Review clinical highlights of new miopia control lens

Daily disposable MiSight offers new option for parents, children, ODs

By Jennifer Palombi, OD, FAAO; Kathy Dumbleton, BSc (Hons), MSc, PhD, MCOptom, FAAO, FBCLA; and Paul Chamberlain

The prevalence of myopia is increasing at an unprecedented rate worldwide with current estimates at 23 percent of the world’s population and a predicted increase to almost 50 percent by 2050. In the U.S., prevalence of myopia has nearly doubled from 25 percent to 42 percent over the last two generations.

The debilitating consequences of myopia-associatd pathology help to explain why is not surprising that eyecare professionals (ECPs) in the U.S. and around the world have become increasingly concerned for their young myopic patients and are eager to discuss management options with their patients’ parents.

Myopia control with contact lenses

In recent times, there have been many studies aimed at reducing myopia progression with optical methods such as progressive addition lenses (PAL), overnight corneal reshaping contact lenses (orthokeratology), and soft contact lenses incorporating multifocal or aspheric optics.
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Chairman’s letter

ALL ABOUT MYOPIA AND HYPERTENSION

By MIKE HENNESSY, SR

THIS ISSUE CLOSES THE BOOKS ON 2019.

Be sure to take a look at the “Year in review of optometric advancements” article on page 8. It is a good wrap-up of what happened in the profession this year.

We have published quite a few stories on myopia control over the years, and I know there will be more.

However, parents of myopic children had a win last month with CooperVision’s FDA approval of MiSight 1 day contact lenses to slow the progression of myopia.

Our cover story this month reviews the three-year data that was recently shared about the lens.

For more, take a look at our website to see Debbie Jones, FCOptom, FAAO, share insight on the data. She served as a clinical investigator for the lens.

Also in this issue we dive into the role of optometrists with managing hypertension.

Elizabeth Steele, OD, FAAO, discusses the recent update to hypertension guidelines—and the resulting controversy—along with information on correctly taking blood pressure readings. Most importantly, she outlines how to recognize and manage a hypertensive crisis in the office.

Taking regular and accurate blood pressure readings in the office is important, and so is the role of ODs to continue to educate their patients about the condition and to encourage them to monitor their blood pressure at home.

Also

Year in review of optometric advancements

By GREG HILL AND MAREK BIERNACINSKI

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THERE’S NO SUBSTITUTE

Xiidra® (lifitegrast ophthalmic solution) 5% is indicated for the treatment of signs and symptoms of dry eye disease (DED). Xiidra is the only lymphocyte function-associated antigen-1 (LFA-1) antagonist treatment for Dry Eye Disease¹,²

Xiidra, the first in a class of LFA-1 antagonists for Dry Eye Disease, is a prescription eye drop FDA-approved to treat both signs and symptoms of the disease.¹,³

References:
1. Xiidra (Prescribing Information). Lexington, MA: Shire US.

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

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

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

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

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

Safety and efficacy in pediatric patients below the age of 17 years have not been established.
BRIEF SUMMARY:
Consult the Full Prescribing Information for complete product information.

INDICATIONS AND USAGE
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 ≥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, eye discharge, eye discomfort, 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.

Manufactured for: Shire US Inc., 300 Shire Way, Lexington, MA 02421. For more information, go to www.Xiidra.com or call 1-800-828-2088.

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Patented: please see https://www.shire.com/legal-notice/product-patents
Last Modified: 01/2018 S33769
Minimize symptoms of dry eye disease in refractive surgery patients

Dry eyes can significantly affect patients’ perception of their surgical outcomes and level of satisfaction; therefore, it’s important to treat dry eye disease both before and after refractive surgery. Read on to discover the best ways to set your patients up for success.

OptometryTimes.com/BedinRSP

AI testing is almost here, and it doesn’t care if ODs are ready

The population of the world is under attack. The robots are coming, the robots are coming. Hardly. But it is important to recognize the pace of change arriving with AI testing and determine how to harness the technological advances that can impact you, your practice, and most importantly, your patient’s experience.

OptometryTimes.com/Robots

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MISSION STATEMENT
OptometryTimes delivers easily digested, practical information by ODs for ODs. This information can be immediately applied to improve the clinical experience of the next patient in your chair as well as your practice performance. In partnering with our readers, OptometryTimes provides data, analysis, tools, and resources which are available whenever and wherever our readers want them.
How I reflect on the year as an optometrist

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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Every year around the middle of December I take my staff and their significant others out to a nice dinner. We chat topically about the year and everyone’s holiday plans as we eat, drink, and toast to another year come and gone and hopefully more to come.

Is there room for improvement? You bet there is.

I make sure to give out holiday bonuses just prior to this event so that my staff is somewhat happy with having to see me on a Saturday night.

Toward the end of the evening, I say a little something. There are always things I want to say, like “You’re all just terrible at hiding your cell phone use at work,” but I end up politely thanking everyone for a job well done and expressing how I’m looking forward to the next year.

Reflection

As we approach the office holiday dinner, I do take a few moments here and there to reflect on the year with regard to my practice and my relationship with optometry in general. Have I made things better? Have I effectively handled change when it came my way? Have I performed change when necessary?

Have I upheld my optic oath to the best of my abilities? Have I done well at carrying out my responsibility as a steward of our profession through my editorial duties with this publication?

An honest look

Or… have I just sat back and complained (an act which seems to getting easier to do)?

Have I passed up opportunities to explain what an optometrist does in 2019? Have I been too busy to take two minutes to call or write a lawmaker to explain the benefits of signing onto, voting for, or voting against a bill that has to do with our patients (with regard to access, safety, or other aspects)?

Have I let insurance affect my clinical decision-making? Have I missed opportunities to tell patients the correlations with smoking and eye diseases? Have I gone to continuing education courses to check off a box rather than to learn and enrich myself and my practice?

Looking ahead

These are all valid questions, and, going through them, I feel like I had a pretty good year.

Is there room for improvement? You bet there is. I will rely on the infectious vitality of the New Year to give me oomph to work on improvement in 2020.

How do you ring in the end of one year and the beginning of the next in the optometric milieu of your life? Let’s bounce some ideas back and forth for the benefit of our patients, our profession, and ourselves.

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Year in review of optometric advancements
A rapid-fire view of 2019’s best innovations in optometry— that stood out the most to ODs

By Greg Hill and Marek Biernacilski

Exploring how technological and pharmaceutical advancements will change the field, four ODs discussed primary areas to watch in this year during a rapid-fire lecture at the American Academy of Optometry 2019 meeting in Orlando. Participants were:
- Jacob Lang, OD, FAAO, of Stillwater, MN
- Jacyln Garlich, OD, FAAO, of Boston
- Mark Bu boltz, OD, FAAO, of Bloomington, MN
- Roya Habibi, OD, FAAO, FSLS, of Seattle

Myopia control contact lenses
Historically, ODs have looked at orthokeratology as the gold standard for myopia control but now, soft lens technology is catching up. Daily-wear soft contact lenses have been approved for myopia control, featuring dual-focus, distance-centered lenses with low refractive error and axial length.

Myopia prevention drops
Low-dose atropine is a known solution for slowing myopia progression, but a new drug called micropine has entered the scene. “This is testing 0.01 % and 0.1 % atropine,” Dr. Garlich says, noting that research indicates that myopia progression can be slowed by as much as 60 to 70 percent.

Presbyopia treatment drops
Multiple companies are working on presbyopia drops. Different modes of action involve miosis for patient comfort by featuring lens optics that dissolve within a month. “This is unique in that it has these nanodroplets that help minimize blur when you put the drop in,” Dr. Garlich says.

Dry eye nasal spray
An innovative new drug for dry eye is a nasal spray OC-01 (Oyster Point), which targets the trigeminal nerve inside of the nose to stimulate tear production. This drug is currently undergoing two Phase IIb clinical trials.

Historically, ODs have looked at orthokeratology as the gold standard for myopia control, but now soft lens technology is catching up.

Intense pulsed light
Intense pulsed light (IPL, Lumenis) solutions for managing dry eye are gaining ground in optometry, with treatment research showing statistically significant improvements for refractory dry eye and meibomian gland function.

Neurotrophic keratitis
Oxervate (cenegermin, Dompé) is a newly approved drug for managing neurotrophic keratitis. This approach leverages a nerve growth protein that occurs naturally in the human body to heal nerves, stimulating immature neurons to grow and survive.

