As COVID-19 changes practice operations, telehealth is on the rise as a viable option for patients who may not obtain in-person eye care. Currently, video and telephone-based consultations are garnishing the most attention; however, telemedicine has been making waves in eye care for the past several years, particularly when it comes to the retina.

Guided by the principles outlined by the Early Treatment Diabetic Retinopathy Study (ETDRS), an important function of primary eye care is the grading of diabetic retinopathy (DR) to allow for the appropriate identification of patients with vision-threatening disease. Recently, artificial intelligence and deep learning algorithms began offering alternate or adjunct mechanisms to grade diabetic retinopathy. Neural networks have demonstrated high levels of sensitivity and specificity in the detection of referral-warranted DR from single-field fundus photographs. The application of these algorithms in the management of DR represent opportunities to broadly screen the general population to greater identify disease.

See OCT screening for DR on page 32
NEW! drsplus

AUTOMATED TRUE COLOR RETINAL IMAGING

+ True color confocal imaging
+ Fast image acquisition
+ Ultra-high resolution
+ No dilation (2.5mm pupil size)

THE NEXT GENERATION IN RETINA & GLAUCOMA DIAGNOSTICS

icare | centervue
Scan, call 888.422.7313, email info@icare-usa.com,
or visit www.icarecentervue.com

icare HOME

24-HOUR AT HOME TONOMETRY

+ Easy to use
+ Remote diurnal IOP curve
+ Long term monitoring
+ Alert notifications
Moving on into the summer

By Mike Hennessy, Sr.

As our June issue goes to print, the country is opening up even more, and many more ODs are moving beyond non-emergent care. In that vein, this issue is chock full of solid clinical information.

In our cover story this month, Drs. Stacy Potwin and Michael Chaglasian look at pediatric glaucoma and how diagnosis and treatment differs from that of adult patients with the disease.

Also featured on our cover this month is a look at contrast sensitivity in glaucoma patients after a patient comment. Dr. Ernie Bowling offers thoughts on better communication between patients and ODs to promote better contact lens care compliance. Dr. Crystal Brimer shares 11 things her patient wishes her previous OD had told her.

Dr. Ernie Bowling explains the importance of lactoferrin in diagnosing dry eye, and Dr. Vin Dang shows how proper documentation helps ODs obtain prior authorizations for dry eye medications.

Dr. Kerry Salsberg outlines clinical advantages that swept-source and multimodal OCT technologies offer. In addition, in a story from sister publication Medical Economics, Dr. Sandeep Jain discusses using better tools for telehealth success.

Finally, Chief Optometric Editor Dr. Ben Casella plans to better address contrast sensitivity with glaucoma patients after a patient comment.

CONTACT LENS CARE

Compliance with directions for use was 100% among the users of a one-step hydrogen peroxide lens care system as compared to 37% among multipurpose system users.

RETINA

OCT, OCTA shows promise in screening for diabetic retinopathy, cotton wool spot leaves a RNFL defect in its wake.

In our cover story this month, Drs. Stacy Potwin and Michael Chaglasian look at pediatric glaucoma and how diagnosis and treatment differs from that of adult patients with the disease.

Also featured on our cover this month is a look at contrast sensitivity in glaucoma patients after a patient comment. Dr. Ernie Bowling offers thoughts on better communication between patients and ODs to promote better contact lens care compliance. Dr. Crystal Brimer shares 11 things her patient wishes her previous OD had told her.

Dr. Ernie Bowling explains the importance of lactoferrin in diagnosing dry eye, and Dr. Vin Dang shows how proper documentation helps ODs obtain prior authorizations for dry eye medications.

Dr. Kerry Salsberg outlines clinical advantages that swept-source and multimodal OCT technologies offer. In addition, in a story from sister publication Medical Economics, Dr. Sandeep Jain discusses using better tools for telehealth success.

