July 2013
VOL. 5, NO. 7

Optometry Times®

OptometryTimes.com

Sixth layer to human cornea discovered by UK researcher

Research must be replicated in younger eyes, vetted for clinical significance

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

A new layer of the human cornea has been discovered by a researcher at the University of Nottingham in the UK.

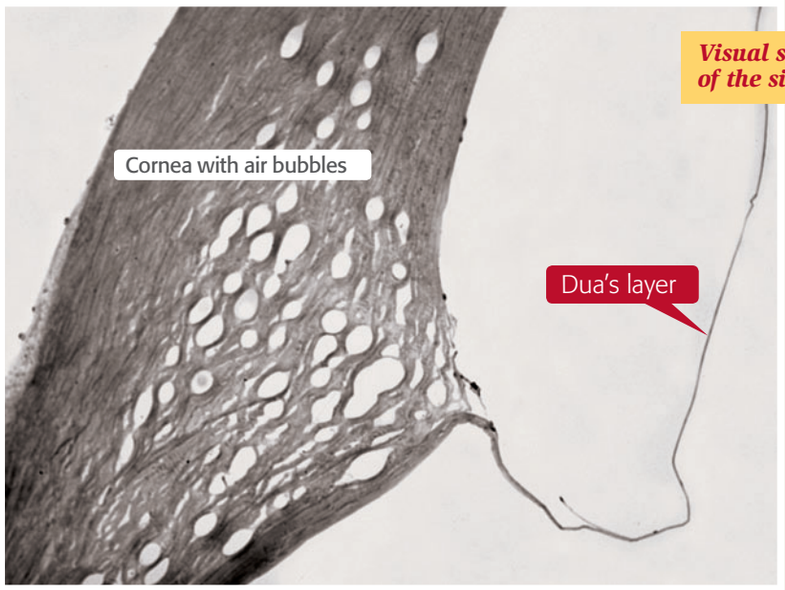
Professor Harminder Dua found the 15-micron thick layer between the corneal stroma and Descemet's membrane. This makes the newly named Dua's layer the fourth of six layers in the cornea. Prof. Dua shared his discovery in a recent study published in *Ophthalmology*.

Prof. Dua suggests that this finding will affect corneal surgery, including penetrating keratoplasty, and understanding of corneal dystrophies and pathologies, such as acute hydrops.

This is an interesting finding that needs to be replicated by other labs in much younger eyes, according to Loretta Szczotka-Flynn, OD, PhD, professor of ophthalmology and visual sciences at Case Western Reserve University, director of the contact lens service at University Hospitals Eye Institute in Cleveland, and *Optometry Times* Editorial Advisory Board member.

"One possibility is that this may be an artifact occurring in older corneas because the only donor corneas they studied came from donors with a median age of 82 years," Dr. Szczotka-Flynn says. "If the presence is confirmed, it will be very important in the lamellar types of corneal transplants. For example, in some lamellar transplants, such as DALK,

See **6th corneal layer** on page 5



Visual sighting of the sixth corneal layer

The newly discovered sixth layer of the cornea is called **Dua's layer,** named after Prof. Harminder S. Dua, whose team of researchers at the University of Nottingham, UK, identified and documented it.

Image courtesy of The University of Nottingham

DES market expected to grow about $4 billion in 10 years

Demand for pharmaceutical products could triple global revenue

By Paul Matheis
Content Channel Manager

London—As dry eye syndrome (DES) affects more and more patients over the next 10 years, pharmaceutical companies are expecting to expand their clinical products globally to treat the condition, thus tripling the market's global revenue over the next decade.

According to an analysis report conducted by London-based research and consulting firm GlobalData, the DES market will benefit from the launch of novel pipeline drugs and the regional expansion of existing products, as manufacturers battle it out for more market share.

Current DES treatments utilize drop applications multiple times daily. However, the DES development pipeline contains various novel delivery technologies and innovative mechanisms of action, which many hope will improve drug efficacy and patient treatment compliance in the future.

DES drug sales in the U.S. accounted for a 63% share of the global market in 2012, and the U.S. is anticipated to remain the most lucrative DES market in the near future, reported GlobalData.

However, the patent expiration of cyclosporine (Restasis, Allergan) in the U.S. and its concomitant approval in Europe will be key drivers for DES sales dropping in the U.S. to a 47% global market share in 2022, whereas the European Union market shares will grow from 19% in 2012 to 41% in 2022.

GlobalData reports that cyclosporine is already the top-selling ophthalmic product in

See **Market growth** on page 5

INSIDE: Special Section

Contact Lenses

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OPTOMETRY TIMES (Print ISSN: 0890-7080, Digital ISSN: 2328-3904) is published monthly (12 issues) by Advanstar Communications Inc., 131 W. First Street, Duluth, MN 55802-2065. Subscription rates: $49 for one year in the United States & Possessions; $59 for one year in Canada and Mexico, and $89 for one year for all other countries. Periodicals Postage paid at Duluth MN 55806 and additional mailing offices. **POSTMASTER:** Please send address changes to OPTOMETRY TIMES, P.O. Box 6089, Duluth, MN 55806-6089. Canadian G.S.T. number: R-124213133RT001, PUBLICATIONS MAIL AGREEMENT NO. 40612608, Return Undeliverable Canadian Addresses to: IMEX Global Solutions, P. O. Box 25542, London, ON N6C 6B2, CANADA. Printed in the U.S.A.

Official publication sponsor of International Vision Expo & Conference New York, International Vision Expo & Conference Las Vegas

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Optometry Times is an optometry-driven publication that disseminates news and information of a clinical, socioeconomic, and political nature in a timely and accurate manner for members of the optometric community.

In partnership with our readers, we will achieve mutual success by:

- Being a forum for optometrists to communicate their clinical knowledge, insights, and discoveries.
- Providing management information that allows optometrists to enhance and expand their practices.
- Addressing political and socioeconomic issues that may either assist or hinder the optometric community, and reporting those issues and their potential outcomes to our readers.

Optometry Times

July 2013 • Vol. 5, No. 7

Nicox partners with Immco Diagnostics to market Sjögren's syndrome test

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

Nicox recently announced that it has partnered with Immco Diagnostics to promote a proprietary laboratory test for early detection of Sjögren's syndrome. The as-yet unnamed test was approved in the U.S. this year and will be launched this fall.

Under the terms of the agreement, Immco will grant Nicox the exclusive rights to market the test to eyecare practitioners in North America. Nicox will be responsible for all marketing activity; Immco will perform testing in its Clinical Laboratory Improvements Amendments (CLIA)-approved laboratory in Buffalo, NY, and handle regulatory activity and reimbursement.

The test will not require a CLIA waiver. "The practitioner will be able to write the order for the patient to go to a local lab," says Nicox Director of Marketing Jason Menzo. "Forty-eight hours later, the practitioner will receive the results. Alternatively, the practitioner may use a lancet to take a sample, then overnight the sample to the Immco laboratory to avoid sending the patient out."

This test combines three proprietary biomarkers (salivary gland protein-1 [SP-1], carbonic anhydrase-6 [CA-6], and parotid secretory protein [PSP]) with traditional markers (antinuclear antibodies [ANA], Ro, La, and Rf [rheumatoid factor]). The proprietary markers were recently discovered by researchers at the University of Buffalo and Immco Diagnostics.[1] Traditional tests for the disease use ANA, Ro, La, and Rf antibodies, which exhibit sensitivity limitations or are associated with later-stage Sjögren's syndrome, according to Nicox. The newer antibodies were found in 45% of patients meeting the criteria for Sjögren's, but lacking antibodies for Ro and La. In patients diagnosed with xerostomia for less than 2 years, 76% had antibodies to SP-1 or CA-6, while only 31% had antibodies to Ro or La.[1]

"The availability of this new diagnostic will further empower optometrists to better fulfill their role as primary eyecare doctors by broadening their diagnostic expertise beyond the exam room," says *Optometry Times* Associate Optometric Editor Katherine M. Mastrota, OD, FAAO, in New York City. "It is of enormous potential to any eyecare professional, particularly those interested in dry eye and ocular surface disease. It would not be surprising that screening for Sjögren's becomes as routine as is a visual field for glaucoma as a component of the comprehensive eye exam."

Says Art Epstein, OD, FAAO: "The thinking currently is that 10% of the population has preclinical Sjögren's. This new test enables practitioners to examine each patient and find specific markers for Sjögren's. It will provide another piece of information to help manage these patients to prevent them from spiraling downward. A practitioner can interface much more effectively with a rheumatologist or internist early on to have these patients monitored and treated." Dr. Epstein is a consultant for Nicox and is in practice in Phoenix.**ODT**

Reference

1. Shen L, Suresh L, Lindemann M, Xuan J, Kowal P, Malyavantham K, Ambrus JL Jr. Novel autoantibodies in Sjogren's syndrome. *Clin Immunol*. 2012 Dec;145(3):251-255.

Market growth

Continued from page 1

the U.S., with sales of almost $1 billion in 2012. Allergan is also developing an improved higher-concentration formulation for the drug (Restasis X), now in phase II clinical trials.

GlobalData predicts DES therapeutic sales across the U.S., France, Germany, Italy, Spain, UK, Japan, China, and India to grow from about $1.6 billion in 2012 to $5.5 billion in 2022.

Among other DES therapies, diquafosol tetrasodium (Diquas, Santen Pharmaceuticals) is currently available in Japan and Korea. The drug is expected to launch in China later this year. Despite trials in the U.S. being halted, the drug is expected to have potential in Europe, Asia, and Latin America.

In addition, rebamipide (Mucosta, Otsuka Pharmaceutical), which was launched in Japan in 2012, is being co-developed by Acucela and Otsuka in the U.S., where it is currently in phase III trials with an expectant approval and launch in 2014. **ODT**

6th corneal layer

Continued from page 1

surgeons may not want to bear all the way to Descemet's. Rather, they may want to retrain their surgical techniques to bear down to this new proposed Dua's layer, which will potentially keep the post-operative corneal transplant stronger and does not seem to lead to increased corneal haze."

According to Prof. Dua, this layer should prove to be of considerable significance and importance in lamellar corneal surgery—both deep anterior lamellar and endothelial keratoplasties.

"It should also help our understanding of the pathology of posterior corneal affections," he says. "The only limitation thus far was the lack of young eyes in our *in vitro* evidence. I have received clear evidence from colleagues that the layer was demonstrated in a child as young as 9.5 years."

"This is an interesting read, but not without some controversy," says Joseph P. Shovlin, OD, FAAO, private practitioner in Scranton, PA, and *Optometry Times* Editorial Advisory Board member. "Apparently, Binder et al described an acellular posterior stromal matrix layer in an original article in *Investigative Ophthalmology and Vision Science*.[1] So, this may not be a novel (original) discussion of a sixth layer of the cornea. I am not certain of the clinical significance of this since we've had information on the structure for over a decade from Binder's paper."

Dr. Binder's paper states:

The attachment of Descemet's membrane (DM) to the posterior stroma appeared to be accomplished in part by fibers 22.3 nm in diameter that ran perpendicular the DM. The depth of penetration of the fibers into DM was 0.16-0.21 um. They were associated frequently with a dense, amorphous mass at the interface between DM and the posterior stroma.[1]

Says Prof. Dua: "Perry Binder's excellent work on the ultra structure of the cornea related to a different plane. The attachment of Descemet's membrane to the Dua's layer has also been studied by Prof. Friedrich Kruse, who refers to it as the inter-fascial layer and mentioned Binder's paper.[2]"**ODT**

Reference

1. Binder PS, Rock ME, Schmidt KC, Anderson JA. High-voltage electron microscopy of normal human cornea. *IOVS*. 1991 July; 32: 2234-2243.
2. Schlötzer-Schrehardt U, Bachmann BO, Laaser K, Cursiefen C, Kruse FE. Characterization of the cleavage plane in Descemet's membrane endothelial keratoplasty. *Ophthalmology*. 2011 Oct;118(10):1950-7.

In Brief

B+L acquired by Valeant for $8.7 billion

Laval, Quebec and **Rochester, NY**—Valeant Pharmaceuticals International, Inc. and Bausch + Lomb Holdings Incorporated announced that they have entered into a definitive agreement under which Valeant will acquire B + L for $8.7 billion in cash. B + L will retain its name and become a division of Valeant. The transaction is expected to close in the third quarter and is subject to regulatory approvals.

Under terms of the agreement, Valeant will pay $8.7 billion in cash, of which approximately $4.5 billion will go to an investor group led by Warburg Pincus, and approximately $4.2 billion will be used to repay Bausch + Lomb's outstanding debt.

Valeant expects to achieve at least $800 million in annual cost savings by end of 2014. B+L expects to have revenues of approximately $3.3 billion and adjusted EBITDA in 2013 of approximately $720 million.

The transaction will be financed with debt and approximately $1.5 - $2.0 billion of new equity. Valeant has secured fully committed debt financing for the transaction from Goldman Sachs Bank USA. Taking into account the anticipated equity raise, Valeant's debt to pro forma adjusted EBITDA ratio will be approximately 4.6 times.

Valeant's existing ophthalmology businesses will be integrated into the Bausch + Lomb division, creating a global eye health platform with estimated pro forma 2013 net revenue of more than $3.5 billion. The acquisition positions Valeant to capitalize on growing eye health trends driven by an aging patient population, an increased rate of diabetes and demand from emerging markets. The combined business will also benefit from access to a strong product portfolio and a late stage pipeline of innovative, new products.