Cutting-edge contact lenses
One of the newest technologies is Oasys with Transitions (senofilcon A, Johnson & Johnson Vision). This lens is innovative because of its 30-second activation time and a partial filter for indoor light. Another new option is Precision1 (verofilcon A, Alcon), featuring a microthin layer of moisture on the lens surface for up to 30 days. This punctal plug is FDA approved for managing postoperative pain and inflammation and is preservative-free. As a plus, ODs don’t need to worry about sizing when applying the insert. “Once the plug is placed, it is activated by moisture and will swell to fit,” Dr. Garlich says.

Rho-k inhibitors
Two new glaucoma medications that target rho-kinase inhibitors include Rhopressa (netarsudil ophthalmic solution 0.02%, Aerie) as well as Rocklatan (netarsudi/latanoprost ophthalmic solution 0.02%/0.005%, Aerie), which was approved in 2019.

Glucoma
For managing glaucoma and dry eye, ODs may be interested in Xelpros (latanaprost, Sun Pharma), the first commercially available latanoprost formulation that is benzalkonium chloride (BAK) free. “Another way to get around this whole dilemma of glaucoma and dry eye is to micродose it, such as through the microdosing Eyenovia Optejet eye dropper,” Dr. Bu boltz says.

New minimally invasive glaucoma surgeries (MIGS) give outglaucoma patients more opportunity to decrease their glaucoma drops after being combined with cataract surgery. The Hydrus implant (Ivantis) and iStent Inject (Glaukos) are notably two new MIGS devices which have proven some benefits over the original iStent (Glaukos).

Also on the horizon is Allergan’s Bimatroprost SR (Sustained-Release) Implant. The drug can be injected into the eye and has shown a 30 percent reduction in intraocular pressure (IOP) over 12 months. Allergan submitted a New Drug Application (NDA) to the FDA in July 2019. In terms of minimally-invasive glaucoma surgery (MIGS) options, ODs can expect to see the Hydrus MICS (Ivantis), iStent Inject (Glaukos), and iStent Supra (Glaukos). There will also be new, valveless tube shunts entering the market, such as Ahmed ClearPath (New World Medical).

Artificial tears
New artificial tear options include Refresh Relieva by Allergan, designed to work on hyperosmotic tears, and Systane Complete, which works on all layers of the tear film at once.

Postop inflammation
ODs may be interested in new intracameral medications such as Dexcyuc (EyePoint). This is dexamethasone intraocular suspension 9 percent that dissolves within a month. “We can see that, when compared to the placebo in about 60 percent of patients, their anterior chamber cleared.” Dr. Lang says.

Dexamethasone plugs
Dextenza (Ocular Therapeutix) is a dexamethasone insert that delivers medication to the ocular surface for up to 30 days. This punctal plug is FDA approved for managing postoperative pain and inflammation and is preservative-free. As a plus, ODs don’t need to worry about sizing when applying the insert. “Once the plug is placed, it is activated by moisture and will swell to fit,” Dr. Garlich says.

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"It is pretty accurate," Dr. Garlich says. New monitoring technology
New technologies in optometry include IDEX-DR (IDx Technologies), an FDA-approved monitoring tool that uses artificial intelligence to assess fundus photos for signs of diabetic retinopathy. “It is pretty accurate,” Dr. Garlich says. Another exciting tool is EyeBOX (Oculogica), an FDA-approved device for concussion diagnosis. A simple test with eye-tracking software allows ODs to better diagnose concussions and monitor patient conditions over time.

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How the blink affects contact lens wear

Behold the significant, protective power of the eyelids

Have you ever sat across from a patient in the exam chair and become distracted by his partial blinks? So much so that you couldn’t hear his talking? What is even more awkward is when you see this with your waitress or banker—or the potential staff member you are interviewing. I find myself biting my tongue to keep from going into a functional anatomy lesson or worse yet, just blurt out, “Will you blink already!”

If an eye stayed closed, it would never dry. This thought helps us to understand the significant protective power of the eyelids. Occasionally, a patient will realize that she doesn’t sleep with her eyes fully closed, but rarely do patients realize they could be blinking incorrectly.

Consequences of a poor blink

A proper blink cleanses, moisturizes the ocular surface and replenishes the nutrients, oil and water supply in the tear film.

When lids do not make contact during a blink, there are negative consequences.

A lack of lid-to-lid contact causes meibomian glands to release meibum. These glands can eventually clog and atrophy over time. Evaporative stress causes more inflammation which can then cause further degradation of the meibomian glands, leading to more evaporative stress and exposure.

Improper blinking causes a pumping action of the lacrimal gland and drives tears down the canaliculi—as a means of cleansing the ocular surface. The most obvious detriment of this is the corneal and conjunctival exposure that occurs, which can lead to surface cell degradation and progressive consequences to the vision and comfort.

How does a blink change with contact lens wear?

With every contact lens exam, I acquire an interferometry video, tear film dynamic video, and a redness assessment. This tells me if there is an incomplete blink pattern, undue exposure of the lens, and how much the contact lens dries as a result, as well as build up on the lens. It is also a great education tool. It helps demonstrate the fit and movement of the lens as well.

A few years ago, we had a LipiView (Johnson & Johnson Vision) in our office. Driven by nothing other than curiosity, we decided to conduct a simple internal review on how contact lens wear might impact the blink. We found that in each of the several patients tested with and without their contact lenses, the trend was the same. The overall number of blinks decreased, and the number of incomplete blinks increased with contact lenses.

Resultantly, this increased the patients’ lipid layer thickness as much as 70 percent in some. It is not clear how thick a patient’s lipid layer needs to be and what degree of increase reduces symptoms. My most extreme patients come to mind, who had no remaining glands and were stuck with discomfort, even with treatment. Perhaps any improvement we can make in our contact lens patients, through education and limiting contact lens wear time, will help preserve glands.

We know a patient’s blink rate decreases when staring at a device. Patel et al. showed it decreases from a mean of 18.4 blinks per minute (bpm) to 3.6 bpm during device use, and Tsubota and Nakamori2 showed a mean decrease from 22 bpm to 7 bpm. Now ODs are finding meibomian gland loss in kids and adolescents and blaming screen time for premature loss.

Additional thoughts to keep in mind:

- A recent study by Jie et al. validated the assumptions that partial blinking is directly correlated to decreased tear film breakup time (TBUT) and both increased meibomian gland disease (MGD) and Ocular Surface Disease Index (OSDI) scores.
- García-Montero et al correlated a decrease in the optical quality dynamics of the tear film among contact lens wearers with the lowest blink rates. This correlation was consistent among all four of the contact lens brands being tested.
- Anecdotally, we know that the blink is affected by contact lens wear, and the contact lens wearer is often the same person who sits in front of the computer for eight to 12 hours per day.
- When 426 subjects were assessed, contact lens wearers logging at least six hours of computer use had a higher prevalence of dry eye disease versus non-wearers with the same amount of device use.

What to do about it

Public education seems to be the best strategy.

We are already seeing examples of this being put into place. Every Sunday my iPhone tells me my average daily hours of screen time for the week. I can envision prime-time commercials and device labels with warnings one day…far away.

I love showing patients a slow-motion video of their blinks with fluorescein and a cobalt blue filter. When there is complete closure the entire screen goes black, which makes it quite easy and obvious to see when the lids don’t close completely. After the show and tell, I demonstrate the blink exercise and stress the importance of creating muscle memory and a new habit. Frequently, patients return saying they have now repeatedly caught themselves not blinking—and that it happens more than they could have fathomed.

But what if we could take it one step further? What if there was wearable technology that notified the patient when she was not blinking completely? Or if she was informed when there was significant tear film debris or build up on their contact lenses?

I am a firm believer that anything measured is improved. When my wrist buzzes at the 10,000-step mark on my Fitbit, there is a joyful release of dopamine for a job well done. Imagine how this concept could influence ocular outcomes, both immediate and long term.

REFERENCES
INDICATIONS AND USAGE
CEQUA™ (cyclosporine ophthalmic solution) 0.09% is a calcineurin inhibitor immunosuppressant indicated to increase tear production in patients with keratoconjunctivitis sicca (dry eye).

IMPORTANT SAFETY INFORMATION

WARNINGS AND PRECAUTIONS
Potential for Eye Injury and Contamination: To avoid the potential for eye injury and contamination, advise patients not to touch the vial tip to the eye or other surfaces.
Change the outlook for dry eye disease

INDICATIONS AND USAGE
CEQUA™ (cyclosporine ophthalmic solution) 0.09% is a calcineurin inhibitor immunosuppressant indicated to increase tear production in patients with keratoconjunctivitis sicca (dry eye).