Finally, Chief Optometric Editor Dr. Ben Casella plans to better address contrast sensitivity with glaucoma patients after a patient comment.
Physical and psychological changes of opening post COVID-19

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

Proceed with caution. This is one of several mantras I have been attempting to live by lately. As practices begin to “open back up,” the process has been beset with caution. Early on, when the Centers for Disease Control and Prevention (CDC) recommended postponing non-emergent care, ODs knew that dipping our toes into the waters of “routine” clinical life again would be slow.

For starters, there are the physical barriers to infection and transmission that need to be in place. We all went on shopping sprees for non-contact forehead thermometers, partitions, filters, wipes, gloves, masks, alcohol, hydrogen peroxide. We updated office protocols: health checks for all who enter, people calling ahead or knocking on the door, questions about COVID-19 specific symptoms and travel to regions deemed “hot spots,” frequent sanitation of all surfaces, changes to the flow of the building, and on and on.

I got used to the physicality pretty quickly. We are used to sanitizing surfaces, anyway. I’m not bothered by the mask and glasses. I will say I’m not smart enough to keep the glasses from fogging. I’m thankful for the slit-lamp partition compliments of Zeiss. The air filters aren’t all that noisy.

In my head

What drives me nuts, however, is the psychology of the whole thing. Did I see any silent carriers today? Were my glasses on tight enough? Does my staff take things as seriously outside the office as I mandate at work? How many gloves are sufficient to store up? How long before I’m comfortable seeing more than a patient every hour? What are my bills going to look like as my Payroll Protection Plan (PPP) loan gets spent down? Will I miss checking a box somewhere on the loan forgiveness application and have to pay it all back? Will we have that second spike we keep hearing about?

I’d be lying if I told you these things weren’t all in my head at the time I penned this editorial. Many of these things are in your heads, too, and I want you to know you are absolutely not alone. As far as being a small business owner during all of this, I have felt alone at times. I was recently on a virtual happy hour with 8 friends, and I was the only one who wasn’t working from home. In fact, one friend was quick to say business was better than ever. Instead of counting that I had operated on less than 1 percent of my typical patient load for 2 months, I simply said, “Hear, hear.”

My motive is not to be rhetorical and not to solicit answers. It is to be honest with you as my friend in optometry. I firmly believe that brighter days are ahead for us. We are in this together, and it is together that we will overcome. Stay safe, take care, and I sincerely hope to see you soon.

Editorial Advisory Board

Jeffrey Anshel, OD, FAAO
Ocular Nutrition Society
Encinitas, CA

Melissa Barrett, OD, FAAO, FSLS
UC Davis Medical Center
Sacramento, CA

Sherry J. Bass, OD, FAAO
SUNY College of Optometry
New York, NY

Justin Bazan, OD
Park Slope Eye
Brooklyn, NY

Ernest L. Bowling, OD, FAAO
Gadston, AL

Crystal Briner, OD, FAAO
Crystal Vision Services
Wilmington, NC

Michael Brown, OD, MHS-CL, FAAO
U.S. Depart. of Veterans Affairs
Huntsville, AL

Mile Brujic, OD, FAAO
Premier Vision Group
Bowling Green, OH

Michael A. Chagasidian, OD, FAAO
Illinois Eye Institute
Chicago, IL

Clark Y. Chang, OD, MSA, MSc, FAAO
Wills Eye Hospital
Philadelphia, PA

A. Paul Chous, OD, MA, FAAO
Chous Eye Care Associates
Tacoma, WA

Michael P. Cooper, OD
Solmsky EyeCare
West Hartford, CT

Melanie Benton, OD, MBA, FAAO
Salisbury Eyecare and Eyewear
Salisbury, NC

Marta Faltykovskij, OD, FAAO
Manhattan Eye, Ear and Throat Hospital Ophthalmology
New York, NY

Steven Furucchi, OD, FAAO
Sepulveda VA Ambulatory Care Center & Nursing Home
Sepulveda, CA