Transitions summit energizes interest in vision benefit offerings

Pinellas Park, FL—Transitions Optical Inc. recently sponsored a medical director roundtable to address the trend that shows significant numbers of U.S. workers are not using their vision care benefits.

The conference included representatives from the National Association of Specialty Health Organizations (NASHO); National Association of Vision Care Plans (NAVCP); Advantica; EyeMed Vision Care; Highmark Vision Holding Company; United HealthCare Specialty Benefits; VSP Vision Care, and WellPoint.

"Despite the importance of proper vision care and vision wear to safeguard and promote employees' health and productivity, many employers spend minimal time educating on it—and employees all too often fail to take advantage," said Julian Roberts, executive director, NAVCP and NASHO.

"As an industry, we need to recognize the importance of promoting education and challenging ourselves to continuously improve quality of care because in the end, if the public doesn't value what we do, none of our other efforts matter," Roberts added.

"We were pleased to have the opportunity to support the NAVCP in focusing plan attention on ways to break through and 'invigorate vision' to make it a higher priority, and help ensure more people get the eyecare and eyewear they need to see, feel, and perform at their best," said Smith Wyckoff, key account manager, managed vision care/online, Transitions Optical.

B+L reports latest ARMOR study findings

Rochester, NY—Bausch + Lomb (B + L) researchers have reported the most recent findings of the ARMOR (Antibiotic Resistance Monitoring in Ocular MicroRganisms) surveillance study of antibiotic resistance patterns in eye care.

For the fourth consecutive year, ARMOR study participants collected bacterial isolates of known ocular pathogens and subjected them to antibiotic susceptibility testing. The 2012 data set included 456 isolates of Streptococcus pneumoniae, Staphylococcus aureus, coagulase-negative staphylococci (CoNS), Pseudomonas aeruginosa, and Haemophilus influenzae from 25 sites across the United States.

Study authors reported that resistance rates have remained relatively stable over the 4-year period. However, several bacterial isolates demonstrated resistance to many common antibiotics. For example, more than 33% of S. aureus and CoNS isolates were resistant to three or more antibiotics, especially MRSA and methicillin-resistant CoNS isolates that were multi-drug resistant more than 73% of the time.

"Because clinicians treat bacterial conjunctivitis empirically in the majority of cases, the data collected in the ongoing ARMOR study is critically important to guide therapeutic decision-making," said Terrence P. O'Brien, MD, Charlotte Breyer Rodgers Distinguished Chair in Ophthalmology and Co-Director of the Ocular Microbiology Laboratory, Bascom Palmer Eye Institute, University of Miami

"In light of the growing problem of bacterial resistance in the community and in medicine generally, the authors' conclusion that continued vigilance is warranted is exceptionally prudent," Dr. Rodgers added.

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The Eye HandBook has diagnostic tests such as color vision, OKN drum, several tests for children's vision, and a variety of media for patient education. Another section lists various ophthalmic meds, concentrations, and availability. It is a great app for eyecare providers and comes at a very reasonable price: FREE.

—Bill Townsend, OD, Canyon, TX

Tissue pre-loaded by eye bank used to perform corneal transplants

Tampa, FL—For the first time, EndoGlide (Angiotech Pharmaceuticals Inc.) cartridges preloaded by an eye bank have been successfully used in corneal transplantation, the Lions Eye Institute for Transplant and Research (LEITR) announced.

Donor endothelial tissue was pre-cut, trephined, and pre-loaded into the EndoGlide device at the LEITR facility in Tampa, FL. The loaded cartridges were then transported to the Massachusetts Eye and Ear Infirmary, Boston, where the procedures were performed by Roberto Pineda II, MD, associate professor of ophthalmology at Harvard Medical School.

"Tissue preparation and device pre-loading by eye banks not only simplifies the surgery and may provide increased reproducible outcomes for endothelial keratoplasty," said Dr. Pineda.

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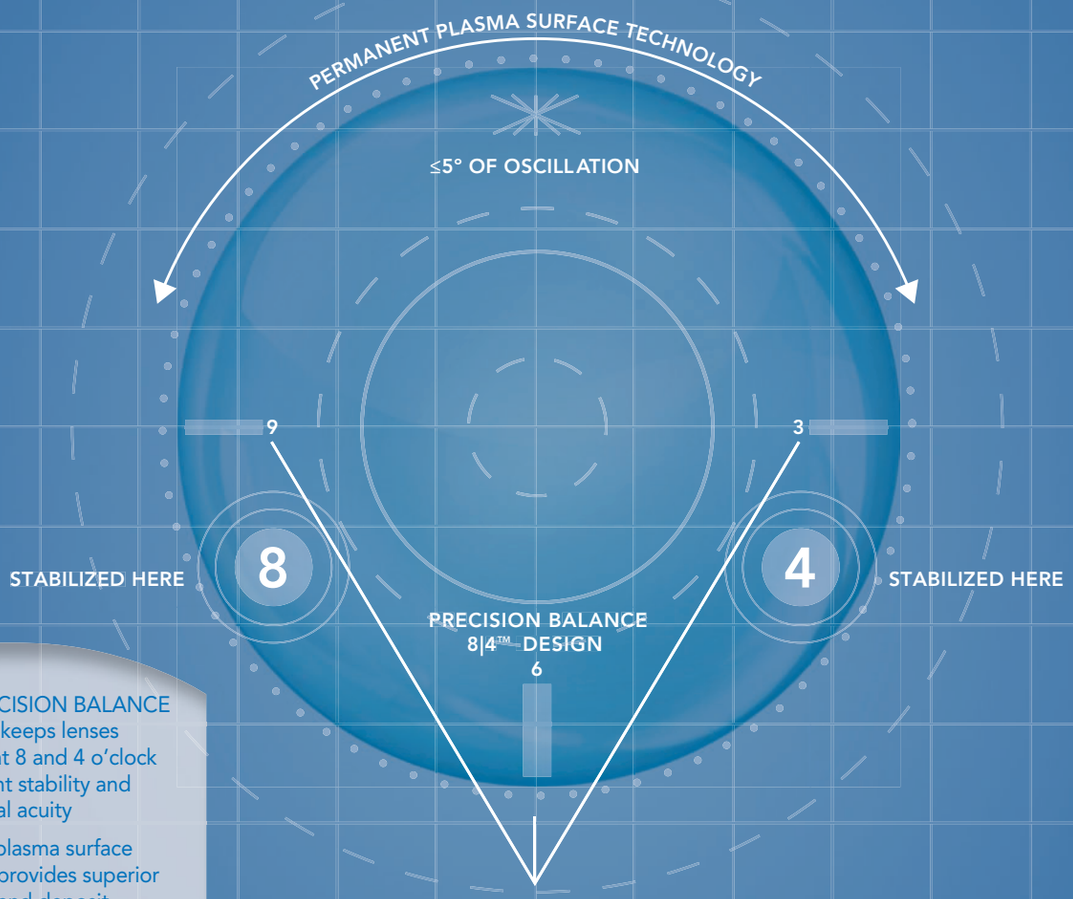

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References: 1. In vitro measurement of contact angles on unworn spherical lenses; significance demonstrated at the 0.05 level; Alcon data on file, 2009. **2.** Ex vivo measurement of lipid deposits on lenses worn daily through manufacturer-recommended replacement period; AOSept Plus used for cleaning and disinfection; significance demonstrated at the 0.05 level; Alcon data on file, 2008. **3.** Nash W, Gabriel M, Mowrey-Mckee M. A comparison of various silicone hydrogel lenses; lipid and protein deposition as a result of daily wear. *Optom Vis Sci.* 2010;87:E-abstract 105110. **4.** Davis RL, Eiden SB. Evaluation of changes in comfort and vision during weeks 3 and 4 of monthly replacement silicone hydrogel contact lenses. American Academy of Optometry; 2012; E-abstract 125401.

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In Brief

Continued from page 6

VSP expands eyecare benefits to the UK

Rancho Cordova, CA—U.S.-based VSP Vision Care will expand eye care offerings to the United Kingdom, doing business as VSP Neighbourhood Eyecare. The move is in line with VSP's previous expansion into Australia and Canada, and strengthens the global eyecare benefit offering for VSP clients.

As part of its strategy and tactics, VSP is partnering with the Association of Optometrists (AOP), National Eyecare Group (NEG), Assicurazioni Generali-UK, and Thomsons Online Benefits. These alliances will focus on developing awareness of the importance of eye examinations and corrective eyewear as an employer-sponsored program for employees.

"The AOP is working closely with VSP to ensure VSP develops its business with full awareness of the issues impacting independent optometric practices, the dynamics affecting profitability, and the delivery of patient care," said Lyndon Taylor, chairman of AOP.

"VSP and Thomsons Online Benefits have several large clients in common who have employees in both the U.S. and the UK, which means we need to be able to deliver a multinational service offering through our Darwin platform," said Brenden Mielke, product director, Thomsons Online Benefits.

Rebamipide suspension helps to ease dry eye, results show

Kyoto, Japan—A 2% rebamipide suspension is more effective than a 0.1% sodium hyaluronate solution for treatment of dry eye, according to Shigeru Kirsohita, MD, PhD, department of ophthalmology, Kyoto Prefectural University of Medicine, Japan, and colleagues.

In a multicenter randomized clinical trial in 188 patients with dry eye, rebamipide ophthalmic suspension (OPC-12759, Otsuka Pharmaceuticals) was more effective than sodium hyaluronate in corneal and conjunctival staining tests and was reported by patients to be more effective for relieving foreign-body sensation and eye pain, the authors report.

"These results suggest that rebamipide may lead to improved treatment of corneal and conjunctival epithelial damage and improvement in symptoms in patients with dry eye. Such efficacy, in addition to the well-tolerated profile of rebamipide, makes it a potentially useful treatment option for dry eye," they wrote in an article in *Ophthalmology*.

Rebamipide, a derivative of quinolone-class antibiotics, is a mucin secretagogue approved in Japan for protection of gastric mucosa and for treatment of dry eye. It has been shown in human and animal studies to enhance secretion of mucin to support tear film adhesion and slow tear film break-up time.

Allegro, Senju team up to develop treatment of vascular eye diseases

San Juan Capistrano, CA, and **Osaka, Japan**—Allegro Ophthalmics LLC and Senju Pharmaceutical Co. Ltd. have entered into a collaboration and license agreement to develop and market Allegro's Integrin Peptide Therapy in Japan.

The pairing aims to improve the quality of life for patients at risk of blindness due to vascular eye diseases by establishing Integrin Peptide Therapy as the first-in-class treatment.

Under the terms of the agreement, Senju will acquire the rights to co-develop and market Allegro's Integrin Peptide Therapy in Japan as an intravitreal injection for vascular eye diseases such as wet age-related macular degeneration and diabetic macular edema. In exchange for these rights, Senju has agreed to pay Allegro an 8-digit upfront license fee, additional development and sales milestone fees, and a percentage royalty on net sales.

Study shows ocular health comparable to wearing no contact lens

Jacksonville, FL—Daily disposable silicone hydrogel contact lenses (narafilcon A) show no clinically significant effect on the ocular surface of the eye, according to a recent study. The findings were published in the June issue of *Contact Lens & Anterior Eye*.

The 74-subject, investigator-masked, parallel group study compared patients with no previous contact lens experience, randomized to wear narafilcon A (1-Day Acuvue TruEye) with patients who had not previously worn contact lenses and kept wearing their own spectacles for 12 months. Biomicroscopy, visual acuity, and subjective response scores were recorded at an initial visit and 6 follow-up visits, in addition to lens fit and surface evaluation for the LW group. Comfort was recorded with text messaging.

After a full year of wear, there were no clinically significant differences between contact lens wearers and spectacle wearers for 5 out of 6 key ocular health measures: bulbar conjunctival hyperemia, limbal hyperemia, corneal staining, neovascularization, and papillary conjunctivitis. There was more conjunctival staining for contact lens wearers than spectacle wearers, although grades were low averaging only "trace" levels throughout the study.

Subjective scores were similar for the two groups. Measured visual acuity was approximately half a line better for spectacle wearers because these subjects were provided with their full sphero-cylindrical over-refraction, compared with contact lens wearers in the best spherical corrected contact lenses.

The study was sponsored by Vistakon Division of Johnson & Johnson Vision Care Inc.

Crizal lenses receive Good Housekeeping Seal

Dallas—Essilor of America has earned the Good Housekeeping Seal of Approval (GHSA) for select products in its line of Crizal No-Glare lenses. After evaluation by The Good Housekeeping Research Institute, the seal was awarded for Crizal No-Glare lenses, adding several of Essilor's products to the roster of some of America's favorite brands that have received the prestigious seal.

According to Good Housekeeping, the Good Housekeeping Seal is an emblem of Good Housekeeping's Consumers Policy. This policy offers a limited warranty in the form of a refund, repair, or replacement if the product carrying its seal is found to be defective within 2 years of purchase.

"Essilor strongly believes in the importance of delivering innovative products that lead the industry in quality and consumer expectations," said Theresa Agnew, senior vice president of marketing, Essilor of America. "The GHSA recognizes the long-term commitment we have to providing consumers with the best, high quality eyeglass lenses available."