IMPORTANT SAFETY INFORMATION
WARNINGS AND PRECAUTIONS
Potential for Eye Injury and Contamination:
To avoid the potential for eye injury and contamination, advise patients not to touch the vial tip to the eye or other surfaces.

Use with Contact Lenses: CEQUA should not be administered while wearing contact lenses. If contact lenses are worn, they should be removed prior to administration of the solution. Lenses may be reinserted 15 minutes following administration of CEQUA ophthalmic solution.

ADVERSE REACTIONS
The most common adverse reactions reported in greater than 5% of patients were pain on instillation of drops (22%) and conjunctival hyperemia (6%). Other adverse reactions reported in 1% to 5% of patients were blepharitis, eye irritation, headache, and urinary tract infection.

Please see brief summary of Full Prescribing Information on the adjacent page.

Brief Summary of Prescribing Information for
CEQUA™ (cyclosporine ophthalmic solution) 0.09%,
for topical ophthalmic use

CEQUA™ (cyclosporine ophthalmic solution) 0.09%
See package insert for Full Prescribing Information.

INDICATIONS AND USAGE
CEQUA ophthalmic solution is a calcineurin inhibitor
immunosuppressant indicated to increase tear production
in patients with keratoconjunctivitis sicca (dry eye).

CONTRAINDICATIONS
None.

WARNINGS AND PRECAUTIONS
Potential for Eye Injury and Contamination
To avoid the potential for eye injury and contamination, advise
patients not to touch the vial tip to the eye or other surfaces.

Use with Contact Lenses
CEQUA should not be administered while wearing contact
lenses. If contact lenses are worn, they should be removed
prior to administration of the solution. Lenses may be
reinserted 15 minutes following administration of CEQUA
ophthalmic solution.

ADVERSE REACTIONS
Clinical Trials Experience
Because clinical trials are conducted under widely varying
conditions, adverse reaction rates observed in the clinical
trials of a drug cannot be directly compared to rates in the
clinical trials of another drug and may not reflect the rates
observed in practice.

In clinical trials, 769 patients received at least 1 dose of
cyclosporine ophthalmic solution. The majority of the treated
patients were female (83%).

The most common adverse reactions reported in greater than
5% of patients were pain on instillation of drops (22%) and
conjunctival hyperemia (6%). Other adverse reactions reported
in 1% to 5% of patients were blepharitis, eye irritation,
headache, and urinary tract infection.

USE IN SPECIFIC POPULATIONS
Pregnancy
Risk Summary
There are no adequate and well-controlled studies of CEQUA
administration in pregnant women to inform a drug-associated
risk. Oral administration of cyclosporine to pregnant rats or
rabbits did not produce teratogenicity at clinically relevant doses.

Data
Animal Data
Oral administration of cyclosporine oral solution (USP) to
pregnant rats or rabbits was teratogenic at maternally toxic
doses of 30 mg/kg/day in rats and 100 mg/kg/day in rabbits, as
indicated by increased pre- and postnatal mortality, reduced
fetal weight, and skeletal retardations. These doses (normalized
to body weight) were approximately 3200 and 21,000 times
higher than the maximum recommended human ophthalmic
dose (MRHOD) of 1.5 mcg/kg/day, respectively. No adverse
embryofetal effects were observed in rats or rabbits receiving
cyclosporine during organogenesis at oral doses up to
17 mg/kg/day or 30 mg/kg/day, respectively (approximately
1800 and 6400 times higher than the MRHOD, respectively).

An oral dose of 45 mg/kg/day cyclosporine (approximately
4800 times higher than MRHOD) administered to rats from
Day 15 of pregnancy until Day 21 postpartum produced
maternal toxicity and an increase in postnatal mortality in
offspring. No adverse effects in dams or offspring were
observed at oral doses up to 15 mg/kg/day (approximately
1600 times greater than the MRHOD).

Lactation
Risk Summary
Cyclosporine blood concentrations are low following topical
ocular administration of CEQUA. There is no information
regarding the presence of cyclosporine in human milk following
topical administration or on the effects of CEQUA on breastfed
infants and milk production. Administration of oral cyclosporine
to rats during lactation did not produce adverse effects in
offspring at clinically relevant doses. The developmental and
health benefits of breastfeeding should be considered along
with the mother’s clinical need for CEQUA and any potential
adverse effects on the breastfed child from cyclosporine.

Pediatric Use
The safety and efficacy of CEQUA ophthalmic solution have
not been established in pediatric patients below the age of 18.

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

PATIENT COUNSELING INFORMATION
Handling the Vial
Advise patients not to allow the tip of the vial to touch the eye
or any surface, as this may contaminate the solution. Advise
patients also not to touch the vial tip to their eye to avoid the
potential for injury to the eye.

Use with Contact Lenses
CEQUA should not be administered while wearing contact
lenses. Patients with decreased tear production typically should
not wear contact lenses. Advise patients that if contact lenses
are worn, they should be removed prior to the administration
of the solution. Lenses may be reinserted 15 minutes following
administration of CEQUA ophthalmic solution.

Administration
Advise patients that the solution from one individual single-use
vial is to be used immediately after opening for administration
to one or both eyes, and the remaining contents should be
discarded immediately after administration.

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PLR-08500 2018
With respect to mechanisms that regulate refractive error development, hyperopic defocus has been shown to encourage eyeball growth; a consequence of which is increasing axial length and myopia \(^\text{17}\) that ultimately may result in regular prescription changes. In contrast, myopic defocus can retard eye growth.\(^\text{18}\)

A number of studies have shown that use of simultaneous optics can control axial elongation and myopia.\(^\text{19-25}\) These simultaneous optics are typically concentric alternating powers of distance correction and myopic defocus, often called “dual-focus” optics. These optics have been investigated in contact lenses. In clinical practice, dual focus lenses are designed to minimize hyperopic defocus or to induce myopic defocus while also allowing simultaneous correction of the child’s current refractive error. This may help to control the progression of myopia.

A study by Anstice and Phillips\(^\text{7}\) evaluated dual-focus soft contact lenses in children aged 11 to 14 years. This study reported that following 10 months, the change in spherical equivalent refraction (SE) and axial length (AL) in the eye wearing the dual focus lens was significantly less than that in the contralateral eye wearing the single-vision lens (SE: -0.44 D vs. -0.69 D; AL: 0.11 mm vs. 0.22 mm).

**TABLE 1** Study lenses for control and treatment groups.

<table>
<thead>
<tr>
<th>CONTROL GROUP</th>
<th>TREATMENT GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens type</td>
<td>Proclear 1 day</td>
</tr>
<tr>
<td>Design</td>
<td>Single vision</td>
</tr>
<tr>
<td>Material</td>
<td>omafilcon A</td>
</tr>
<tr>
<td>Diameter (mm)</td>
<td>14.2</td>
</tr>
<tr>
<td>Base curve (mm)</td>
<td>8.7</td>
</tr>
<tr>
<td>Water content (%)</td>
<td>60</td>
</tr>
<tr>
<td>Wear regimen</td>
<td>Daily disposable</td>
</tr>
</tbody>
</table>

**MiSight 1 day lenses**

MiSight 1 day myopia management contact lenses (CooperVision) were approved in the U.S. in November 2019, are manufactured using omafilcon A material, and implement a dual focus design. Four alternate rings of power are used to correct existing myopia and to create myopic defocus over the entire retina. MiSight 1 day features a central distance correction zone for clear vision with a concentric treatment zone introducing myopic defocus. A further distance and treatment ring completes the design (Figure 1).

The results of a randomized, three-year clinical study into the effectiveness of MiSight 1 day have been presented in recent years at key global clinical conferences and have been published in *Optometry and Vision Science.*\(^\text{26}\) This article summarizes the key findings from that research and other work presented at key conferences on the lens’ performance.

**Study outline**

The study enrolled 144 children who were randomly assigned to the control group or the treatment group. The treatment group wore MiSight 1 day (n=70), and the control group wore Proclear 1 day (omafilcon A, CooperVision; n=74), these interventions were identical in all respects apart from optical design (see Table 1).

To help ensure that the children recruited to the study were ethnically diverse, four clinical research sites located in the United Kingdom, Canada, Portugal, and Singapore were chosen. Myopic children with no prior contact lens experience were recruited with specific inclusion criteria (see Table 2).

The investigators, children, and parents were unaware of which group participants had been assigned to. See MiSight on page 14.