Barbara Fluder, OD
Williams Eye Institute
Memphis, TN

Lisa Frye, ABOC, FAAO
EyeCare Associates
Birmingham, AL

Ben Gadiee, OD, FAAO
Gadiee Eye Centers
Louisville, KY

David L. Geffen, OD, FAAO
Crystal Vision Services
Los Angeles, CA

Jeffry D. Gerson, OD, FAAO
WestGlen Eyecare
Shawnee, KS

Alan Hazler, OD, FAAO
Shady Grove Eye and Vision Care
Rockville, MD

Whitney Hauser, OD
Southern College of Optometry
Memphis, TN

Scott G. Hausworth, OD, FAAO
University of Colorado School of Medicine
Aurora, CO

James Hill, OD, FAAO
Medical University of South Carolina
Charleston, SC

Milton M. Hom, OD, FAAO
Azusa, CA

David L. Kading, OD, FAAO
Specialty Eyecare Group
Kirkland, WA

Jennifer Leyerly, OD
Triumph Vision Optometry
Cary, NC

Katherine M. Mastrota, MS, OD, FAAO
Hotel Association of New York City Health Center
New York, NY

Pamela J. Miller, OD, FAAO, JD
Highland, CA

Andrew S. Morgenstern, OD, FAAO
Walter Reed National Military Hosp.
Bethesda, MD

Muhammad Rafieetary, OD, FAAO
Charles Retina Institute
Memphis, TN

Stuart Richer, OD, PhD, FAAO
James Lovell Federal Health Care Facility
North Chicago, IL

John Rumpakis, OD, MBA, FAAO
Practice Resource Management
Lake Oswego, OR

Scott E. Schachter, OD
Advanced Eyecare
Plano Beach, CA

Leo P. Sames, OD, FAAO
University of Alabama at Birmingham School of Optometry
Birmingham, AL

Diana L. Shechtman, OD, FAAO
Nova Southeastern University
Fort Lauderdale, FL

Joseph P. Shovlin, OD, FAAO, DPNAP
Northeastern Eye Institute
Scranton, PA

Jeffry D. Gerson, OD, FAAO
WestGlen Eyecare
Shawnee, KS

Alan Hazler, OD, FAAO
Shady Grove Eye and Vision Care
Rockville, MD

Whitney Hauser, OD
Southern College of Optometry
Memphis, TN

Scott G. Hausworth, OD, FAAO
University of Colorado School of Medicine
Aurora, CO

James Hill, OD, FAAO
Medical University of South Carolina
Charleston, SC

Milton M. Hom, OD, FAAO
Azusa, CA

David L. Kading, OD, FAAO
Specialty Eyecare Group
Kirkland, WA

Jennifer Leyerly, OD
Triumph Vision Optometry
Cary, NC

Katherine M. Mastrota, MS, OD, FAAO
Hotel Association of New York City Health Center
New York, NY

Pamela J. Miller, OD, FAAO, JD
Highland, CA

Andrew S. Morgenstern, OD, FAAO
Walter Reed National Military Hosp.
Bethesda, MD

Muhammad Rafieetary, OD, FAAO
Charles Retina Institute
Memphis, TN

Stuart Richer, OD, PhD, FAAO
James Lovell Federal Health Care Facility
North Chicago, IL

John Rumpakis, OD, MBA, FAAO
Practice Resource Management
Lake Oswego, OR

Scott E. Schachter, OD
Advanced Eyecare
Plano Beach, CA

Leo P. Sames, OD, FAAO
University of Alabama at Birmingham School of Optometry
Birmingham, AL

Diana L. Shechtman, OD, FAAO
Nova Southeastern University
Fort Lauderdale, FL

Joseph P. Shovlin, OD, FAAO, DPNAP
Northeastern Eye Institute
Scranton, PA

Dr. Dori Carlson shares what she wishes she knew as a younger OD on page 25.
Patients aren’t hearing contact lens care information

Doctors and staff need to better communicate recommendations to contact lens wearers

By Ernie Bowling, OD, FAAO

A
n estimated 45 million U.S. residents enjoy the benefit of contact lens wear, but many of them might be at increased risk for complications stemming from improper wear and care.

Unlike daily disposable, single-use contact lenses, those with longer replacement schedules must be maintained. Contact lens solutions perform the essential functions of disinfecting, cleaning, and preserving the lenses to prevent infection and improve wearing comfort.