These Crizal lenses were awarded the GHSA:

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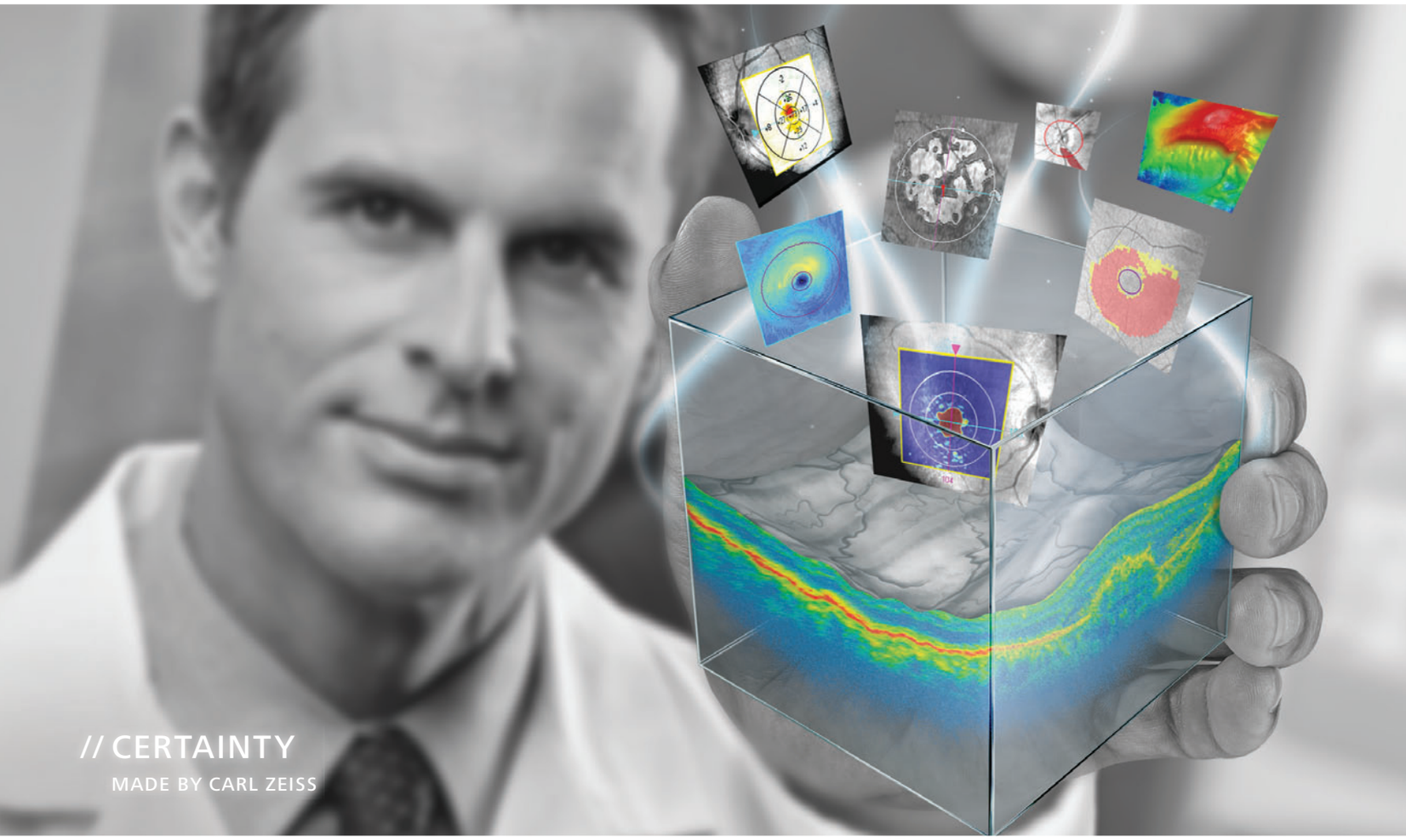

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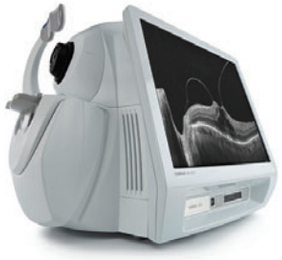

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Thinking outside the box

By Ernest L. Bowling, OD, MS, FAAO
Chief Optometric Editor

We've started a series of articles on the ocular effects of systemic disease. The first article in this series is an excellent summary by Dr. Michael Ohlson in which he outlines why understanding systemic disease is important for primary care optometry (see "Primary-care optometry in the 21st century," in the May issue).

Optometrists need to embrace this idea of caring for the whole person. As primary eyecare providers (ECPs), we are often the entry point into the healthcare system for many of our patients. As such, optometrists need to be aware of the ocular effects of systemic disease and much more. The Affordable Care Act will introduce a tremendous number of patients into the U.S. healthcare system. Many legislators, prognosticators, and ECPs argue the system currently is not prepared for this influx and could leave these new patients without access to providers. For example, starting next year, nearly 5 million uninsured Californians will suddenly have health coverage due to the implementation of the Affordable Care Act. Yet California doesn't have enough primary-care physicians. Forty-two of its 58 counties fall short of the federal government's most basic standard.[1]

Can optometry help ease this burden? At least one elected official thinks so. Ed Hernandez, OD, a forward-thinking state senator in California (and optometrist) has introduced SB 492, which would expand the optometric scope of practice in his state to the point where optometrists would be allowed (or pick a better word) to treat systemic disease, such as hypertension and diabetes. The legislation would also expand the scope of practice of nurse practitioners and pharmacists. The bill unanimously passed the Senate Business, Professions,

See **Outside the box** on page 12

Functional and fashionable sunglasses for dogs

By Katherine M. Mastrota, MS, OD, FAAO
Associate Optometric Editor

Brooklyn, NY, is a great place to live... great restaurants, great shopping, great arena, and great yoga.

Yoga Sole, where I practice yoga, has a wonderful sense of community. Yoga bonds the students, and students' stories bond the studio.

Shatzi is the poodle of Yoga Sole's proprietor. Everyone loves Shatzi, so it was disheartening to hear that the 12-year-old dog was having trouble walking outside. Once out-of-doors, Shatzi would become anxious, shake his head, and refuse to walk. The veterinarian felt it was Shatzi's back that was troubling him. I was certain Shatzi was suffering from disorienting glare disability, stray light caused by his known cataracts.

Dog sunglasses made a definite difference in Shatzi's sight.

Cataracts are common in older dogs, especially in dogs with diabetes. As in humans, dogs can undergo lens phacoemulsification and insertion of an IOL to restore vision. Unfortunately, cataract surgery in canines has

See **Dog sunglasses** on page 12

Exciting times for contact lenses

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

As I write this, I'm preparing for the American Optometric Association meeting in San Diego. On my schedule I'm noticing a few events around a contact lens launch as well as meetings with representatives from other companies that manufacture contact lenses. I'm also finalizing content for this issue, which includes a special section on contact lenses. (The dynamic duo of Drs. David Kading and Mile Brujic share information on clean lens wear on page 27, and healthcare writer Frank Celia provides an overview of a new lens on page 24.) I'm thinking about how much and how quickly contact lenses have evolved in the past 24 years that I have been involved in optometry.

What an exciting time for contact lenses!

We have newer and better materials with which to manufacture lenses. We have improved designs for better vision. Multifocal and toric designs are available in many formats to give presbyopes and astigmats more options for lens wear—patient populations who for so long desired clear vision with contact lenses. Scleral lenses have emerged again to breathe new life into GP lens fitting. Daily disposables are beginning to gain traction in the U.S.

Developments in contact lenses are coming faster and faster. I remember when the first 2-week replacement lens was available. I was new to the industry then, working as a technician for Dr. John Duffy and slicing my fingers on the crimped tops of vialed lenses. The contact lenses kept coming…more torics and multifocals, then better torics and multifocals. Silicone hydrogel materials? Got it. Resurgence of continuous wear? Got that, too. Daily disposables were pie in the sky to patients back then. Expanded parameters, custom lenses, hand-painted lenses for diseased and traumatized eyes, the explosion of cosmetic contact lenses… Look at how far we've come.

The future of contact lenses looks to be just as bright, with great concepts on the horizon. I can't wait to see what the next 24 years bring.

And I haven't even touched on lens care.**ODT**

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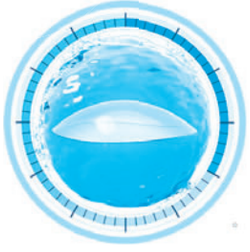

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Letters

To the Editor

Great ASCRS coverage

Gretchyn Bailey's editorial, "Optometry at the ASCRS meeting," in the May issue is an outstanding article. *Love* your style. You got the message conveyed beautifully.

Marlane J. Brown, OD, FAAO
ASCRS IOMED Task Force Member
Minneapolis, MN

Fair and balanced

Thanks for presenting both sides of ASCRS IOMED program.

I wanted to thank you for your unbiased reporting on the ASCRS meeting IOMED program ("ASCRS welcomes ODs during IOMED program," May) and particularly on your editorial piece. There is a need for optometric ownership in the form of partnership in any integrated eyecare system. So far, the models proposed by ophthalmology, starting with Dr. Lindstrom's Ophthalmology-Led Eye Care System (this name says it all), have placed the ophthalmologist in the employer/leader/decision-maker role and offer the integrated optometrist an employee position with no to little control over the care of his/her patients or the optometrist's future.

I'm also encouraged to see some mention of the other 98% (my guess) of U.S. optometrists who do not work for an ophthalmologist, a VA clinic, an academic institution, or a TLC-type of business. These ODs, the 98%, must be included in any system that purports to offer a solution to the increased number of patients heading our way. This number is just too big to ignore, and ophthalmology seems intent on doing just that because its leadership has not figured out a way of controlling this many doctors.

Again, thank you for presenting both sides of this issue.

Randall N. Reichle, OD, FAAO
Houston, TX

Keeping informed

I recently read Gretchyn Bailey's editorial, "Are you part of the conversation?" in the April issue. I enjoy the topics that are covered in your publication, and I appreciate the information that I get from following your various social media efforts.

Teresa Narayan, OD
New Haven, CT

Like something we published?
Hate something we published?
Have a suggestion?

WE WANT TO HEAR FROM YOU!

Send your comments to gbailey@advanstar.com.
Letters may be edited for length or clarity.

Outside the box

Continued from page 10

and Economic Development Committee the first week of May.[2]

Can optometrists provide for the overall well-being of our patients? With additional training, absolutely. I'm not alone in this thinking. A recent *Optometry Times* online poll on our Facebook page, while not scientific, showed the majority of respondents consider this to be a natural extension of optometric services. Think about your own practice. How many patients could you help if you were able to treat systemic disease?

You have to applaud Dr. Hernandez's outside-the-box thinking. As we all know, optometry is a legislated profession; I shudder to think about the turf battles this matter would produce. Optometrists need to chart the future of optometry, and Dr. Hernandez has shined a light onto a path we as a profession can take.**ODT**

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Dog sunglasses

Continued from page 10

a higher risk of breed-related complications than in their human owners. Intra-operative hyphema, ongoing ocular inflammation, infection, glaucoma, corneal ulceration, keratoconjunctivitis sicca, retinal detachment, and the risks of general anesthesia in older pets reduces the success of cataract surgery to as low 79%.

As the yoga studio's "in-house" optometrist, my professional opinion was of interest. What would I recommend?

I firmly believe every patient—four legged or two legged—should wear the best quality sun eyewear not only to protect the patient's eyes from damaging ultraviolet light but also to reduce glare disability in patients with media opacities, such as cataracts. So, I prescribed sunwear for Shatzi.

It turns out there are quite a few manufacturers of dog sunglasses. From the tiniest teacup breed to the biggest bull mastiff, a pair of appropriate sunshades can be had. Most customer reviews report that dogs easily accept wearing glasses and that dogs who appear sensitive to light seem less so with sunglass protection.

What happened to our Shatzi? Sunglasses have significantly dampened the erratic behavior originally described by his owners. He behaves like his old self, strutting his doggie stuff down the city streets. And I was dubbed best eye doc ever at the yoga studio.

Brooklynites love their dogs. Many shops have a dog water dish outside and dog biscuits inside. Should we make available canine sunwear in our offices? Maybe. Who else is better suited?**ODT**

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A game changer for your practice

Delefilcon A lens material enables CLs to remain hydrated throughout the day

Wow! That was my first impression when I tried on the new Dailies Total 1 water-gradient 1-day contact lenses (CLs) by Alcon. I gave up CLs years ago because I could never get over the feeling of persistent presence. This is the first CL I've ever worn that I didn't even know was in my eye.

Dailies Total 1 represents a new era in CLs. The lens, more than a decade in development, was designed to address of the key challenges in daily CL practice: comfort, fit, handling, visual acuity, and ocular health. It is the first water-gradient CL, allowing a gradual transition from 33% water at the silicone-hydrogel core to more than 80% water content at the CL surface (see Figure 1). The water content approaches 100% at the very outer surface, similar to the precorneal tear film.[1]

The highly lubricous outer surface is composed of an ultrasoft surface gel which makes up about 10% of the lens thickness and is comprised of a non-silicone hydrophilic polymer network with extended surface polymer chains. The water gradient occurs between the core and the surface where the water content rapidly increases as the material shifts from a silicone-rich core material to an essentially silicone-free hydrophilic surface gel.[2] The lens surface mimics the natural hydrophilic ocular surface.