**Figure 1.** MiSight 1 day lens design.
assigned to for the duration of the study due to a rigorous randomization and masking procedure. Further, both groups were recruited to be extremely well matched with no significant differences between the groups for all factors considered to be important in myopia control (see Table 3).

The children were instructed to wear the assigned contact lenses on a daily disposable basis for a minimum of 10 hours per day at least six days per week for the duration of the study. Follow-up visits were scheduled after one week and one, six, 12, 18, 24, 30, and 36 months.

Some 109 children who were dispensed lenses completed the clinical trial (53 wearing MiSight 1 day, 56 wearing Proclear 1 day) which represents an extremely high retention rate for a study of this nature and duration.

Key findings

Refractive error and axial length

Cycloplegic refractive error (SERE) and AL were measured at baseline, 12-month, 24-month and 36-month visits. Open-field autorefration was conducted with a Grand Seiko autorefractor, and 36-month visits. Open-field autorefraction was measured at baseline, 12-month, 24-month and 36-month visits. Open-field autorefraction was measured at baseline, 12-month, 24-month and 36-month visits.
to help understand the impact of MiSight 1 day in an older population of children. The children in both groups showed similar rates of progression through Years Four and Five in both refractive error and axial length growth.36

At the same meeting, data were presented on the wearer experience and subjective responses comparing the dual focus and spherical daily disposable lenses from the study.37 Subjective responses with MiSight 1 day were similar to those with the equivalent single-vision spherical lens, and most vision ratings were consistently high, similar for both lens types and equally liked.

The children aged eight to 15 demonstrated a high level of capability with wearing contact lenses and were highly satisfied with the comfort, vision, and handling performance of both MiSight 1 day and Proclear 1 day. All children had a significant preference for contact lenses over spectacle lenses, emphasizing their success with soft, daily disposable lenses.

Conclusion
Being a daily disposable lens, MiSight 1 day offers well-documented advantages over reusable lenses34,35 and is widely considered to be an ideal option for children and teens. With MiSight 1 day, ECPs now have the option of prescribing an easy-to-fit contact lens to help manage myopia progression in their young patients.

Intervention at an early age, when the amount of myopia is low, should be discussed with all parents.●

This article is based on an article published in Optician. UK: Chamberlain P, Dumbleton K, Lumb E. Clinical Evaluation of MiSight 1 day Contact Lens for Myopia Control: Three-Year Milestone Results. Optician. 06 September 2019 pages 28-33.

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Blue light is one of the main causes of damage to our eyes as we age and is an important factor that can cause the worrisome loss of sight-enabling pigmentation in the back of the eye.

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- Color Rendering, how truthfully a color is shown by the light measured compared to if the color was lit by bright sunlight.
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What do rosacea and meibomian gland dysfunction (MGD) have in common? Apparently, a whole lot, according to Douglas Devries, OD, FAAO, in Sparks, NV. It turns out that a commonly used treatment for rosacea might be the hidden weapon ODs have been looking for in helping to manage dry eye.

Dr. Devries discussed this innovative new way that ODs can manage the symptoms of MGD during Vision Expo West 2019 in Las Vegas.

Facts on MGD and rosacea

One in 10 people are affected by rosacea with over 80 percent of those patients having concomitant MGD, which results in dry eye, according to Dr. Devries.

“There is a clear association between MGD and rosacea,” Dr. Devries says.

Rosacea is generally a cosmetic concern for patients, with little to no associated physical pain. MGD, on the other hand, is a known driver of discomfort—particularly for contact lens wearers.

MGD contributes to decreased contact lens wear and dropout overall—and many contact lens wearers never realize they have it, Dr. Devries says.

Traditional remedies for MGD as well as dry eye are focused on managing symptoms and preserving meibomian gland function. Therapies such as topical medication and manual lid stimulation are often used in conjunction with one another, but less explored is the potential of dry eye relief via light stimulation, specifically, intense pulsed light (IPL).

IPL basics

IPL uses a targeted, wide spectrum light that is separated by cut-off filters to provide localized treatment to the surface of the skin.

This approach is a common therapy in dermatological practice due to the way targeted light exposure helps improve the superficial appearance of the skin.

As it turns out, this outcome is what makes IPL an appealing option for both ODs and patients, too.

“There was tremendous interest in a therapeutic procedure that gave a cosmetic side effect,” Dr. Devries says.

Typically, patients opting for this treatment undergo several sessions of light therapy spaced several weeks apart. ODs guide the device along the patient’s face to carefully stimulate tissue and activate meibomian gland function.

“The algorithms within the device will tell you what cut-off filters to use for each patient’s skin type,” Dr. Devries says.

“I think meibomian gland imaging is one of the best things that you can do as a baseline for all of your contact lens patients,” Dr. Devries says.

But like all new therapies, ODs must work to manage patient expectations, going in.

Although IPL therapy is proving effective as an adjunct therapy for MGD, it still cannot restore atrophied meibomian glands.

However, it is a promising approach. Both ODs and patients seem satisfied.

“The acceptance has been tremendous—patients are very happy with the results,” Dr. Devries says.

Combining medical and aesthetic

Dr. Devries says that the cosmetic benefits are a key selling point for wary patients.

“It will take care of fine collagen,” he says.

Targeted light therapy can reduce or outright eliminate sun spots, age spots, and facial rosacea by stimulating collagen until it breaks down and is reabsorbed by the skin.

Although this is where the cosmetic benefits end, ODs should continue addressing MGD by following-up with thermal expression, Dr. Devries says.

“Unquestionably, the best results are conducting IPL and then performing thermal expression,” he says.

He also recommends that ODs suggest IPL by explaining the benefits in terms that make sense to the patient. Simple phrasing can completely change a patient’s perspective on the procedure, he says.

“A better patient presentation doubled the amount that people were willing to spend and the number of procedures they were willing to have,” Dr. Devries says.

ODs can take this a step further. Explore meibography tools that provide detailed anatomical views of a patient’s eye, which can act as an important, visual call to action.

“I think this is an absolute necessity as ODs get more involved with providing intense pulsed light treatments,” he says.

TAKE-HOME MESSAGE

Intense pulsed light (IPL) has demonstrated therapeutic effectiveness in treating meibomian gland dysfunction. There are therapeutic applications as well as cosmetic implementations in regard to treatment.

IPL treats rosacea and meibomian gland dysfunction

When ODs see the association between conditions, it can help patients understand treatment.

By Greg Hill and Marek Biernacinski

Figure 1. More than 80 percent of patients with rosacea have concomitant meibomian gland dysfunction.

Greg Hill is a medical freelancer writer based in Atlanta.
Marek Biernacinski is a freelance writer based in Las Vegas.
By Greg Hill

By the year 2050, 45.6 million Americans will need some type of ocular surgery. Some 6.3 million of these patients will require care for glaucoma. As these numbers climb, ODs will see a need for better collaboration with their surgical partners.

Experts like John Berdahl, MD, and Justin Schweitzer, OD, FAAO, of Sioux Falls, SD, predict these new collaborations to come with a few growing pains.

Dr. Berdahl and Dr. Schweitzer challenged optometrists to rethink how they deliver glaucoma care in a presentation at Vision West Expo 2019 in Las Vegas.

With demand increasing for surgical eyecare services, ODs will need to pick up the slack and embrace new collaborative care strategies with ophthalmologists to help meet their patients’ needs, says Dr. Schweitzer.

The role of ODs in collaborative care
“Is there a missing link in that communication?” Dr. Schweitzer asks of the typical relationship between ODs and ophthalmologists.

Co-managing glaucoma patient care requires different strategies that are not always obvious to one side or the other. Communication is key, Dr. Schweitzer says.

ODs remain responsible for discussing options, suggesting procedures, and caring for patients across the operative spectrum. But in collaborative care, ODs and ophthalmologists need to support one another.

“Patients are not using medication regimens correctly, no matter what they tell you,” Dr. Schweitzer says.

“Help ophthalmologists keep their options open,” Dr. Berdahl says.

He suggests that ODs think long term about what type of care the patient will receive on both sides of the referral.

For example, if an OD suspects a patient might need minimally invasive glaucoma surgery (MIGS), she may decide to put the patient on a drop ahead of time. Such a treatment plan makes it easier for the ophthalmologist to prescribe a follow-up treatment, if needed.

As optometrists refer, they should try to leverage their longstanding patient relationships, Dr. Berdahl says. Patients may have more confidence in their trusted clinicians than with new ophthalmologists.