Patient-doctor disconnect

Far too often, the contact lens care regimen is given too little attention during the annual eye exam. Two surveys conducted to assess contact lens education revealed that one-third (32.9 percent) of contact lens wearers over 18 years of age recalled never hearing any contact lens wear and care recommendations, and only 19.8 percent recalled being told to avoid “topping off” their contact lens solutions.

Yet there is a disconnect between what the patient hears and what the provider says. The same survey reported that the majority of providers stated they shared care recommendations always or most of the time at initial visits, regular checkups, and at complication-related visits.

This gap between what providers say and what the patient hears might be a factor in the large proportion of contact lens wearers reporting behaviors that place them at risk for contact lens-related complications. Addressing this gap might improve contact lens wear and care practices.

There is a disconnect between what the patient hears and what the provider says

Patient recommendations

So, how does a busy practice accomplish this? Fortunately, there are resources available. The American Optometric Association makes the following recommendations for contact lens wearers:

- Always wash and dry hands before handling contact lenses
- Carefully and regularly clean contact lenses as directed by your eye doctor. Rub the contact lenses with fingers and rinse them thoroughly before soaking the lenses overnight in multipurpose solution that completely covers each lens
- Store lenses in the proper lens storage case and replace the case every 3 months or sooner. Clean the case after each use, and keep it open and dry between cleanings
- Use only products recommended by your eye care practitioner to clean and disinfect your lenses. Do not use saline solution and rewetting drops to disinfect lenses—that is not what they are designed to do
- Use fresh solution to clean and store contact lenses. Never reuse old solution. Change contact lens solution according to the manufacturer’s recommendations, even if you don’t wear the lenses daily
- Always follow the recommended contact lens replacement schedule prescribed by your eye doctor
- Remove contact lenses before swimming or entering a hot tub
- See your eye doctor for regularly scheduled contact lens and eye examination

The American Academy of Ophthalmology also has recommendations for contact lens care, and the Centers for Disease Control and Prevention also has poster and patient information sheets available.

Hydrogen peroxide

Finally, a word about an old stand-by: hydrogen peroxide. Despite its well-established disinfection and safety benefits, the use of hydrogen peroxide lens care systems remains low in comparison with multipurpose solution use. Hydrogen peroxide care systems currently account for about 25 percent of lens care recommendations by U.S. practitioners.

Noncompliant contact lens care behaviors are common among multipurpose solution users, including “topping off” solution, failure to rub and rinse lenses, and infrequent lens case cleaning and replacement. Hydrogen peroxide lens care systems are easy to use and limit the number of steps necessary to achieve disinfection.

There is evidence of greater compliance with hydrogen peroxide care systems versus multipurpose care systems. A 2007 survey found compliance with directions for use was 100 percent among the users of a one-step hydrogen peroxide lens care system, in comparison with 37 percent among multipurpose system users.

Hydrogen peroxide lens care systems provide practitioners with a means to address many of the concerns with lens care noncompliance. It definitely has its place in our arsenal of lens care regimens.

REFERENCES


See Contact lens care on page 10
Help your patients with DIABETIC RETINOPATHY (DR), and HELP DRIVE PATIENT OUTCOMES

Through early detection, monitoring, and timely referral, you can play a pivotal role in managing your DR patients’ vision

IF YOU SEE OR SUSPECT DR:

Educate your patients about living with DR and potential treatment options

Refer DR patients for timely intervention

• According to the AOA, you should refer patients with
  – Severe nonproliferative DR (NPDR) within 2 to 4 weeks
  – Proliferative DR (PDR) within 1 week

Follow up to ensure they have visited a retina specialist

INDICATIONS AND IMPORTANT SAFETY INFORMATION

EYLEA® (aflibercept) Injection 2 mg (0.05 mL) is indicated for the treatment of patients with Neovascular (Wet) Age-related Macular Degeneration (AMD), Macular Edema following Retinal Vein Occlusion (RVO), Diabetic Macular Edema (DME), and Diabetic Retinopathy (DR).