New manufacturing paradigm

Dailies Total 1 is made using LightStream technology with a new silicone hydrogel material, delefilcon A. The lenses have a very low surface modulus, which enhances comfort, and a moderate core modulus that facilitates ease of handling. With a Dk/t of 156 (at -3.00 D), Dailies Total 1 lenses have the highest oxygen transmissibility of any daily disposable lens.[3]

What truly sets this lens apart is its initial and end-of-day comfort. Most CL wearers silently struggle with CL dryness and discomfort. Based on a survey of 113 CL patients, 86% reported their eyes dried out when wearing CLs, yet less than a quarter of them mentioned it to their eyecare provider (ECP). Of the patients surveyed, 80% said their CLs were uncomfortable at the end of the day, and 76% complained of irritated eyes when wearing CLs—only about 10% of patients actually reported symptoms to their ECP.[4]

In an ongoing survey in Europe of 24 ECPs fitting 280 patients with Dailies Total 1, there was a 79% overall reduction in end-of-day dryness, a 60% overall increase in wearers who could wear lenses comfortably all day long, a 45% overall increase in clear vision until the end of the day, and an 89% overall increase in end-of-day comfort with Dailies Total 1 vs. competitors' lenses. The study subjects showed a 13:1 preference for Dailies Total 1 over their previous CLs.[5] In 5 clinical studies of 236 patients, 97% of subjects were successfully fit with Dailies Total 1 lenses in clinical trials.[6] In another clinical study of 80 patients, 9 out of 10 subjects agreed that Dailies Total 1 CLs were so comfortable they didn't feel anything in their eyes.[7]

Wowing the marketplace

Remember the "wow" I said I experienced? I wasn't alone. Among CL wearers in the European survey, 68% reported feeling a "wow" experience when first applying Dailies Total 1.[5]

Every day, patients embrace new technologies in their daily lives. As ECPs, we want to provide our patients with the best technologies to ensure they continue to come see us. Dailies Total 1 is just that—breakthrough technology. All of our patients deserve to try these lenses and experience the "wow" for themselves. **ODT**

By Ernie Bowling, OD
Dr. Bowling is in solo private practice in Gadsden, AL, and is chief optometric editor of *Optometry Times*.

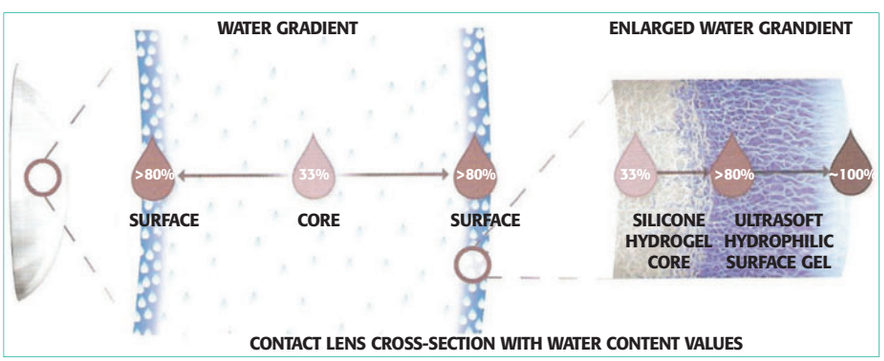

Figure 1. Contact lens cross-section with water content values. (Illustration courtesy of Alcon.)

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Tear osmolarity is central to OSD

Research confirms tear film osmolarity is integral part of ocular surface disease

In 1978 Jeff Gilbard, MD, proposed that hypersmolarity of the tear film plays an important role in inducing ocular surface disease seen in the cornea and conjunctiva.[1] In 1979, he demonstrated that there was a significant positive correlation between tear film osmolarity and Rose Bengal staining.[2]

In rabbit models, he showed that decreases in corneal epithelial glycogen and in conjunctival goblet cell density, and morphological abnormalities of the conjunctiva correlated with increases in tear film osmolarity and duration of disease (1988).[3] Dr. Gilbard also showed that closure of the meibomian gland orifices increased tear film osmolarity in the presence of normal lacrimal gland function and caused dry eye-type ocular surface abnormalities (1989).[4]

This work contributed to the International Dry Eye WorkShop in 2007, identifying tear hyperosmolarity as an important factor in the pathogenesis of DES including it as a part of the definition of dry eye.[5]

Katherine M. Mastrota, MS, OD, FAAO

Dr. Mastrota is center director of Omni Eye Surgery in New York City and associate optometric editor of *Optometry Times*.

Now, 35 years later, what do tear osmolarity studies show? Searching the literature, here's what we find:

- Tear film osmolarity is increased in patients with diabetes mellitus compared with healthy controls. Tear film osmolarity also correlates with the duration of the disease.[6]
- Tear hyperosmolarity and abnormal tear film function are associated with pterygium. Pterygium excision improved tear osmolarity and tear film function. Tear osmolarity, however, deteriorated again with the recurrence of pterygium.[7]
- Exposure to air pollution reduces tear film stability and negatively influences tear film osmolarity.[8]
- There are significant relationships between tear osmolarity and lid characteristics, including lid sensitivity.[9]
- Patients complaining of epiphora in the absence of other ocular surface pathology have significantly lower tear osmolarity.[10]
- Tear osmolarity is increased in patients treated for glaucoma or ocular hypertension, particularly in patients using multiple preserved eye drops.[11]
- The cytotoxic effects of BAK on conjunctival epithelial cells *in vitro* are increased in hyperosmotic conditions, with characteristic cell death processes such as apoptosis.[12]
- Orally administered ethanol is secreted into the tears. Ethanol in tears induced tear hyperosmolarity and shortened tear break-up time.[13]
- Tear osmolarity is higher in eyes of patients with pseudoexfoliation when compared with normal subjects.[14]
- A significant increase of osmolarity was found in patients with severe conjunctivochalasis.[15]
- Tear osmolarity is increased with dehydration and tracked alterations in plasma osmolarity.[16]

These studies evaluate how tear osmolarity is impacted by a variety of conditions *in vivo*, *in vitro*, and in animal models.**ODT**

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Ocular manifestations of systemic hypertension

Systemic hypertension has reached epidemic proportions in the United States, and aggressive and creative treatment approaches are needed. Optometrists are already well positioned to provide valuable primary care services for hypertensive patients, regardless of whether or not they are ever involved in directly treating the disease.

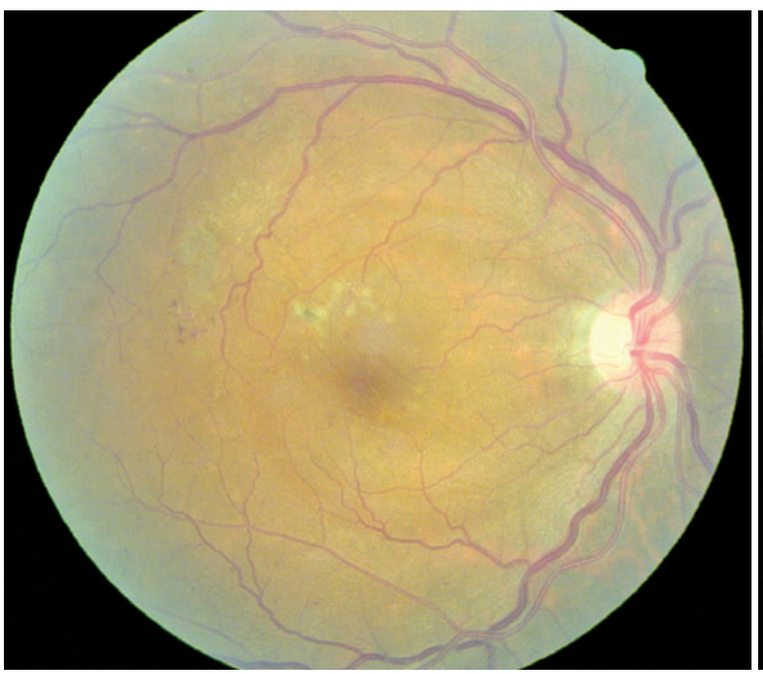


Figure 1. Combined hypertensive and diabetic retinopathy.

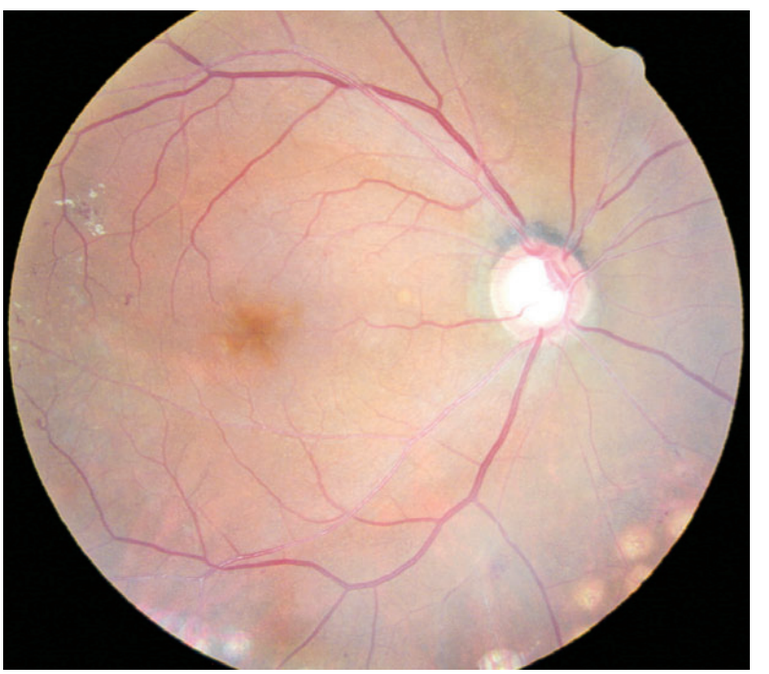


Figure 2. Hypertensive retinopathy (Bonnet Sign, silver wiring) plus diabetic retinopathy.

By Michael D. Brown, OD

A California legislator recently introduced Senate Bill 492, which would allow optometrists to treat chronic systemic problems, such as hypertension. Guaranteed to stir discussion and add fuel to ongoing scope-of-practice turf wars, SB 492 is indicative of the growing concern over the increased numbers of primary-care practitioners needed to treat both current patients and new ones who will be entering the healthcare system under the Affordable Care Act.

Clinical findings

In light of this projected shortfall of doctors, it's good to recall what optometrists already do well—directly viewing retinal vasculature and tissues and diagnosing the ophthalmic end-organ damage caused by systemic hypertension. This privileged view enables optometrists to play a valuable role in limiting both ocular and systemic damage from hypertension.

Take-Home Message

Systemic hypertension has reached epidemic proportions in the United States, and aggressive and creative treatment approaches are needed. Optometrists are already well positioned to provide valuable primary care services for hypertensive patients, regardless of whether or not they are ever involved in directly treating the disease.

The majority of ophthalmic manifestations of systemic hypertension center around damage caused by abnormal vascular autoregulation.[1] Increased perfusion pressure results in arteriolar constriction to regulate retinal blood flow. Chronic vasospasm leads to both diffuse and focal arteriolar narrowing and increased vascular tortuosity. Hardening of the arterioles (arteriosclerosis) can manifest as the classic Gunn or Bonnet signs (arteriovenous, or AV nicking), which are characterized by compression of an underlying venule by an overlying arteriole.[2] As an arteriole continues to harden, it can deflect a venule enough to change its course (Salus' sign) and eventually set the stage for a branch vein occlusion (BRVO).

TABLE 1 **Traditional classification of hypertensive retinopathy**

	Grade I	Grade II	Grade III	Grade IV
Keith-Wagener Barker	Subtle arteriole constriction and vascular tortuosity	AV nicking	Flame hemorrhages/CWS	Optic disc edema
Scheie	Increased ALR	AV nicking	Copper wiring	Silver wiring
Modified Scheie	Subtle arteriole narrowing	Obvious arteriole narrowing with focal irregularities	Retinal hemorrhages, exudates, or CWS	Optic disc edema

Increased arteriolar blood pressure also damages arteriole endothelium, leading to thickening of the vessel wall and narrowing of the lumen. This is seen as change in the arteriolar light reflex (ALR) formed by the interface of the blood column and the vessel wall, first as a diffuse, less bright ALR, then as an increase in the width of the ALR (copper wiring). In more advanced cases, the ALR widens to encompass the entire width of the arteriole (sheathing or silver wiring).[3]

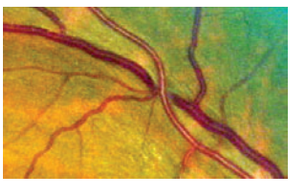


Figure 3. Gunn sign, increased ALR, tortuosity.

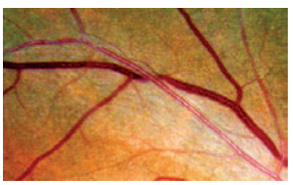


Figure 4. Bonnet sign, increased ALR, arteriolar narrowing.