“You can really help us with your 15-year relationship that we can’t get in our 15-minute interaction,” he says.

MIGS and glaucoma compliance
A key aspect of modern glaucoma management is leveraging MIGS alongside traditional methodologies.

MIGS formed a bridge between conservative treatments and more aggressive filtration surgeries, Dr. Schweitzer says. In addition, MIGS offers an easier way for patients to adhere to their medication regimens—a known challenge in glaucoma management.

“Patients are not using medication regimens correctly, no matter what they tell you,” Dr. Schweitzer says.

MIGS offers an alternative that reduces the burden of medication.

“When we take compliance out of our patients’ hands, it is usually a win for the patients,” Dr. Berdahl says.

Long-term glaucoma management
Among the other tools used to manage glaucoma, selective laser trabeculoplasty (SLT) offers a successful first-line treatment. This approach selectively targets pigmented trabecular meshwork (TM) cells, with research showing successful decreases in mean intraocular pressure (IOP).

Other methodologies involve the use of stents, subconjunctival devices, and trabecular meshwork procedures that offer glaucoma relief.

Among the treatments mentioned were original iStent (Glaukos), Hydrus Microstent (Ivantis), Kahook Dual Blade (New World Medical), Omni Glaucoma Treatment System (Sight Sciences), and Xen Gel Stent (Allergan).

“To me, minimally-invasive glaucoma procedures are really a no-brainer,” Dr. Schweitzer says. However, ODs need to be careful when deploying newer technologies.

“The right thing for the patient may not be the right thing for the eye,” Dr. Berdahl says.

ODs: Redefine your role in glaucoma collaborative care

Good communication is key when it comes to keeping patient needs at the forefront of care.

Certain therapies may not be covered by a patient’s health insurance. In those cases, the OD needs to balance the patient’s personal needs with the best medical approach.

“What I usually believe the right thing for the eye is to try a trabecular bypass approach first,” Dr. Schweitzer says.

Taking compliance out of patients’ hands is a win for patients

This approach can produce dramatic results without the need to resort to more invasive implantations, he says.

Stopping glaucoma medications
A common concern for glaucoma patients is the type of daily management they will need to maintain after their surgery.

“When do you take a patient off a medication after a MIGS procedure?” Dr. Schweitzer asks.

Dr. Berdahl suggests keeping patients on medications for at least a week prior to the procedure, then decreasing medications, as needed, based on IOP. Again, ODs must keep the patient’s expectations in mind during these discussions.

“A lot of times patients want to know if they will get off their drops after surgery,” Dr. Berdahl says. As the stewards of the patient’s postoperative care, ODs will need to make sure they are coordinating with their surgical partners to come up with the right answers for the best patient management.

Greg Hill is a freelance writer based in Atlanta.
PUT YOUR PATIENTS WITH DIABETIC RETINOPATHY (DR) ON THE PATH TOWARD MANAGING THEIR DISEASE AND SET THE COURSE FOR SUCCESS IN DR

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

Through early detection, monitoring, and timely referral, you play a pivotal role in managing your DR patients’ vision\textsuperscript{3-4}

If you see or suspect DR:

Educate your patients about the severity of DR, especially when left untreated\textsuperscript{3-4}
- Your early and frequent discussions about disease progression, treatment options, and referral will empower patients, which could help them avoid significant vision loss\textsuperscript{3-4}

According to the AOA, you should refer patients with\textsuperscript{5}:
- Severe nonproliferative DR (NPDR) within 2 to 4 weeks
- Proliferative DR (PDR) within 2 to 4 weeks
- High-risk PDR with or without macular edema within 24 to 48 hours

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

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

The AOA recommends frequent monitoring of patients\textsuperscript{3}
- At least every 6 to 8 months in patients with moderate NPDR and more frequently for patients with greater disease severity\textsuperscript{3}

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

Regeneron is committed to helping you partner with your patients for comprehensive care of DR, as well as for care of other retinal diseases.

AOA = American Optometric Association.

Telemedicine in optometry: Is it inevitable?

Telemedicine is finding a place for itself in optometry, but should ODs allow it more room?

By Greg Hill

S

hould optometrists (ODs) embrace the rise of telemedicine? Or is it a step in the wrong direction?

Dr. Mike Rothschild, OD, of Leadership OD, posed these questions at Vision West Expo 2019 in Las Vegas.

It is no secret that telemedicine is a hot topic in optometry. ODs are turning to technology to improve patient access to care, healthcare delivery speed, and patient satisfaction overall. Dr. Rothschild sought to address the trends—as well concerns—that will shape the future of telemedicine in optometry.

Telemedicine is expanding healthcare

The benefits of telemedicine include shorter patient wait times, better prioritization for urgent care, and a lessened load on the OD’s schedule. And according to Dr. Rothschild, patients in the U.S. are ready for it.

“About 70 percent of Americans, all age groups, are willing to see a doctor remotely,” he says.

And the use cases for telehealth are growing, in turn.

“Stroke and radiology are the big topics right now,” Dr. Rothschild says.

He recounted a past experience in which a patient was quickly diagnosed with a stroke through a virtual telemedicine consultation, ending in a positive outcome.

“All of us know that early intervention in stroke care is the most important piece of it,” he says.

Through strategies like these, telemedicine has the potential to be used for life-saving applications.

It’s important for ODs to help patients understand that the doctor they’ll be seeing isn’t the doctor they’re used to

Dr. Rothschild detailed several other advancements, one of which is the remote monitoring of intraocular pressure (IOP). This tool has the potential to improve healthcare delivery by distributing continuous, consistent care.

For example, Dr. Rothschild described how one such tool could track a patient’s IOP and automatically alert her if and when her pressure levels grew too high.

And though the technology is still new, these advancements and those like it are being supported by new Medicare codes—something Dr. Rothschild notes is a good sign for adoption.

“The fact that Medicare is creating these kind of codes means that it is starting to come,” he says. However, not everyone is on board.

Addressing telemedicine concerns

Both patients and optometrists have concerns about the push for telemedicine.

Dr. Rothschild described three primary concerns voiced by those unwilling to try telemedicine:

1. Preference for face-to-face appointments
2. Lack of confidence in the technology
3. Hesitation over concerns if insurance will pay

“They are the kind of things that are worrying the people who are not ready to jump on this yet,” he says.

Patients are not the only ones with concerns about the rise of telemedicine. There are blind spots within the approach that doctors are taking note of. Dr. Rothschild detailed several problems heard from clinicians:

1. Health Insurance
2. Portability and Accountability
3. Act (HIPAA) compliance
4. Guaranteeing payment from providers
5. Ensuring that patients understand the service

Addressing these apprehensions will involve coordination from entities like Medicare alongside optometrists. Dr. Rothschild noted that relationship-building would be a key aspect of this approach.

“What we have to do better is focus on the relationships,” he says.

It is important for ODs to help patients understand that the doctor they will be seeing is not the doctor they are used to. ODs also need to educate patients on available tools to help facilitate their transition into tech-enabled healthcare.

Across virtual appointments, interactive exams, screening applications, and other tools, this push has as much potential benefit for optometrists as for the patients themselves.

“This is a good antidote for provider burnout,” Dr. Rothschild says.

The application of telemedicine can reduce the burden on an overworked OD in part by helping with prioritization in the clinic and in part by serving patients through online contacts and video conferencing rather than traditional, in-person exams. ODs can give what limited attention they have to the most pressing cases while leaving less-critical tasks to others, thus optimizing their practice overall.

“We can focus on the acute concerns... the routine stuff may be happening next door or across the hall,” he says.

So, while the outlook of telemedicine in the optometry is bright, telemedicine as a strategy is still limited in its capabilities. Foreign body removal, for example, cannot be done remotely. A human element is still a crucial aspect of delivering quality care. The hands-on guidance of an OD can never be replaced virtually when it comes to delivering bad news, such as a glaucoma diagnosis, or helping a child through his first eye exam.

“When the time, a doctor has to be there for the stuff that can’t be done online,” Dr. Rothschild says.

Greg Hill is a freelance writer based in Atlanta.

TAKE-HOME MESSAGE

Telemedicine is transforming how patients access eyecare. Benefits of telemedicine include shorter wait times, better prioritization for urgent care, and a lessened load on ODs’ schedules. Despite the perks, there are concerns about the push for telemedicine from both doctors and patients. In order to address these, ODs will need to focus on making the switch gradually to virtual appointments, interactive exams, and other tools.