CONTRAINDICATIONS

• EYLEA is contraindicated in patients with ocular or periocular infections, active intraocular inflammation, or known hypersensitivity to aflibercept or to any of the excipients in EYLEA.

WARNINGS AND PRECAUTIONS

• Intravitreal injections, including those with EYLEA, have been associated with endophthalmitis and retinal detachments. Proper aseptic injection technique must always be used when administering EYLEA. Patients should be instructed to report any symptoms suggestive of endophthalmitis or retinal detachment without delay and should be managed appropriately. Intraocular inflammation has been reported with the use of EYLEA.


EYLEA is a registered trademark of Regeneron Pharmaceuticals, Inc.

© 2020, Regeneron Pharmaceuticals, Inc. All rights reserved.
777 Old Saw Mill River Road, Tarrytown, NY 10591
WARNINGS AND PRECAUTIONS (cont’d)

- Acute increases in intraocular pressure have been seen within 60 minutes of intravitreal injection, including with EYLEA. Sustained increases in intraocular pressure have also been reported after repeated intravitreal dosing with VEGF inhibitors. Intraocular pressure and the perfusion of the optic nerve head should be monitored and managed appropriately.

- There is a potential risk of arterial thromboembolic events (ATEs) following intravitreal use of VEGF inhibitors, including EYLEA. ATEs are defined as nonfatal stroke, nonfatal myocardial infarction, or vascular death (including deaths of unknown cause). The incidence of reported thromboembolic events in wet AMD studies during the first year was 1.8% (32 out of 1824) in the combined group of patients treated with EYLEA compared with 1.5% (9 out of 595) in patients treated with ranibizumab; through 96 weeks, the incidence was 3.3% (60 out of 1824) in the EYLEA group compared with 3.2% (19 out of 595) in the ranibizumab group. The incidence in the DME studies from baseline to week 52 was 3.3% (19 out of 578) in the combined group of patients treated with EYLEA compared with 2.8% (8 out of 287) in the control group; from baseline to week 100, the incidence was 6.4% (37 out of 578) in the combined group of patients treated with EYLEA compared with 4.2% (12 out of 287) in the control group. There were no reported thromboembolic events in the patients treated with EYLEA in the first six months of the RVO studies.

ADVERSE REACTIONS

- Serious adverse reactions related to the injection procedure have occurred in <0.1% of intravitreal injections with EYLEA including endophthalmitis and retinal detachment.

- The most common adverse reactions (≥5%) reported in patients receiving EYLEA were conjunctival hemorrhage, eye pain, cataract, vitreous detachment, vitreous floaters, and intraocular pressure increased.

Please see Brief Summary of Prescribing Information on the following pages.
BRIEF SUMMARY—Please see the EYLEA full Prescribing Information available on HCP.EYLEA.US for additional product information.

1 INDICATIONS AND USAGE
EYLEA is a vascular endothelial growth factor (VEGF) inhibitor indicated for the treatment of Neovascular (Wet) Age-Related Macular Degeneration (AMD); Macular Edema Following Retinal Vein Occlusion (RVO); Diabetic Macular Edema (DME); Diabetic Retinopathy (DR).

2 CONTRAINDICATIONS
4.1 Ocular or Pericellular Injuries
EYLEA is contraindicated in patients with ocular or pericellular injuries.

4.2 Active Intraocular Inflammation
EYLEA is contraindicated in patients with active intraocular inflammation.

4.3 Hypersensitivity
EYLEA is contraindicated in patients with known hypersensitivity to aflibercept or any of the excipients in EYLEA. Hypersensitivity reactions may manifest as rash, pruritus, urticaria, severe anaphylactic/anaphylactoid reactions, or severe intraocular inflammation.

5 WARNING AND PRECAUTIONS
5.1 Endothelialitis and Retinal Detachments
Intraocular infections, including those with EYLEA, have been associated with endothelialitis and retinal detachments [see Adverse Reactions (6.8)]. Proper aseptic injection technique must always be used when administering EYLEA. Patients should be instructed to report any symptoms suggestive of endothelialitis or retinal detachment without delay and should be managed appropriately [see Patient Counseling Information (5.7)].