Proportional effects

Chronic hypertensive retinopathy worsens in proportion to the length of time that systemic blood pressure remains above normal. Acute, or malignant, hypertensive retinopathy, however, is proportional to the amount above normal of the presenting blood pressure reading.[2] It can quickly cause a breakdown in the blood-retinal barrier, manifesting as dot and blot hemorrhages in the inner retina, flame hemorrhages in the nerve fiber layer (NFL), cotton wool spots (CWS) from NFL ischemia and axonal swelling, and macroaneurysms. Exudates can form, including the classic macular star. Severe acute hypertensive retinopathy can lead to complications, such as hemorrhagic detachment of the internal limiting membrane, as well as subhyaloid and vitreous hemorrhage.[3]

Chronic hypertensive choroidopathy

While often overlooked, hypertension also produces changes in the choroid and optic nerve. Chronic hypertensive choroidopathy manifests as a diffuse pigment granularity, RPE clumping surrounded by atrophic areas (Elschnig spots), and triangular patches of atrophy. Acute hypertensive choroidopathy can produce linear RPE changes, or Seigrist's streaks, as well as focal pigment epithelial detachments, serous retinal detachments, and cystoid macular edema.[4]

Optic nerve swelling from acute exudative changes can be present in cases of malignant hypertension. Swelling usually resolves with good systemic treatment, but nerve pallor and optic nerve dysfunction may remain. Chronic systemic hypertension can also lead to gradual compromise of the peripapillary choroidal vessels and posterior ciliary arteries that serve the optic nerve, resulting in slow-onset nerve pallor, or in cases of acute obstruction, classic non-arteritic ischemic optic neuropathy (NAION).[2]

Finally, other ophthalmic manifestations of systemic hypertension can be visualized externally. Palsies of cranial nerves III, IV, VI, and VII can all occur secondary to chronic or acute systemic hypertension. Subconjunctival hemorrhages, while usually secondary to a Valsalva maneuver, can also occur in conjunction with acute blood pressure elevation.

Liebreich first described hypertensive retinopathy in 1859. Since then, many researchers have proposed numerous classification schemes, most notably, the Keith-Wagener Barker (KWB,), the Scheie, and the Modified Scheie systems (see Table 1).[5-7]

However, current thought challenges the relevance of previous classification systems. Poor correlation of retinal signs with severity of hypertension; the presence of retinal signs in normotensives; a lack of predictable progression in clinical signs; the recognition of choroidopathy and optic neuropathy as separate manifestations; and poor inter-observer reliability have all led to the current trend of simply describing what you see. This approach, while noting nonmalignant (chronic) vs. malignant (acute) forms of the disease, as well as severity (mild, moderate, severe), provides a useful framework for determining the urgency of treatment and referral.[8]

Uncontrolled hypertension can worsen diabetic retinopathy, and better blood pressure control can decrease the risk of diabetic macular edema and proliferative changes.

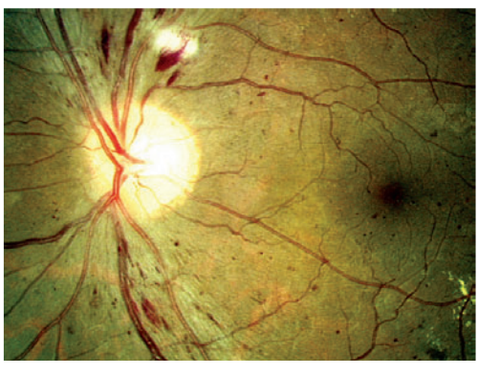
Treatment and management

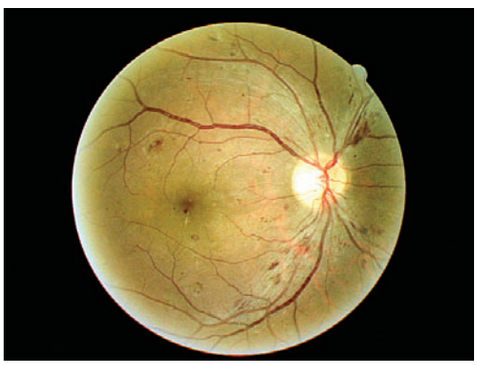
Fundamentally, treating hypertensive retinopathy and other ophthalmic manifestations of hypertension is focused on lowering blood pressure to safe levels.

For previously undiagnosed hypertensives, diagnosis of early hypertensive retinopathy can result in prompt initiation of treat-

See **Systemic hypertension** on page 18

Ophthalmic manifestations of hypertension center around damage caused by abnormal vascular autoregulation.





Figures 5 and 6. Malignant hypertensive retinopathy. (Photos courtesy of Michael D. Brown, OD)

Systemic hypertension

Continued from page 17

ment. For previously diagnosed hypertensives, the presence of more advanced retinopathy or changes in retinopathy from a previous exam might lead to changes in or additions to antihypertensive medications.

In general, the urgency of antihypertensive treatment increases with the severity of ophthalmic signs. Malignant hypertensive retinopathy indicates a serious breakdown in the eye's autoregulation and a hypertensive crisis that calls for immediate referral and treatment. However, blood pressure should be lowered gradually over the course of hours because rapid reduction could lead to optic nerve or systemic hypoperfusion and subsequent infarct.[9] Blood pressure should always be checked in the presence of bilateral disc edema, regardless of whether or not retinal hemorrhages are present, because malignant hypertension can sometimes present with minimal microvascular change.[10]

Practitioners also should be alert to asymmetry in hypertensive retinopathy because this could be a sign of carotid artery disease. It is sometimes difficult to distinguish between hypertensive and diabetic retinopathies in cases of concomitant disease, but it is important to remember that uncontrolled hypertension can worsen diabetic retinopathy, and better blood pressure control can decrease the risk of diabetic macular edema and proliferative changes.

Associated eye conditions, such as vascular occlusions or NAION, should be managed either through observation or specialty consultation, depending on severity. In addition, optometrists need to consider differential diagnoses, such as autoimmune disease, anemia, radiation retinopathy, central retinal vein occlusion (CRVO), ocular ischemic syndrome, leukemia, and blood dyscrasias in the presence of apparent hypertensive retinopathy.[4]

We've seen that systemic hypertension has reached epidemic proportions in the United States, and aggressive and creative treatment approaches are needed. Optometrists are already well positioned to provide valuable primary-care services for hypertensive patients, regardless of whether or not they are ever involved in directly treating the disease.**ODT**

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Dr. Brown has practiced medical optometry with the U.S. Department of Veterans Affairs Outpatient Clinic in Huntsville, AL, for more than 20 years. He has served as an adjunct professor with both the University of Alabama at Birmingham School of Optometry and the University of Alabama School of Medicine. He has a special interest in complex corneal and anterior segment cases. Dr. Brown did not indicate a financial interest in the topic. E-mail him at idoc61@gmail.com.

Ocular manifestations of SYSTEMIC DISEASE

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Raise the bar for diagnosing, treating acute conjunctivitis

A dedicated red-eye protocol can enable a practice to achieve early and accurate diagnosis

By Scott B. Han, OD, FAAO

Employing best-in-class management of acute conjunctivitis means abandoning empirical diagnosis in favor of differential diagnosis. Viral, bacterial, and allergic are the most common types of acute conjunctivitis and have similar symptoms.[1-3] More importantly, adenovirus causes approximately 1 out of 4 acute conjunctivitis cases seen by eyecare professionals and is often misdiagnosed.[2-6] My practice provides early and accurate diagnosis of acute conjunctivitis via a dedicated red eye protocol for conjunctivitis, a process that I find motivates my staff and satisfies my patients.

I strive to recruit technicians and staff who are passionate about patient care and want to deliver the best results. So it is no surprise to me how well my staff has taken to adopting a red-eye protocol for conjunctivitis because it offers them a deeper level of involvement with patient care. For example, my front desk staff identifies patients who may have conjunctivitis and isolates the patient as soon as he or she enters the office. The technician then performs the preliminary work-up, which includes utilizing a point-of-care diagnostic test, AdenoPlus (Nicox Inc.), to aid in the differential diagnosis of the red eye by either confirming the presence of, or ruling out, adenoviral conjunctivitis. After running the test, my technicians will often peek at the results to see if the patient has adenovirus or not, evidence that the protocol has sparked a deep interest in patient care among my staff.

Evidence-based testing

By the time I see the patient, I have his or her test results, clinical examination, and medical history in front of me. I can then immediately diagnose the patient and develop a treatment plan. I have received positive feedback from conjunctivitis patients because having this protocol offers them efficient management and concrete evidence to support my clinical observation. Many patients are cynical when facing a lack of evidence, so using an evidence-based diagnostic test eliminates much of the skepticism associated with diagnosing acute conjunctivitis.

Within this protocol, having a test to rule out adenovirus greatly benefits patients.

Take-Home Message

Improve standard of care and efficiency of diagnosis and treatment by implementing a red-eye protocol for clinician and staff.

If adenovirus is confirmed, I have a clear treatment plan ready, along with instructions for reducing contagion. However, it is equally important to patients when I have proven that adenovirus is *not* present. I can assure the patient that it is OK to interact with family members and return to work, and that is valuable information. Bacterial and allergic conjunctivitis lack the contagious threat posed by adenovirus, so being able to confidently rule those out lets the patient get back to living his or her life to the fullest sooner.

Activating the treatment plan

Once I have determined the root cause of the conjunctivitis, I can proceed with treatment. For allergic conjunctivitis, I like to prescribe the newer antihistamine-mast cell stabilizer combinations, such as bepotastine besilate (Bepreve, Bausch + Lomb) or alcaftadine (Lastacaft, Allergan.). If a patient has more signs than symptoms, I reach for loteprednol etabonate (Alrex, Bausch + Lomb) to calm the eye quickly. For bacterial conjunctivitis, broad-spectrum fluoroquinolones make the most sense to prescribe, and I favor besifloxacin (Besivance, Bausch + Lomb).

When treating viral conjunctivitis, I have had great success using Betadine 5% (Purdue Products) in the early phases to reduce viral load on the ocular surfaces. After topical anesthesia, I apply two drops of Betadine onto the eye and have the patient swish it around by closing the eye and looking up, then down, then left, and then right for 60 seconds. I also like to spread any excess Betadine onto the lashes. After 60 seconds, I use balanced salt solution to rinse the Betadine off the eye. Finally, I instill two drops of ketorolac 0.45% (Acuvail, Allergan) for patient comfort.

Diagnosing and treating conjunctivitis correctly when the patient first presents with a red eye saves time for my practice and for my patients. This translates into increased efficiency because managing acute conjunctivitis empirically—risking misdiagnosis and, subsequently, mistreatment—can lead to multiple patient visits, directing my time away from other conditions and forcing the patient to return to the practice several times.

Ultimately, by implementing concrete steps designed to better identify, diagnose, and treat patients with conjunctivitis, my practice has improved its standard of care for managing a surprisingly hard-to-manage disease state. As a result of adopting this protocol, I am a more effective clinician, treating more satisfied patients—proof that a little strategy can go a long way.**ODT**

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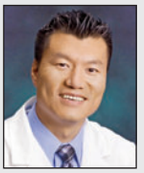

Scott B. Han, OD, FAAO, is director of optometry and partner in a multi-location practice in West Coast Florida. Dr. Han is a consultant/speaker for Allergan, Bausch + Lomb, and Merck. Contact him at shan@theeyeassociates.com.

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Top 5 reasons for a retinal consult

Don't fear the retina—optometrists are qualified to diagnose and treat many retinal disorders

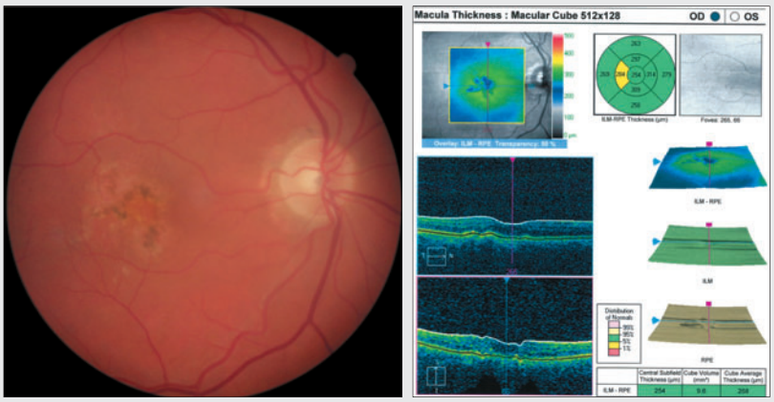

Figure 1. The right eye of a patient who had been followed for non-neovascular AMD for several years. He presented stating that he woke up in the middle of the night and could not see the middle digit on his alarm clock. Stereoscopic fundus examination revealed a subtle macular elevation consistent with CNVM, which was demonstrated on OCT.

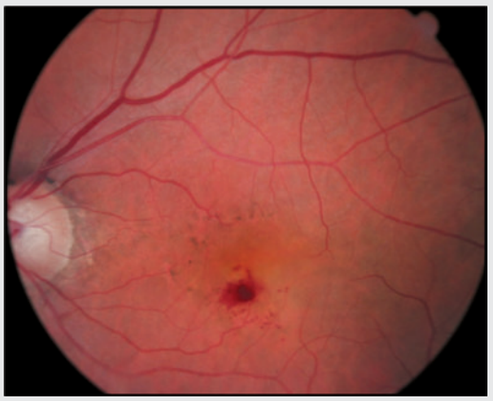

Figure 2. The left eye of a long-time patient who had undergone cataract surgery elsewhere and noticed recent vision loss. Note the subtle pigmentary changes surrounding the macula as well as the bright red appearance of blood in the macula suggesting its location above the RPE.

By Leo Semes, OD, FAAO

In a practical sense, *categories* of retinal disease come to mind that could trigger a retinal consult. Broadly, when the macula is compromised by conditions amenable to surgery, these rise to the top of the list. Keeping with the theme of surgery, patients with retinal detachment not yet involving the macula come in a close second. So, let's start down the road keeping in mind that other guidance includes those cases, in general, that threaten vision.