70% of Americans, all age groups, are willing to see a doctor remotely
Defining hypertension

Hypertension, based on most current standards, is defined as having a measured blood pressure of ≥140 mm Hg systolic or ≥90 mm Hg diastolic.1

Under this definition, the prevalence of hypertension in the U.S. is astounding, affecting 30.8 percent of adults age 20 or older, which in 2015 amounted to 75 million Americans.2 Prevalence increases with age, impacting 64.9 percent of those age 60 and older, and is most common among African Americans.3

These statistics have been relatively stable since the early 2000s.

However, the 2017 American College of Cardiology/American Heart Association Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure (ACC/AHC) in Adults defined hypertension as ≥2 blood pressure readings in ≥2 settings with ≥120 mm Hg systolic or ≥80 mm Hg diastolic.4

In conflict with other internationally recognized standards, this lower threshold for diagnosis increases the prevalence of hypertension in American adults by 26.8 percent.4

2017 guidelines criticized

The lowered thresholds for initiating management and treatment goals are based on lowering risk for future cardiovascular disease and the documented benefit of blood pressure reduction based on clinical trials.4

A more recent publication showed that patients had the same risk of cardiovascular disease regardless of threshold utilized, advocating an early start to therapy when indicated by the lower values.4

Optic disc and/or macular edema are examples of severe hypertensive retinopathy which do represent end-organ damage, making the eye exam key in the decision-making process

However, the lowered thresholds for classification and treatment have generated controversy among healthcare providers nationally and internationally with the criticism focused on the associated increased prevalence of hypertension, unnecessary treatment without perceived benefit, and subsequent cost to people and healthcare systems.1,4

On the other hand, the 2017 ACA/AHA Guidelines include 100 pages of useful points for the care of hypertensive patients, including methodologies, risk factors, etiologies, co-morbidities, and treatment strategies. Those aspects most applicable to optometry will be summarized here.4

Historically speaking, most practitioners recognize the blood pressure guidelines published by the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC), most recently updated in 2014.5

Table 1 illustrates JNC blood pressure classification and referral guidelines, with a comparison to the 2017 ACC/AHA guidelines (highlighted in gray). Generally speaking, most values are 10 mm Hg lower based on ACC/AHC.

One of the most notably positive aspects of the 2017 ACC/AHA Guidelines, which brought praise from the International Society of Hypertension and others in the healthcare community, was that its lower thresholds have the potential to increase awareness of hypertension as a chronic disease with significant risk of morbidity and mortality for those in the earlier stages of the disease. This awareness has the potential to cause preventive behavior, such as positive lifestyle modifications, before the disease progresses.

In addition, it emphasized the importance of considering risk factors when determining thresholds for treatment as well as treatment strategies. Risk factors including age >65, atherosclerosis or risk of developing it (e.g. high total cholesterol; smoking history), chronic kidney disease, and diabetes can be entered into an online risk calculator developed as a product of this publication.

The atherosclerotic cardiovascular disease (ASCVD) risk calculator can be accessed at http://tools.acc.org/ASCVD-Risk-Estimator/ or downloaded as a smartphone application.

Based on the results of the risk calculator for a patient’s 10-year risk of CVD, patients with blood pressure readings in different categories may be recommended for non-pharmacologic or pharmacologic therapy.

For example, a patient with blood pressure of 127/86 mm Hg with a low ASCVD 10-year risk (<10 percent) would be recommended strictly non-pharmacologic therapy, focusing on a healthy diet, exercise, and other positive lifestyle changes. A different patient with the same blood pressure but an ASCVD 10-year risk of >10 percent would be recommended pharmacologic therapy in addition to the lifestyle modifications. In fact, most adults who are classified as hypertensive under the 2017 ACC/AHA Guidelines, but not previously using JNC standards, would simply be managed with non-pharmacologic treatments.4

Proper blood pressure measurement

Accurate data is the first step to any medical decision-making process, and blood pressure readings are not an exception. The 2017 ACC/AHA Guidelines emphasized the importance of technique in obtaining accurate blood pressure readings, and possible sources of error.

The prevalence of hypertension in the U.S. is astounding, affecting 30.8% of adults age 20 or older, which in 2015 amounted to 75 million Americans.

Prevalence increases with age, impacting 64.9% of those age 60 and older, and is most common among African Americans.
Hypertension

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KEY STEPS:

- The patient should be seated and relaxed for five to 10 minutes prior to taking measurement.

- The proper sized cuff should be chosen for the patient’s arm in order to avoid over- (if the cuff is too large) or under-estimation (if the cuff is too small) of actual reading.

- The patient should have unrestricted bearing of the upper arm.

- The patient should be seated with legs uncrossed and with back against a chair or wall.

- The patient should have a slightly bent arm with palm up so the midpoint of the upper arm is resting at right atrium level. If the arm is above heart level, the reading will be underestimated. Due to gravitational forces, if the arm is held below heart level, the reading will be overestimated.

- The patient’s arm is rested on a table or an armrest, or it can be fully supported by the clinician (see Figure 1) if needed. No exertion should be present in order to prevent muscle contractions, which could artificially increase the reading.

- The clinician should palpate for the radial pulse (Figure 2), then pump the cuff quickly to the point where this pulse first disappears. The clinician should then continue to pump for an additional 30 mm Hg before slowly deflating the cuff at a rate of 2 to 3 mm Hg/second and listening for the first sound.

Pumping at least 30 mm Hg past the disappearance of the radial pulse will help to avoid the auscultatory gap, a period of diminished Korotkoff sounds during manual measurement and can prevent a gross underestimation of systolic blood pressure. This period of inaudible sounds impacting approximately 20 percent of patients can be up to 20 mm Hg long and is most common with increased arterial wall stiffness, such as those patients with chronic hypertension.

Automated blood pressure cuffs offer a quick and fairly accurate alternative to manual blood pressure for screening and can be easily taught to technicians. Accuracy is known to be a concern in extreme high and low ranges, so manual blood pressure can be used to repeat readings in these cases. For best results, patients using wrist cuffs should be asked to brace their tested wrist against the chest at heart level.

Handling a hypertensive crisis

One of the most important situations for which optometrists need accurate and the most up-to-date guidance is when a patient’s blood pressure is extremely high, obligating the practitioner to act quickly and with confidence.

The guidelines tell us that when a blood pressure is above the critical high point, defined by JNC as >180 mm Hg systolic or >110 mm Hg diastolic (note that ACC/AHA defines the diastolic as >120 mm Hg, interesting enough), there is potential for a hypertensive crisis, which is a true medical emergency.

What differentiates the urgency from the emergency in these scenarios is evidence of end-organ damage, which most often occurs when the blood pressure has rapidly increased beyond the range within which the body’s auto-regulation system can adapt.

Optic disc and/or macular edema are examples of severe hypertensive retinopathy which do represent end-organ damage, making the eye exam key in the decision-making process. Evaluating these structures before sending the patients along is crucial.

A patient with blood pressure of 159/116 mm Hg and notable optic disc as well as macular edema, as noted in Figure 3, for example, is treated as an emergency. A patient with the same blood pressure but the absence of disc edema can be treated urgently, referring within one week.

These referral decisions can be intimidating and based on many other factors, such as systemic symptoms (e.g. headache, malaise) as well as primary-care doctor recommendations.

There may be special considerations for the remainder of the eye exam after the blood pressure has rapidly increased. For example, ODs have a choice of a variety of dilation agents and in some cases the option of non-mydriatic or wide-field photographs instead. While 2.5% phenylephrine is considered safe and

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**TABLE 1** Blood pressure classifications and referral guidelines

<table>
<thead>
<tr>
<th>Blood pressure classification</th>
<th>Systolic</th>
<th>Diastolic</th>
<th>Referral urgency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
<td>N/A</td>
</tr>
<tr>
<td>Pre-hypertension/Elevated</td>
<td>JNC 120-139 and JNC 80-89</td>
<td>ACC/AHA 120-129 and ACC/AHA &lt;80</td>
<td>1 year</td>
</tr>
<tr>
<td>Stage 1 HTN</td>
<td>JNC 140-159 or JNC 90-99</td>
<td>ACC/AHA 130-139 or ACC/AHA 80-89</td>
<td>2 months</td>
</tr>
<tr>
<td>Stage 2 HTN</td>
<td>JNC ≥160 or JNC ≥100</td>
<td>ACC/AHA ≥140 or ACC/AHA ≥90</td>
<td>1 month</td>
</tr>
<tr>
<td>Critical high point/</td>
<td>JNC &gt;180 or JNC &gt;110</td>
<td>ACC/AHA ≥180 or ACC/AHA ≥120</td>
<td>Immediately to 1 week</td>
</tr>
</tbody>
</table>

*Table modified from ACC/AHA 2017 Guidelines to include referral urgency and JNC Comparison.*
has not to date been noted to increase heart rate or blood pressure, it is likely not necessary for adequate dilation to examine the posterior pole. Phenylephrine 10%, on the other hand, should be avoided as even the slightest increase to heart rate or blood pressure can be life-threatening to patients in this vulnerable vascular state.10 Nasolacrimal occlusion can also be utilized to minimize systemic absorption of topical vasoconstrictors, when necessary.