5.2 Increase in Intraocular Pressure
Acute increases in intraocular pressure have been seen within 60 minutes of intraocular injection, including with EYLEA [see Adverse Reactions (6.8)]. Sustained increases in intraocular pressure have also been reported after repeated intraocular dosing with vascular endothelial growth factor (VEGF) inhibitors. Intraocular pressure and the periphery of the optic nerve head should be monitored and managed appropriately.

5.3 Therapeutic Events
There is a potential risk of arterial thromboembolic events (ATEs) following intraocular use of VEGF inhibitors, including EYLEA. ATEs are defined as non-fatal myocardial infarction, non-fatal cerebral infarction, or vascular death (including death from unknown causes). The incidence of reported thromboembolic events in wet AMD studies during the first year was 1.8% (32 of 1742) in the combined group of patients treated with EYLEA compared with 0% (0 of 909) in patients treated with placebo through 96 weeks. The incidence was 3.1% (40 of 1284) in the EYLEA group compared with 0.8% (8 of 929) in the placebo group. The incidence in the DME studies from baseline to week 52 was 5.1% (59 of 1178) in the combined group of patients treated with EYLEA compared with 3.7% (40 of 1111) in the placebo group. The incidence of ATEs in weeks 53 through 96 was 4.4% (47 of 1076) in the combined group of patients treated with EYLEA compared with 3.7% (32 of 880) in the placebo group.

6 ADVERSE REACTIONS
The following potentially serious adverse reactions are described elsewhere in the labeling:

- Hypersensitivity [see Contraindications (4.3)]
- Endothelialitis and retinal detachments [see Warnings and Precautions (5.1)]
- Increase in intraocular pressure [see Warnings and Precautions (5.2)]
- Therapeutic events [see Warnings and Precautions (5.3)]

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

A total of 2290 patients treated with EYLEA constituted the safety population in eight phase 5 studies. Among those, 2219 patients were treated with the recommended dose of 2 mg. Serious adverse reactions related to the injection procedure have occurred in <1% of patients treated with EYLEA including intraocular hemorrhages and retinal detachment. The most common adverse reactions (≥5%) reported in patients receiving EYLEA were conjunctival hemorrhage, eye pain, conjunctival injection, detrusor injection, vitreous hemorrhage, foreign body sensation in eyes, retinal detachment, tear and vision loss.

7 IMMUNOGEOGRAPHY
As with all therapeutic proteins, there is a potential for an immune response in patients treated with EYLEA. The immunogenicity of aflibercept has been evaluated in several nonclinical studies. The immunogenicity data reflect the percentage of patients whose test results were considered positive for antibodies to EYLEA in immunocapture assays. The detection of an immune response is highly dependent on the sensitivity and specificity of the assays used, sample handling, timing of sample collection, concomitant medications, and underlying immunological status and the comparison of the incidence in animal studies to the incidence in humans. The incidence of antibodies to aflibercept may be misleading.

8 USE IN SPECIFIC POPULATIONS
8.1 Pregnancy
8.1.1 Pregnancy Risk Category
Pregnancy and well-controlled studies with EYLEA have not been conducted in pregnant women. Aflibercept, the free form of aflibercept, has been shown to be embryotoxic and teratogenic in animals at doses 200 times the human dose. In utero administration of aflibercept in pregnant monkeys resulted in embryotoxicity and delay in skeletal and ocular development. These findings were reversible within 20 weeks after cessation of treatment.

8.1.2 Maternal and Lactation
EYLEA is contraindicated in patients with a known hypersensitivity to aflibercept or any of the excipients in EYLEA. Hypersensitivity reactions may manifest as rash, pruritus, urticaria, severe anaphylactic/anaphylactoid reactions, or severe intraocular inflammation.

8.1.3 Reproduction
Aflibercept produced adverse embryotoxic effects in rabbits, including external, visceral, and skeletal malformations. A fetal No Observed Adverse Effect Level (NOAEL) was not identified. At the lowest dose shown to produce adverse embryotoxic effects, systemic exposures (based on AUC, for free drug) were approximately 10-fold higher than AUC values observed in humans if a single arterial treatment at the recommended clinical dose [see Animal Data].