Because we have more efficient diagnostic methods than ever before, optometrists have the ability to make more detailed clinical determinations. This gives us information that, in conjunction with the philosophy of the consultant retina specialist, will create benefit for our patients. As primary-care providers with sophisticated diagnostic imaging at our disposal, we should respect—not fear—the retina.

Getting started

Patients who present with painless vision loss of acute onset should be differentiated regarding etiology. The biggest differentiator is between optic nerve and macular disorders. Cerebrovascular etiologies, however, represent a separate category and are generally easily sorted out using visual field testing. Those patients often require systemic care or the services of a neurologist or neuro-ophthalmologist.

Etiologies involving the optic nerve have characteristic appearances—including pale nerve, swollen nerve, and hemorrhagic involvement of the nerve—and show color vision or contrast sensitivity deficits. In addition, they have visual field defects that correspond to the portion of the visual pathway involved. Macular etiologies are often visible at stereoscopic fundus examination.

Five reasons for requesting a retinal consult

- Anything that involves choroidal neovascularization.
- Patients with diabetes, at risk for developing clinically significant macular edema.
- Abnormal vitreo-macular vitreomacular interactions.
- Fresh retinal detachment with macula intact.
- When you just can't figure it out.

Let's begin with the category of proliferative macular disorders. The poster child here is choroidal neovascularization (CNV). While we all know what the hall-of-fame cases present and look like, sometimes these are subtle. Under the umbrella of age-related CNV would be choroidal neovascularization secondary to age-related macular degeneration (see Figure 1). A rarer macular proliferative disorder is retinal angiomatous proliferation (RAP) (see Figure 2). In each of these cases, restoration of the integrity of a compromised circulatory system (choroidal and retinal, respectively) is amenable to an intravitreal injection of an ant-VEGF agent. At the surgeon's suggestion and based on the patient's preference, these may include, ranibizumab (Lucentis, Genentech), bevacizumab (Avastin, Genentech), or the more recently approved aflibercept (Eylea, Regeneron Pharmaceuticals).

Other disorders presenting with choroidal neovascularization include infectious etiologies, such as the histoplasmosis syndrome, CNV secondary to high myopia, macular teleangiectasia, polypoidal, and angioid streaks. Category one for a retinal consult would then be anything that involves choroidal neovascularization.

Diabetes and CSME

We all see patients with diabetes and are faced with varying degrees of compliance. It is particularly important to follow regularly those patients at greatest risk for developing clinically significant macular edema (CSME), which is the leading cause of vision loss among diabetics. When discussing the retina consult with patients, I relate the accumulation of fluid in the retina as akin to having a flood in the basement. The longer the water sits there, the worse the damage. The same is true of CSME. Making a diagnosis of CSME is often a clinical challenge at fundus examination. Subtle thickening of the retina may not be evident, which makes ancillary tests, such as photography and digital imaging, so helpful (see Figure 3). The definitions that qualify a fundus appearance as having CMSE center around retinal thick-

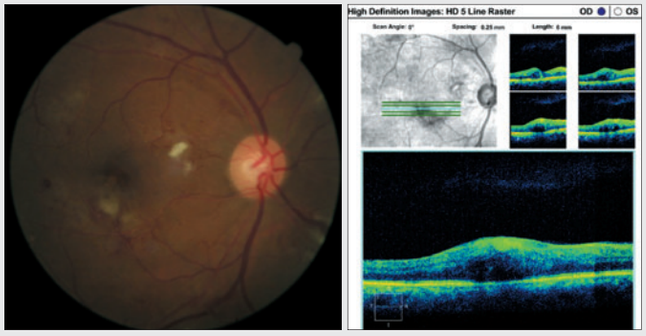

Figure 3. The left eye of a patient diagnosed with diabetes for over 20 years. In addition, he had been treated for systemic hypertension for that same period of time. Note the blurry grey area near the macula that represents fluid accumulation and corresponds with cystic spaces imaged at OCT.

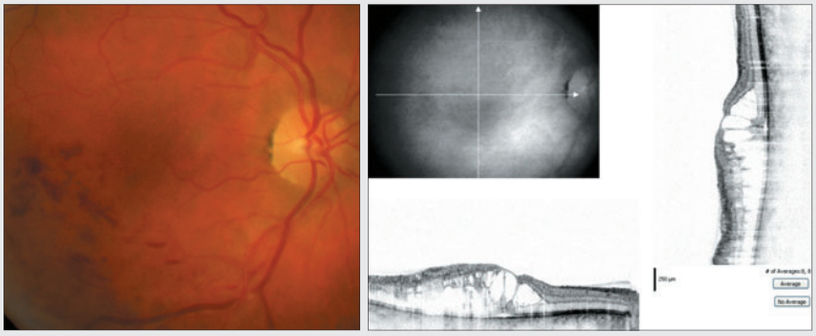

Figure 4. Macular edema following branch RVO. The macula is involved as seen in the fundus photo and the OCT demonstrates significant retinal disruption.

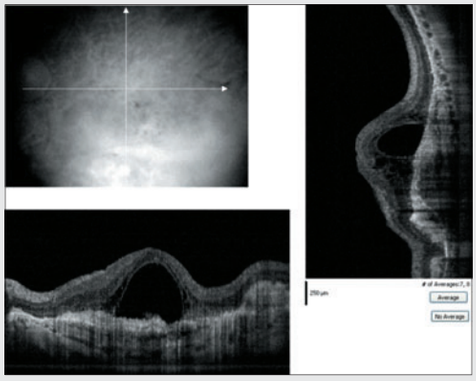

Figure 5. OCT of a patient following bilateral cataract extraction with IOL implantation. The VA is 20/200 in the case of late-onset macular edema.

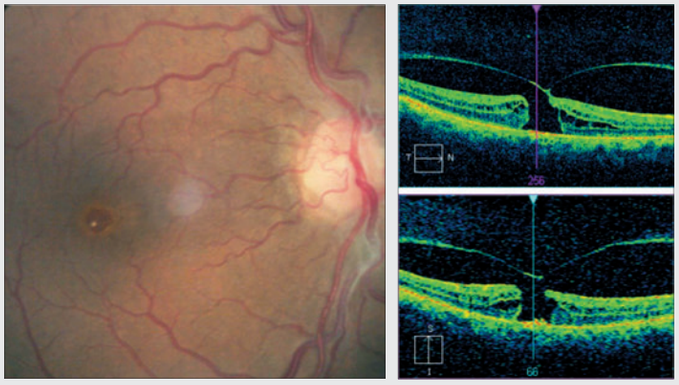

Figure 6. Macular hole formation in a 60-year-old patient. Note the small macular hole and vitreo-retinal defect in the fundus image and the characteristic appearance on OCT. (Photos courtesy of Leo Semes, OD, FAAO.)

ening (fluid accumulation) and evidence of exudate in proximity to the macula. Fluid accumulation representing CSME may be amenable to an anti-VEGF treatment as well, and deserves retinal consultation.

Another etiology of macular edema is secondary to retinal vein occlusion (RVO), an obstruction of small veins in the retina. Similar to CSME, these cases may respond to intravitreal anti-VEGF, but may be treated initially with a topical non-steroidal anti-inflammatory (NSAID). More rapid resolution is generally obtained with the former (see Figure 4).

Cystoid macular edema (CME) is not nearly as common following cataract surgery as was the case 2 decades ago but still occurs occasionally. Since many of these cases are co-managed by optometrists, vigilance during the post-operative period is the paradigm. Vision loss or the observation of macular thickening, or demonstration of CME by digital imaging deserves a retinal consult. Neglect can result in vision loss as with CSME in diabetic patients (see Figure 5).

Vitreomacular abnormalities

The third category of retina-specialist consults would be those involving abnormal vitreomacular interactions. Several items fall under this heading. Vitreo-macular traction, *per se*, may be asymptomatic or go unnoticed by the patient. When visual disturbances prompt a visit to the optometrist, subtle changes may be difficult to detect at stereoscopic examination. We have learned much from OCT that substantiates histology and supports the original staging of this group of disorders. Macular hole formation is a leading cause of the sight-threatening entities. In many instances, the patient presents only following vision loss and fundus examination confirms the central defect. In other instances, precursors to full-thickness macular hole formation are seen at OCT and prompt closer follow-up of those patients at highest risk by either the optometrist or retinal surgeon (see Figure 6).

Leaving the posterior pole as a prompt for retina consult, fresh retinal detachment with intact macula would be next in the lineup. When patients become symptomatic with persistent flashing lights or a new-onset of floaters, the examining optometrist may observe red blood cells or RPE cells in the vitreous. Other characteristic clues to retinal detachment in the presence of symptoms are wrinkled retina/retinal vasculature, and obscured choroidal detail. When the macula remains attached, the prognosis for visual recovery is improved if the patient is attended to within 24-48 hours.

The fifth and final reason to obtain a retina consult would be when you just can't figure it out. This is not intended as a cop-out suggestion. We should use all our diagnostic capabilities, background knowledge of anatomy, and the patient history to make a tentative diagnosis. When the possibilities are confusing and the prognosis is unknown, then appropriate consultation is in order. A further aspect of this fifth reason is to have a good understanding of your retina specialist's management philosophies. Another component of such a relationship consists of good communication between the optometrist and the consultant. This also includes what the optometrist's role in follow-up will be. All of those elements should be in place for the benefit of seamless patient care.

Finally, resist the urge to send a patient for a consult when the surgeon will be doing nothing more that you are capable of providing for the patient.**ODT**

Author Info

Leo Semes, OD, FAAO,
Dr. Semes is a professor of optometry at the University of Alabama-Birmingham. He is a founding member of the Optometric Glaucoma Society and a founding fellow of the Optometric Retina Society.

Staying in shape

A new contact lens enhances comfort by retaining its shape throughout the day

By Frank Celia

Patients and clinicians alike know what a stray or discarded contact lens looks like. It shrinks, becomes brittle and crumples, losing its clarity and spherical shape. Loss of water content causes this transformation. So, for a contact lens to be viable, it must remain hydrated.

Something similar to this dynamic lies at the heart of patients' end-of-day comfort problems, experts believe, albeit on a much lesser scale. Applied in the morning, a contact lens has its full water content intact. At this time of day, patients report the highest levels of comfort. But, as the hours pass, contact lenses slowly dehydrate and comfort levels decline, reaching their nadir around dinnertime, when many patients opt to remove their contact lenses and rely on spectacles until turning in for the night.

The big question

What's the connection between loss of water content and loss of comfort? Current theory—and theoretical it is, because these processes remain difficult to evaluate *in vivo*—holds that on a much smaller scale the same transformation seen in discarded lenses occurs in worn lenses. That is, dehydration causes the material to begin to crumple up and lose its spherical shape. This very slight loss of optical shape accounts for the dry, pinching, scratchy, foreign-body sensation, as well as the blurred vision reported by end-of-day wearers, researchers believe.

The design of a new daily disposable hydrogel contact lens, the Biotrue ONEday (Bausch + Lomb [B + L]), addresses hydration by retaining enough moisture to hold its shape throughout the day, according to the company, which also said the lens is proving to be a hit with patients and practitioners.

Bio-inspiration

Biotrue ONEday is made from HyperGel (nesofilcon A), a new material that combines the best features of conventional hydrogels with silicone hydrogels. It offers high water content—78%, the same percentage present in the human cornea—while delivering more oxygen than a traditional hydrogel and without sacrificing hydrogel comfort, according to the company.

Take-Home Message

A new contact lens material (nesofilcon A), which combines the best features of conventional hydrogels and silicone hydrogels, offers high water content to combat end-of-day dehydration and resulting discomfort.

While designing the nesofilcon A material, B + L research scientists looked to the natural model of the human eye—consequently, the terms "bio-inspired" and "biomimicry" are often applied to Biotrue ONEday. This is not an uncommon approach in product design. Famously, the inventors of Velcro were inspired by the burrs that stick to clothing after a walk in the woods, for example.

> 'This product seems to deliver on our wish list, without using silicone.'
>
> Joseph P. Shovlin, OD, FAAO

In this case, researchers looked to how the cornea retains moisture. They included a polymer in the material that slowly migrates to the surface of the lens throughout the day, forming a barrier that guards against moisture evaporation, similar to the way the lipid layer of tear film guards against evaporation.

At the same time, the material provides a high level of oxygen transmissibility, with a Dk/t value of 42 at the center of a -3.00 D lens. This will not match the best Dk/t values of silicone hydrogel material, but is far above average for a conventional hydrogel.

Increased late-day comfort stands as the main selling point of this lens, a vital characteristic because comfort remains the number one reason cited by contact lens dropouts. Biotrue ONEday has received mostly positive reviews since its entry into the market last year.

High contentment

"We were using some specialty lenses, such as Safigel 1Day, known for their wetting properties," said David I. Geffen, OD, FAAO, a private practitioner in San Diego. "We've switched most of those patients over to Biotrue ONEday. They have been happier than ever because not only do they get the wetter lens, they also get a lens with fantastic optics."

Paradoxically, previous contact lenses with high water content tended to become the most dry toward the end of the day, Dr. Geffen noted. "These lenses dehydrated so badly that they became like potato chips on the eye. We had a lot of complaints from patients about these lenses. On top of everything else, because the lenses were so fragile, we were ripping them, too. We would split the lens while pulling it out of the vial," he said. The high tensile strength of Biotrue ONEday is another virtue appreciated by practitioners and contact lens-wearing patients.