Why a hypertensive crisis
Under normal blood pressure ranges, the autonomic nervous system’s auto-regulation helps to control retinal blood flow. However, it operates within a certain range, beyond which the system breaks down and vessels are no longer protected. Typically optic disc and macular edema are caused by a very rapid increase in blood pressure to a point beyond this range, allowing for fluid and exudative material to escape outside of the vasculature.

Most patients who experience a hypertensive crisis have a known history of hypertension but have had a recent change in medication, have problems with compliance, or may be having a drug interaction with a recent additional medication, such those listed in Table 2.

Unfortunately, these hypertensive events are strongly associated with mortality, with a one-year death rate of greater than 79 percent.1 Median survival of these patients is 10.4 months if the emergency is left untreated, which highlights the need for ODs to be on the lookout and to manage appropriately.

Optometry’s role
Optometry’s role continues to be recognition, accurate results, and timely referrals.

Part of discussions with patients suffering from hypertension, or those with elevated blood pressure, should always include education. Hypertensive retinopathy is second only to diabetic retinopathy, and while it does not as likely lead directly to vision loss, it is equally associated with systemic morbidity and mortality.11 Hypertension was a pri...
Hypertension
Continued from page 25

mary or contributing cause of more than 360,000 deaths in the U.S. in 2013, with stroke, heart attack, and kidney disease being the most common mor-

12

dities.12,14 These points tend to hit home when we relate them to vision.

Known hypertensives should also be encour-

aged to perform home monitoring of blood pressure because we now know that this is a crucial behav-

ior for success stories in hypertension compliance. Automated cuffs and other devices can be used

to home to not only create daily modifications to behavior on the part of the patient but also to establish a record of data for the provider treating the disease and can reduce inaccuracies related to office-induced hypertension (ie. “white coat” hypertension).

Measuring blood pressure in-office is quick, easy, and has the potential to influence a patient’s health in many ways.●

REFERENCES

Dr. Steele graduated from the UAB School of Optometry in 2003, then com-
pleted a residency in primary care and ocular disease at the Tuscaloosa Veter-
ans Affairs Medical Center. She joined the UAB faculty in 2004. She received the SECO Young Optometrist of the South Award in 2010 and the AOA Educator of the Year Award in 2017. Her teaching interests include ophthalmic imaging and ocular disease. bsteele@uab.edu

IN BRIEF

Parents don’t prioritize children’s vision, according to new survey

BOULDER, CO—A new survey from The Global Myopia Awareness Coalition (GMAC) reveals that while parents remain focused on their children’s overall success, only 57 percent make regular appointments to stay on top of their children’s health.

Parents ranked annual visits to the eye doctor as less important than visits to the dentist or pediatri-

cian. In fact, only 27 percent of parents re-

ported taking their children to an optometrist in the past year. This may be due to the mispercep-
tions the survey also revealed about what com-
prehensive eye exams entail.

For example, while most parents (85 percent) said they were at least somewhat familiar with comprehensive eye exams, 88 percent also be-
lieved that comprehensive exams aren’t needed until their children enter school, and nearly half (48 percent) believed that a pediatrician could conduct them.

In reality, an annual comprehensive eye exam should be scheduled for children as early as six months old, can only be conducted by an eye care specialist, and is vital to diagnosing common vi-
sion problems such as myopia, or nearsighted-

ness, which can increase the risk of eye diseases later in life.

Unlike regular visits to the dentist or pediatric-
ian, parents reported waiting until something is “wrong,” like their children telling them they can’t see the whiteboard (66 percent), seeing their children squint more than normal (62 percent), or seeing their children hold materials far away (52 percent), in order to take them in for a com-
prehensive eye exam.

“We know parents will do just about anything to help their kids succeed, and healthy vision plays a big role in that whether a child is able to express it to their parents or not,” says Matt Oerding, co-
founder and CEO of Treehouse Eyes and GMAC board chairman.

“Knowing your children’s potential risk of myo-
pia and taking action before it’s too late can benefit their academic and athletic performance, personal growth and overall health,” he says.

Treatment options for myopia continue to ex-
pand. Just last month, the U.S. Food and Drug Administration (FDA) granted GMAC member company CooperVision, Inc. approval of the first contact lens indicated to slow the progression of myopia in children between the ages of eight and 12 years old at the initiation of treatment.●
Achieving Individualized Patient Experiences

When assessing contact lenses, the best choice an optometrist can make is one that best fits into their patients’ lives.

In this Optometry Times® podcast, Heather Webster, OD, discusses the wide range of eye conditions and lifestyles managed by a family of contact lenses, from seasonal allergies and light sensitivity to extended computer use, presbyopia and astigmatism.
MiSight
Continued from page 15
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Dr. Palombi is a graduate of The Ohio State University College of Optometry. She lectured on both ocular disease and contact lens topics during her 20 years of clinical practice, which included private practice, hospital-based, and OVD/MD practice settings.

Mr. Chamberlain earned his bachelor’s degree in optometry from City University in London. He is responsible for the strategic direction and execution of CooperVision’s research in myopia. Before joining CooperVision in 2011, Paul spent five years managing industry-sponsored research studies at Eurolens Research at the University of Manchester. Prior to that, he was part of Michel Guillon’s research team at Optometric Technology Group in London.

Dr. Dumbleton is a clinical research scientist and consultant. She completed her optometry training at the University of Wales in Cardiff and at Moorfields Eye Hospital in London and her MSc in Physiological Optics and PhD in Vision Science at the University of Waterloo in Ontario, Canada. She is a Diplomate of the College, Contact Lens, and Refractive Technologies Section of the American Academy of Optometry. Dr. Dumbleton has more than 30 years of experience in vision research. Her research interests include contact lens materials and designs, the ocular surface, and compliance with health care treatments and recommendations. She currently serves as the secretary of the International Society for Contact Lens Research and as a consultant for CooperVision, Alcon, Johnson & Johnson Vision, and Plexus Optix.

By one month of use, over 80% of children described contact lens application as ‘kind of easy’ or ‘really easy’ from 2011:52:6690-6.

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Surgical, medical approaches making waves in presbyopia

Pipeline, research giving insights into treatment options for managing refractive condition

By Greg Hill and Marek Biernaciński

The simple fact is, we are all marching toward presbyopia. It is the only eye dysfunction with 100 percent penetration. The treatment market for presbyopia and myopia is set to surpass $28 billion by 2026, according to the latest Grand View Research, Inc. report.

So, while we are all destined to face presbyopia at one point or another, advances in treatment options are expanding.

This was the message from Larry Baitch, OD, PhD, FAAO, of the Massachusetts College of Pharmacy and Health Sciences (MCPHS) College of Optometry, at the American Academy of Optometry 2019 annual meeting in Orlando.

Overview of presbyopia management

Presbyopia is a significant concern in optometry, marked by a loss in dynamic accommodation. Though we still don’t fully understand the relationship between presbyopia and accommodation, research is giving optometrists some insights into how to manage presbyopic symptoms through surgical intervention and medical therapies.

“What we’re seeing is that the eye is actually an adaptive optic,” Dr. Baitch says.

Though there are multiple theories on the exact mechanisms behind accommodation, it is known that restoring lenticular dynamic accommodation is a crucial goal for improving near vision in presbyopia management.

New surgical modalities

Several surgical treatment tools in the pipeline may offer better outcomes for presbyopic correction.

Dr. Baitch says that the Crystalens intraocular lens (IOL, Bausch + Lomb) was a forerunner for many of these technologies.

This lens was key to the US Food and Drug Administration (FDA) guidance that any device labeled as an “accommodative device” must provide at least one diopter of accommodation documented by objective and subjective means over long-term studies.

SightLife Surgical Kamra

The only FDA-approved corneal implant available today is the Kamra (SightLife Surgical).

