoors—fishing, hunting, golfing. Most of my free time is spent skiing and being outdoors.

What’s the craziest thing you ever did? I was in Alaska for a couple of weeks between optometry school and residency. I had a friend move up there after high school. Me and another buddy went up there to see him. [Laughs] I was in Alaska for a couple of weeks between optometry school and residency. I had a friend move up there after high school. Me and another buddy went up there to see him. We rented a vehicle and drove out into the boonies. We hiked in 13 miles with the packs and had to cross rivers. Moose came popping out of the woods between me and my buddy while we were fishing. They kept moving and didn’t come toward us. We had lots of those experiences where you don’t have control and nature is in charge. So beautiful and a great experience, but you wonder if something happens here, it isn’t going to be great.

Do you have any regrets? [Laughs] I try not to focus on them. I can’t say there is a big regret. I think you find your way in life, and that’s the way life is supposed to be. I see my regrets more as life lessons than regrets.

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What one piece of advice would you offer ODs following behind you? Lifelong learning. Don’t give up, don’t get complacent. Don’t feel like your cup is full. Realize that there is more, everything is evolving, and we have to stay on top of things all the time to know what’s next, how to do the job better, and how to better care for patients. My advice is continuing that learning through an entire career and continuing to better yourself as a practitioner.

To hear the full interview with Jacob R. Lang listen online:

optometrytimes.com/JacobLang

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How can ODs and MDs work better together? It all comes down to communication. I don’t think there is much different between us now, and we are seeing a generational shift where optometrists and ophthalmologists realize we need each other. That’s hard to say sometimes for both sides. I think we better each other when we work together, and I think that better serves patient care.

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