Double duty

Dr. Geffen said that he has had positive experiences fitting former contact lens dropouts with Biotrue ONEday. "One patient in particular, a 5.00 D myope, was experiencing dry eye problems with moderate superficial punctate keratitis (SPK) across the whole cornea. Even after she discontinued lens wear, the dryness continued," he said. But, after wearing Biotrue ONEday lenses for several days, her corneas healed.

Said Dr. Geffen: "She was having exposure problems, and the lenses acted as a bandage,

See **Shape** on page 26

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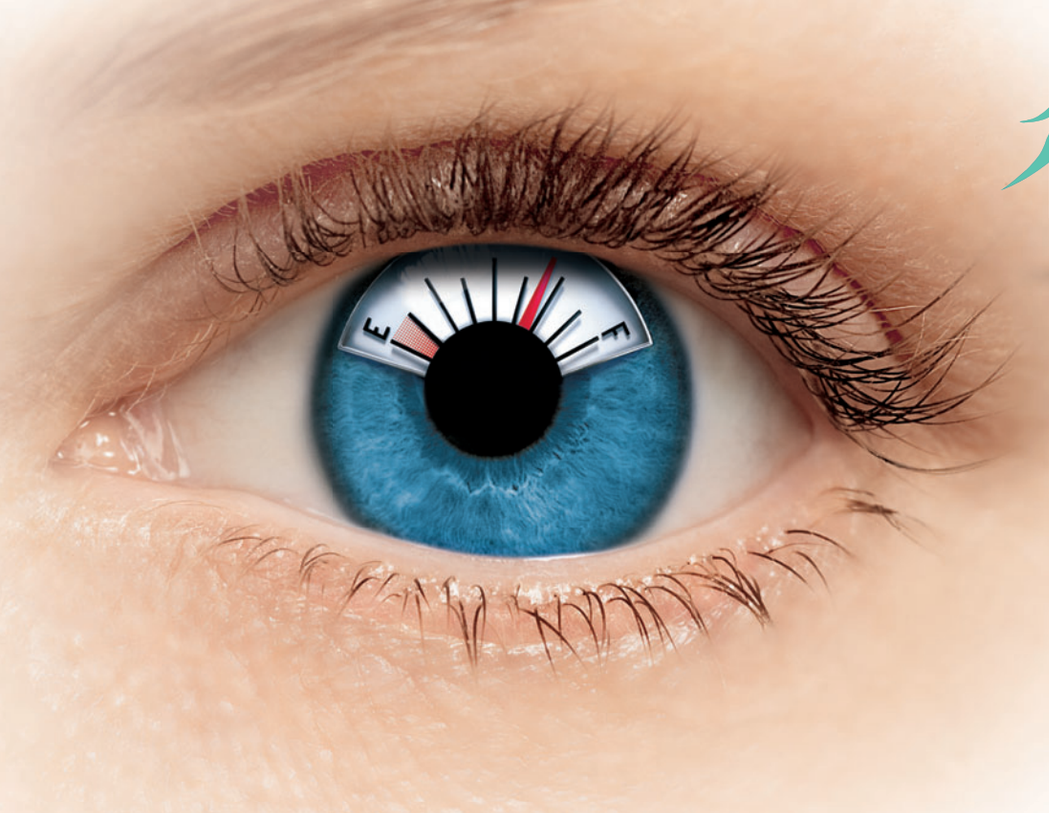
Frank Celia is a freelance healthcare writer based in the Philadelphia area. Contact him at frankcelia@aol.com.



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Shape

Continued from page 24

keeping the moisture in. Now she was telling me how comfortable her eyes were."

Although Biotrue ONEday is the go-to daily disposable for Jason Jedlicka, OD, FAAO, Dr. Jedlicka said it's not a silver bullet for every patient. "This lens is sturdy, which makes handling nice, and most people do not mind the thickness. But I have had a few patients prefer a thinner lens design when given the option," said Dr. Jedlicka, in group practice in Edina, MN.

Biotrue ONEday might not be the best choice for patients with particularly large or steep corneas, Dr. Jedlicka added. Also, patients will typically require about -0.25 D more than their spectacle refraction calls for, he said. "But, as long as we know that going in, it's not a problem."

Aspheric optics

Like other B + L lenses, Biotrue ONEday offers what the company calls high-definition vision. This correction strategy is based on the notion that all human eyes contain a small amount of spherical aberration, averaging about +0.15 µm per eye. The company's proprietary spherical aberration correction algorithms correct for such naturally occurring asymmetry. The result is most noticeable during nighttime vision when glare and halos are reduced. The company says Biotrue ONEday goes one step further than its previous products, customizing algorithms for each 0.25 D change in lens power.

> '[Patients] have been happier than ever because not only do they get the wetter lens, they also get a lens with fantastic optics.'
>
> David I. Geffen, OD, FAAO

"It's a great attribute and increases vision quality," said Dr. Geffen. "When you have patients who show 20/20 vision in your office but still have difficult night symptoms, this lens can possibly eliminate some of those problems."

Daily disposables are now the fastest growing segment of the contact lens market, according to Dr. Geffen. Many eyecare professionals see Biotrue ONEday as the perfect workhorse lens for this demographic.

"As long as the patient's prescription falls within the available parameters, a daily disposable option is the best replacement schedule for most patients," said Joseph P. Shovlin, OD, FAAO, in group practice in Scranton, PA.

Dr. Shovlin added: "For years, we've been hearing that the most compatible contact lens will be the one that best mimics the cornea and supports the tear film. The HyperGel material mimics the water content of the cornea. This product seems to deliver on our wish list, without using silicone, which has its impediments."**ODT**

Five steps for better CL wear

Maximize your success with contact lens patients by minimizing surface deposits

By David Kading, OD, FAAO, and Mile Brujic, OD, FAAO

Our contact lens (CL) patients are constantly searching for a cleaner, more comfortable lens. Consider these 5 steps to help you recommend a cleaner, healthier lens wearing experience.

1 Rub lenses

Although many patients have adopted a no-rub regimen for lenses that require lens care, rubbing still has significant value. Part of the reason for not rubbing may be because of previous package labeling, and part may be secondary to complacent instructions given to patients by practitioners when recommending care solutions. Within the past 3 years there have been three new CL solutions on the market; none have no-rub labeling. It is incumbent upon the eyecare practitioner to educate patients on this vital habit to optimize lens-wearing success.

It has been well established that patients who rubbed their lenses reduced deposits on the surfaces of CLs compared with patients who simply rinsed and stored their lenses.[1] In the era of silicone hydrogel (SiHy) lenses, it has been well established that SiHy lenses have very different deposition characteristic profiles than their hydrogel predecessors.[2] Hydrogels tend to deposit more proteins than SiHys, and SiHys tend to deposit more lipids than hydrogels.[3] Certain care systems are better designed to effectively remove lipids from the surfaces of lenses.[4] It is incumbent upon us as eyecare practitioners to strongly recommend the solutions we want our patients to use and to reinforce proper use of the solutions, including correctly rubbing the lens.

2 Identify allergy sufferers

Patients who suffer from allergies tend to produce excessive mucous and discharge while their allergies are active.[5] And allergy patients are more likely to be symptomatic of CL discomfort. This is a concern particularly because the prevalence of allergies tends to be between 20%-40% of the population.[6] Also, 70% of those who have systemic allergies will also have ocular symptoms.[7]

Although some of our patients will come in when symptomatic or let us know of allergy symptoms at other times of the year, many of our patients won't tell us of ocular symptoms, even when questioned, leading to underdiagnosing the condition.[8] Patients, at times, will minimize certain symptoms during CL checkups because those patients may think that our recommendation would be to discontinue CL wear. These patients will, unfortunately, attempt to self-treat with over-the-counter options or temporally limiting lens wear.

Not identifying these patients during yearly visits is a concern. That's why we have our patients bring in any CL care products to appointments. This will give us an accurate view of what our patients are actually using, including using drops for discomfort during allergy season.

Fortunately, we have effective options to help patients with allergies, but it ultimately depends on us to identify these patients. Prescribing an effective mast-cell stabilizer/anti-histamine combination will help allergy patients by reducing symptoms and the amount of discharge. Also, recommending a peroxide care system works well for these patients by providing maximum disinfection with a high level of cleaning efficacy.

3 Be vigilant about compliance

It may sound surprising, but daily disposable contact lenses (DDCLs) should be replaced daily, 2-week lenses should be replaced every 2 weeks, and monthly lenses on a monthly basis. The compliance rate of each of the lens modalities varies significantly. DDCLs win the compliance battle because 88% of patients replace them as scheduled. Two-week lenses have a 48% compliance rate, while monthly lens wearers replace lenses with 72% compliance. In fact, 2-week lens wearers wear their lenses on average for 27 days (2.6x the manufacturers' recommended replacement frequency (MRRF) and 1-month wearers wear theirs for 47 days on average (1.5x the MRRF).[9,10] Manufacturers set these replacement schedules based on their impressions of what will provide the patient with the optimal lens-wearing experience. So, it is essential for both doctors and patients to follow this replacement schedule.

5 steps for cleaner, more comfortable lenses

1. Rub lenses
2. Identify allergy sufferers
3. Be vigilant about replacement compliance
4. Understand CL solutions can improve surface qualities
5. Consider daily disposables for patients who continue to have problems

Some patients may need to replace lenses on a more frequent basis, but exceeding the recommended replacement schedule may put the patient at risk for suboptimal lens experiences, including deposit buildup. Although it seems obvious that replacing lenses is better for patients, researchers discovered that patients achieved better end-of-day comfort, better vision, better end-of-day comfort at the close of the lens wearing cycle (2-week or 1-month), and better vision at the close of the lens wearing cycle (2-week or 1-month).[11]

By having patients follow the MRRF with a reminder that it will enhance the lens-wearing experience, we can help them gain better comfort and better vision.

4 Understand CL solutions can improve surface qualities

CL solutions are a vital part of patients' CL-wearing experience. When a patient doesn't replace his lenses on a daily basis, it is crucial that he use a CL solution that is compatible with the lens. Many of our patients are wearing SiHy lenses, and as such, the solution that patients use should reflect the technology.

Many of the soft lenses that we prescribe have a hydrophobic (water-repelling) back-

See **Clean lenses** on page 28

Author Info

Dr. Kading (far left) owns a three-doctor, two-location practice in the Seattle area.

Dr. Brujic is a partner in a five-doctor, four-location practice in northwest Ohio.

Together, Drs. Kading and Brujic own Optometric Insights. Either one or both have received honoraria for consulting, performing research, speaking, or writing from: Alcon Laboratories, Allergan, Bausch + Lomb, Contamac, CooperVision, Essilor, Nicox, Paragon, SynergEyes, Transitions, Valeant Pharmaceuticals, Vistakon, and Valley Contax.

Clean lenses

Continued from page 27

bone. However, when patients initially place them on their eyes, the lenses have hydrophilic (water-loving) sites on the lens surface. As the tear surface becomes unstable throughout the day and begins to break up, the hydrophilic groups will migrate into the lens that produces a hydrophobic surface.[12] One study, looking at the capabilities of a newer CL solution, found that the solution's unique wetting agent would embed itself into the hydrophobic areas, which recreates the hydrophilic nature of the lens.[12]

Older technology solutions, such as private label and generic, do not have the wetting capabilities designed specifically for SiHy lenses because they were invented prior to SiHy lenses hitting the market.

Ensure that each patient is using the lens solution that you recommended during the annual exam. Be sure to explain to your patients the rationale of why you are prescribing it. By making certain that patients are using updated solutions, you can help to keep the surface of their lenses clear so that deposits don't have a chance to become embedded on the lens surface.

5 Consider DDCLs for patients who continue to have problems

DDCLs provide us with a viable option to help reduce deposition on the surface of lenses. With the lens being replaced every day, the previous day's wear is never a factor.

There are a number of options with DDCLs. A variety of prescriptions and parameters are available in hydrogel materials. Vistakon and Alcon currently have the only SiHy daily disposable lenses on the U.S. market.**ODT**

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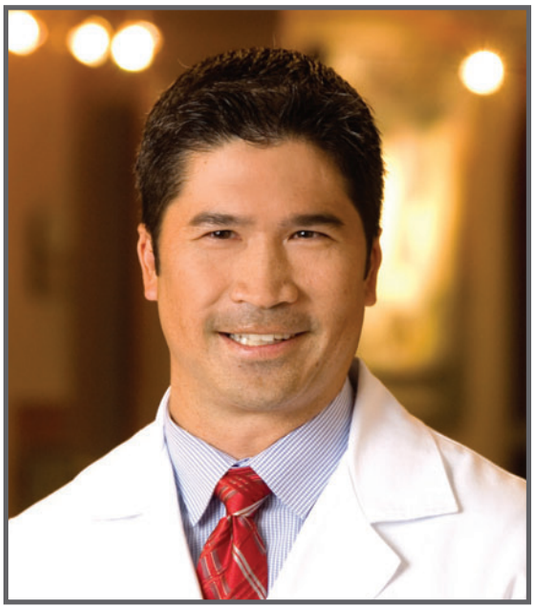

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In Brief

Technology drives Okia's innovative collection

Kowloon, Hong Kong—The Double Match collection from Okia showcases the latest high-definition eyewear.

HDA Technology enables an unlimited selection of colors and patterns on acetate frames. Okia now goes one more step further and shows a new definition level its technology is able to achieve: the HDA patterns of this new collection cover both sides of the temples, opening new incredible possibilities for product design.