The pinhole-aperture implant has experienced high levels of patient satisfaction due to improved, uncorrected near visual acuity, Dr. Baitch says. However, it is not a magic-bullet solution as retrospective studies have shown explantation rates of 5.7 percent over 31 months.

Though adverse events are unavoidable for surgical procedures, eyecare providers need to balance the risks against the benefits for each patient. “You have to decide whether that is acceptable to you,” Dr. Baitch says.

Presbyopic allogenic refractive lenticule (PEARL)

The PEARL technique uses a femtosecond laser to create a lenticule in the corneal stroma, with the goal of using the patient’s tissue for the presbyopic inlay.

This approach reduces complications of synthetic material rejection and supports better oxygen and nutrient flow through the cornea. However, a primary drawback is that it’s still a modified monovision technique.

“Again, it’s still a multifocal,” he says.

Intracor multifocal corneal ablation

Intracor offers an innovative approach to presbyopia management that involves deliberately creating ectasia in the lens.

“Anybody who’s worked in refractive surgery knows that our biggest horror is ectasia,” he says. Intracor’s approach leverages a femtosecond laser, inducing intentional ectasia to create a multifocal corrective effect in the central near zone. In a 12-month follow-up visit, 71.4 percent of patients were satisfied with the procedure.

Additional treatment options

Other emerging modalities discussed include:

– Refocus binocular treatment,
– VisAbility scleral implant for presbyopia
– AceVision VisioLite Laser

Pharmaceutical treatments

In terms of pharmaceutical management, one of the most exciting products is an eye drop to treat presbyopia (UNR844, Novartis; formerly EV06). This drug treats the lens directly by “un-crosslinking” the lens and breaking the collagen fibers to support elasticity.

Another new option is the corneal shaping contact lens (Yolia) that reshapes the lens structure with the help of a topical pharmaceutical.

“There’s improved near vision, and reportedly no loss in distance visual acuity,” he says.

Additional treatment options

With the addition of these exciting new technologies, partial or complete restoration of accommodation allowing truly effective near-to-far focus may be possible.

Greg Hill is a freelance writer based in Atlanta. Marek Biernaciński is a freelance writer based in Las Vegas.

TAKE-HOME MESSAGE

As the only eye disorder with 100 percent occurrence, there is no modern treatment that reverses the accommodative deficiency that defines presbyopia. Patients requiring a full range of vision without optical aids often turn to surgical fixes which exist as a stand-in for recovering near vision, necessitating neuroadaptation and a high tolerance for reduced night vision. Exciting technologies in the pipeline may provide partial or complete restoration of accommodation allowing truly effective near-to-far focus.

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Careers

New Jersey
Q: How did you get from nutritional science to optometry? I was originally a business major with premed tracking, but I found out that I would have to do an additional year to complete my business degree and premed. I have always been interested in the science behind what you consume on a daily basis and how it impacts your body. Originally, I wanted to be a dermatologist. I’m a man of faith, and the dermatologist I was shadowing was down about his profession—he was lackluster to recommend it but also depressed about the number of years he put in to get where he was. So, I started looking at all the healthcare professions. There was a pre-optometry group meeting that Mark Colip was the featured speaker; he’s now the dean of Illinois College of Optometry (ICO). He inspired me beyond measure.

Q: What’s something your colleagues don’t know about you? I like to joke around that I live on Estrogen Island. I have three older sisters, two sisters-in-law, my wife, my daughter, nine female employees, and a female business partner. It’s a unique role that I live in. As my wife and I continue to build our family, we joke that we will probably have all girls. [Laughs]

Q: What’s your guilty pleasure food? I love chips and salsa. I’m a salt guy. I’m not as much a sweets guy. I could eat any kind of chips and any kind of dip.

Q: What attracted you to entrepreneurship? Just getting involved. I was elected president of the American Optometric Student Association (AOSA) during my third year. Getting a little taste of leadership over time and knowing there’s more to just being a primary eyecare doctor or even specialized optometrist. I like to diversify my life. Entrepreneurial endeavors keep things interesting for me. I try not to bite off more than I can chew.

Q: What are the three best ways for graduating OD students to market themselves? Social media is the number one. It’s something they’re already doing on a day-to-day basis, they’re comfortable with it. Being forward facing, sharing professionally and sometimes personally with your followers is a way to grow an audience and get involved. I recommend also showing up to public events, whether it’s a national meeting, a local society meeting, an industry dinner, or just getting together with colleagues. If they want to market themselves to patients, invite local business leaders. Get involved with different groups—business development groups are in every city. And number three is internal marketing within the practice. As soon as they start practicing, hand a business card to every patient. Follow up with patients when they need to be followed up. Send a personalized thank-you letter for coming to see them. Maximizing your opportunity with every person you provide care to is the easiest way to market yourself.

Q: How did you land your first job? I was in residency and decided that I wanted to move south. I had been going to the North Carolina Optometric Society meetings when I was a student. I took notes, met people, handed out business cards. I started reaching out to those people during my residency and networking...kind of a grassroots effort. None of those people had opportunities at the time, so I reached out to people who had jobs posted and asking who was hiring. The first job that I took out of optometry residency was shared between two practices: Part time in an office in north Charlotte and part time at one in south Charlotte, both in the suburbs. Finding the opportunity didn’t take too long, a couple of months.

Q: How do you benefit from a residency? I enjoyed residency. I went into it because I wanted to maximize my clinical knowledge and experience coming out of school and keep the door open to go to a VA. If you don’t do a residency, it’s hard to get into a VA or academic or research setting. So, it keeps that network open, and I’m a better practicing optometrist because of it. I came out with much more comfort with taking care of people, managing challenging circumstance not only in the exam room but also helping people from check-in to check-out.

Q: What is your biggest frustration with optometry? People underestimating the services they provide. It’s not the optometrists who are doing it but bigger corporations. At times it’s a race to the bottom. Everyone is trying to give away service for free so they can capture a sale of a product, whether it’s contact lenses or glasses. Seeing that in the marketplace frustrates me. I don’t think we should provide anything advertised for free. I understand that telemedicine is going to be a thing of the future and there is opportunity there, we just have to make sure that we are doing it the right way. With some of the disruptive technology, people trying to cut the line of actually coming in and getting fit with contact lenses is frustrating to me as well because their contact lenses are not being fit and prescribed by an eyecare professional.

Q: Do you have any regrets? I like to think of things as glass half full. Everything happens for a reason. You have to play the cards you’re dealt without getting down on mistakes or missed opportunities. I don’t live a life of regret.

Q: What’s the craziest thing you’ve ever done? I’m a pretty boring guy! [Laughs] I asked my wife to marry me about months into our relationship. As somebody who takes time to make decisions, I went with my heart on that one. That’s crazy for me. I don’t make impromptu decisions. It’s 100 percent crazy that she said “yes.” [Laughs] She said yes, and we’re happily married. We have our fourth year anniversary coming up in April, and our daughter is turning two.

—Vernon Trollinger
ACUVUE™ RevitaLens Multi-Purpose Disinfecting Solution offers the all-day comfort and convenience of a multi-purpose solution with peroxide quality disinfection.¹

ACUVUE™ RevitaLens Multi-Purpose Disinfecting Solution (MPDS) killed Acanthamoeba trophozoites – delivering peroxide quality disinfection in vitro.¹

Several in-vitro studies suggest ACUVUE™ RevitaLens MPDS performs favorably vs. leading multi-purpose solutions. However, there is no standardized method for testing the efficacy of lens care solutions against Acanthamoeba.¹

6 hours live-cell imaging of Acanthamoeba castellanii trophozoites.¹

* In an in-vitro study between competitive brands and ACUVUE™ RevitaLens MPDS, time-lapse measurements were taken to accurately document the time course for eradication of Acanthamoeba castellanii trophozoites. The live-cell methodology visually demonstrates the efficacy of each of the contact lens solutions in eradicating Acanthamoeba castellanii trophozoites.

¹UV Data on File 2018. ACUVUE RevitaLens Multipurpose Disinfecting Solution Packaging Claims

ACUVUE™ RevitaLens Multi-Purpose Disinfecting Solution is indicated for the care of soft (hydrophilic) contact lenses, including silicone hydrogel lenses. Use this product as directed in the product carton to disinfect, clean, rinse, store, remove protein and condition contact lenses. Do not use this product if allergic to any ingredient in ACUVUE™ RevitaLens MPDS. Problems with contact lenses and lens care products could result in corneal infection and/or ulcers and lead to loss of vision. It is essential that patients follow the directions and labeling instructions for proper use of lenses and lens care products, including the lens case.

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