Okia Double Match eyewear is inspired by nature and the animal world is the main inspiration behind the HDA patterns chosen for the collection. Bright, vivid colors—such as green, pink, purple, and orange—light up the frames designs for an unconventional look.

Colors, details embody X-IDE sunglasses

Calalzo di Cadore, Italy—X-IDE delivers the latest sunwear fashion trends with its capsule collection.

Eggert, shown above, is a square style with larger lenses, combining bright colors with quality details. Transparent resin encloses the metal frame to make it visibly lighter and highlights the graduated hues of the metal beneath it.

Color clearly plays the starring role, with high contrast combinations of black/white, red/black, blue/white, black/blue/green, fuchsia/orange/grey, grey/green, sky-blue/orange, and mirrored lenses in red, sky blue, yellow, orange, and purple.

E-Voque display creates stylish retail setting

Collegeville, PA—The E-Voque display and furniture collection from Eye Designs elevates an optical into a retail environment. With sleek lines, modular components, LED lighting, and brushed chrome accents, E-Voque brings style and sophistication to premium brands and signature frame collections. The E-Voque display unit features oversized LED lit shelves for creating product vignettes for brands and frames.

By incorporating modular components, such as mirror block, accessory block, and frame block with wave frame holders, the E-Voque display can be divided into distinctive product presentations and merchandised by brand. The E-Voque collection includes low-profile wall units, mirror units, and dispensing tables of varying sizes and configurations.

Magnifiers add +5.00 D for focusing at near

Grover Beach, CA—Dr. Hirsch's Magnifying Spectacles from Marlin Industries enable practitioners to quickly, efficiently, and

inexpensively provide their patients with an additional +5.00 D associated with base-in prism for focusing at an 8-in. distance.

The magnifiers are made from optical-grade polycarbonate with a scratch-coated front. They maintain excellent memory even when stretched over the widest of frames.

These spectacles are well suited for visually-compromised and normally sighted patients for many vocational and avocational needs that often require extra magnification at near.

Star power, artistic style lead new Zyloware releases

Port Chester, NY—Zyloware has introduced new styles from Daisy Fuentes Eyewear.

The Daisy Fuentes Carla (above) is a full rim handcrafted zyl frame. The zyl temples are embellished with a foil animal print design as an appealing. Spring hinges enhance the comfortable fit. Colors: tortoise/pink (shown), black/white.

New in the Etched collection is the XP 601M for men (shown above), designed with a thin, full rim metal front and a sleek, wrapping metal endpiece. Thick, handcrafted zyl temples feature a metal plaque with a unique inlay pattern. For enhanced comfort, the XP 601M has spring hinges, snap-in nosepads, and accommodates progressive lenses. Colors: dark gunmetal (shown), brown.**ODT**

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Records

Continued from page 38

As far back as Dr. Schwartz can remember, he has collected records—doo-wop, rock 'n roll, and rockabilly—mostly 78s, 45s, and LPs of vocal groups from the 1950s through the 1970s.

Hooked on music

Dr. Schwartz admitted his passion for music was inspired by an unlikely source—his family's Swedish housekeeper and nanny. As a toddler, he stayed at her home when his parents travelled. Although she didn't speak fluent English, she constantly listened to music by American artists.

"She had records all over the house," Dr. Schwartz recalled. "I spent my day on the floor with a record player. Over time, I became educated on the different labels and different artists."

One thing led to another, and by the time he started kindergarten, he already owned quite a few records. Now, his collection ranks among the largest in the world.

Optometry in the family

Although collecting music may have been Dr. Schwartz' first love, he never wanted more than a part-time commitment. While growing up, he was exposed to the field of optometry by his father, who was an optometrist, and his mother, a registered nurse. "I grew up around the equipment and was exposed to the profession from an early age," he said, adding that as a child, he set his sights on becoming an optometrist.

Quest for golden oldies

Still, he could never think of abandoning music, so he found an effective compromise. During his spare time from 1968 until 1994, he worked as a professional DJ at several radio stations. Most of his DJ career was spent playing top 40 tunes on WSBA radio in York, PA.

Since then, Dr. Schwartz has continued to grow his collection by purchasing record libraries from various radio stations, jukebox distributors, and private collections around the country.

Not every lead panned out, Dr. Schwartz added. He recalled one operator claiming to own 100,000 records in good condition. However, Dr. Schwartz and a friend discovered less than half that number, and those they saw were dirty and water damaged.

Meanwhile, he cofounded Keystone Record Collectors in 1979, which supports 300 paid members and hosts monthly Pennsylvania Music Expos that attract more than 1,000 people. Likewise, he launched a record label in 1995 called X-BAT, the name of his high school fraternal organization. The label releases mostly oldies, he said, adding that it has also recorded music performed by local musicians.

"I buy either the master tapes or license the right to use music from the owner, if we can find the owner," he said, explaining that he has helped artists, such as Jimmy Clanton ("Venus in Blue Jeans"), Lee Andrews and The Hearts ("Long Lonely Nights"), and Roy Tyson ("Oh What A Night For Love") find their old material. "It's much harder to find large quantities of records now than 25 years ago. Most of the old stores, jukebox distributors, and radio stations are gone. The records have either been thrown away or sold."

Back at his office, only one item offers a clue about Dr. Schwartz' double life. Hanging on the wall in an exam room is Foreigner's "Double Vision" poster signed by the band's lead singer, Lou Gramm, and guitarist-songwriter, Mick Jones. For now, Dr. Schwartz said he prefers to keep his medical and musical careers separate.

5 Favorite Finds

5 records in different genres worth chasing

By Philip J. Schwartz, OD

1. **"Golden Teardrops" by The Flamingos** (Chance 1145, 45 rpm red plastic, 1953). Possibly the greatest group vocal record ever made. Stunning, delicate harmonies.
2. **Elvis Presley on Sun Records** (1954-55) History in the making. All 5 records came in 78 rpm and 45 rpm formats.
3. **"Yesterday And Today" by The Beatles** (Capitol LP T2553, 1966) The original "butcher cover" showed the Beatles in bloody aprons, with manikins. The LP was quickly recalled, the cover revised, and shipped to market.
4. **"Rocket 88" by Jackie Brenston** (Chess 78 rpm, 1951) Was this the first rock and roll record? Definitely not, but still a must-have early blues rocker featuring Ike Turner's band.
5. **"It's A Crying Shame" by The Gentlemen** (Crimson acetate, later on Vandan 45 rpm, 1966). They don't sound like gentlemen. Like garage rock? Put this one on at high volume and blow out your windows!

In the future, Dr. Schwartz hopes to house his collection under one roof, now stored in his house and in climate-controlled storage units. He plans to build some type of studio that will provide a listening room for friends and other collectors.

Until then, he'll continue hunting for old records while humming some of his favorite lyrics: "Doo wop shoo bop a doo wop…"**ODT**

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Philip J. Schwartz, OD, is in private practice in Lancaster, PA. Contact him at pschwa7845@aol.com.

An enthusiastic collector of recorded music, Dr. Philip Schwartz has most of the records that entered the *Billboard* charts between 1950 and 1975.

OD as 'spin' doctor

Philip Schwartz, OD, cares for his stacks of tracks—vinyl records from the 1950s through the 1970s

By Carol Patton

Philip J. Schwartz, OD, could talk for hours about his music collection and related adventures. Take the time he entered a dimly lit warehouse in West Palm Beach, FL, carrying several thousand dollars in his pocket, to meet some guys who could have easily co-starred in *The Sopranos*. Or when he helps retired performing artists find copies of their old hits. Not to mention his nearly 30 years as a professional DJ for radio stations throughout the northeastern United States.

Take-Home Message

Philip J. Schwartz, OD, is also a "spin" doctor, of sorts. Dr. Schwartz collects vintage vinyl—recorded music from the 1950s through the 1970s. He estimates that his collection of 45s, 78s, and LPs includes well over 100,000 pieces.

Dr. Schwartz, who practices in Lancaster County, PA, collects recorded music. As far back as he can remember, he has been collecting records—doo-wop, rock 'n roll, and rockabilly—mostly 78s, 45s, and LPs of vocal groups from the 1950s through the 1970s.

Dr. Schwartz doesn't know exactly how many records he owns, but guesstimates the total as well over 100,000. His collection has never been appraised because he has no intention of selling them. Although Dr. Schwartz can barely sing or play a note, his game plan is to listen, enjoy, and share his music.

"I collect any artist who was popular and many who were not," Dr. Schwartz said, adding that most of his collection is vinyl records. "I have most of the records that entered the Billboard charts between 1950 and 1975."

See **Records** on page 37

Photo courtesy Philip J. Schwartz, OD

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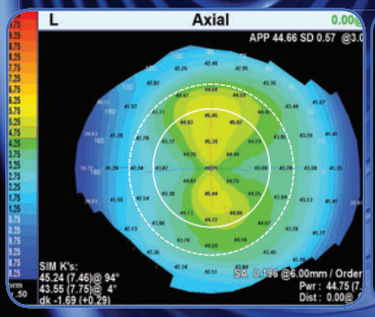
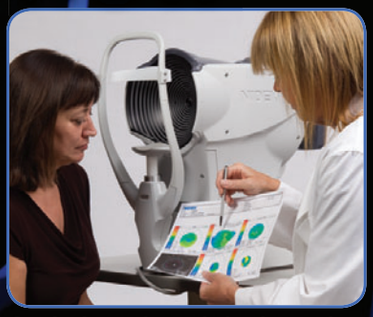


In less than 60 seconds, the OPD-Scan III harvests 23 critical diagnostics and determines which patients can achieve 20/20 vision with minimal refinement. The TRS-5100 then completes the needed refinement or traditional refraction, with digital speed and accuracy.



A patient's complete optical pathway and total visual system is assessed.

How will your patients be impressed?

- Significantly shorter exam times
- Patient verification of old vs. new Rx – instantly
- Educational tools that graphically display all diagnoses
- More time with you in face-to-face consults
- Time to spend in optical selection and fittings
- Fewer remakes in their lens Rx
- Solutions to day/night vision frustrations
- A new high-tech examination experience
- A completely enhanced patient experience

What's ***not*** to talk positively about with friends and family?

XFRACTION: WAVEFRONT OPTIMIZED REFRAXION

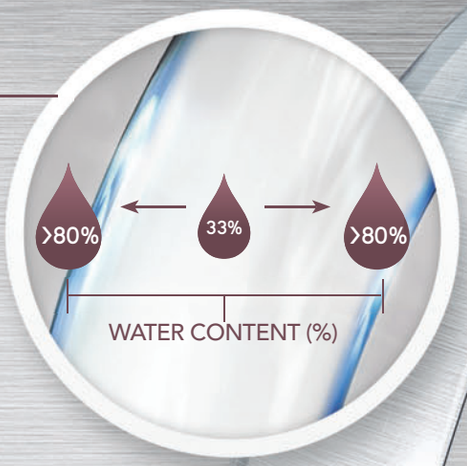
NIDEK | MARCO

Designed and Manufactured by NIDEK – Represented by MARCO

800.874.5274
www.marco.com

*Data based on national averages.

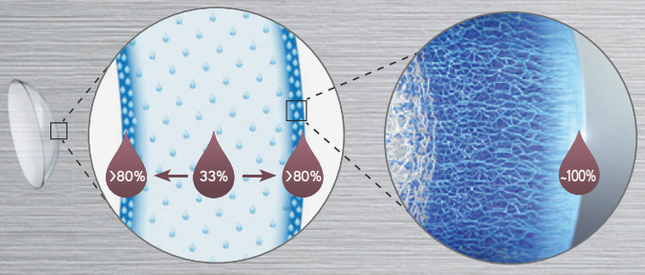
UNIQUE WATER GRADIENT



THIS IS WHY contact lenses have reached a new era in comfort.

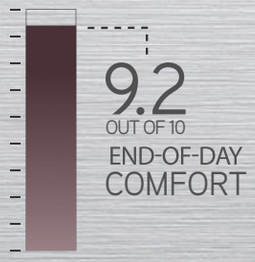
DAILIES TOTAL1® Water Gradient Contact Lenses feature an increase from 33% to over 80% water content from core to surface* for the highest oxygen transmissibility, and lasting lubricity for exceptional end-of-day comfort.[1, 2, 3]

The First And Only Water Gradient Contact Lens



Contact Lens Cross-Section

Enlarged Water Gradient



UNIQUE WATER GRADIENT

Features different surface and core water contents, optimizing both surface and core properties[2]

LASTING LUBRICITY

Ultrasoft, hydrophilic surface gel approaches 100% water at the outermost surface for exceptional lubricity[4]

OUTSTANDING COMFORT

Lasting lubricity for exceptional comfort from beginning to end of day[3]

Let your customers experience the DAILIES TOTAL1® contact lens difference today.

PERFORMANCE DRIVEN BY SCIENCE™

*In vitro measurement of unworn lenses.

1. Based on the ratio of lens oxygen transmissibilities among daily disposable contact lenses. Alcon data on file, 2010.
2. Based on critical coefficient of friction measured by inclined plate method; significance demonstrated at the 0.05 level. Alcon data on file, 2011.
3. In a randomized, subject-masked clinical study, n=40. Alcon data on file, 2011.
4. Angelini TE, Nixon RM, Dunn AC, et al. Viscoelasticity and mesh-size at the surface of hydrogels characterized with microrheology. ARVO 2013;E-abstract 500, B0137.

See product instructions for complete wear, care and safety information. 04/13 DAL13097JAD

Alcon®
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