At 1.8 mg/kg, the highest dose studied at the time, the development of antibodies to EYLEA was consistent with those seen in the phase 3 VIVID and VISTA trials (see Table 3 above).

8.2 Lactation
EYLEA is contraindicated in patients with a known hypersensitivity to aflibercept or any of the excipients in EYLEA. Hypersensitivity reactions may manifest as rash, pruritus, urticaria, severe anaphylactic/anaphylactoid reactions, or severe intraocular inflammation.

8.3 Females and Males of Reproductive Potential
Aflibercept is contraindicated in patients with a known hypersensitivity to aflibercept or any of the excipients in EYLEA. Hypersensitivity reactions may manifest as rash, pruritus, urticaria, severe anaphylactic/anaphylactoid reactions, or severe intraocular inflammation.

8.4 Pediatric Use
The safety and effectiveness of EYLEA in pediatric patients have not been established. Patients may experience temporary visual disturbances after an intravitreal injection with EYLEA and the associated eye examinations were considered positive for antibodies to EYLEA in immunocapture assays. The detection of an immune response is highly dependent on the sensitivity and specificity of the assays used, sample handling, timing of sample collection, concomitant medications, and underlying immunological status and the comparison of the incidence in animal studies to the incidence in humans. The incidence of antibodies to aflibercept may be misleading.

8.5 Geriatric Use
In the clinical studies, approximately 76% (2049/2701) of patients randomized to treatment with EYLEA were 65 years of age and over. No evidence of increased safety or efficacy was observed with increasing age in these studies.

8.6 Patient Counseling Information
In the following day EYLEA administration, patients are at risk of developing endothelitis or retinal detachment. If the eye becomes red, sensitive to light, painful, or develops a change in vision, advise patients to seek immediate care from an ophthalmologist [see Warnings and Precautions (3.1)]. Advise patients not to drive or use machinery until visual function has recovered sufficiently.

Table 1: Most Common Adverse Reactions (≥5%) in Wet AMD Studies

<table>
<thead>
<tr>
<th>Adverse Reaction</th>
<th>Baseline to Week 52</th>
<th>Baseline to Week 6</th>
<th>Baseline to Week 24</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EYLEA (N=578)</td>
<td>Active Control (N=565)</td>
<td>EYLEA (N=578)</td>
</tr>
<tr>
<td>Conjunctival hemorrhage</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Foreign body sensation in eyes</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Intraocular inflammation</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Iris injection</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 2: Most Common Adverse Reactions (≥1%) in RVO Studies

<table>
<thead>
<tr>
<th>Adverse Reaction</th>
<th>Control (N=287)</th>
<th>EYLEA (N=578)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>Conjunctival hemorrhage</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Intraocular pressure increased</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>Corneal epithelium defect</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Retinal edema</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Vitreous floaters</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Corneal edema</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 3: Most Common Adverse Reactions (≥1%) in DME Studies

<table>
<thead>
<tr>
<th>Adverse Reaction</th>
<th>Baseline to Week 52</th>
<th>Baseline to Week 6</th>
<th>Baseline to Week 24</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EYLEA (N=142)</td>
<td>Active Control (N=130)</td>
<td>EYLEA (N=142)</td>
</tr>
<tr>
<td>Conjunctival hemorrhage</td>
<td>4%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Foreign body sensation in eyes</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Intraocular inflammation</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Iris injection</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 4: Most Common Adverse Reactions (≥1%) in CRVO Studies

<table>
<thead>
<tr>
<th>Adverse Reaction</th>
<th>EYLEA (N=176)</th>
<th>Control (N=176)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>Conjunctival hemorrhage</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Intraocular pressure increased</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Corneal epithelium defect</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Retinal edema</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Vitreous floaters</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Corneal edema</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
11 things my patient wished her previous OD had told her

Patients clearly want more, not less, information and data from their eyecare providers

By Crystal M. Brimer, OD, FAAO

ODs often talk about the state of the contact lens industry and patient behavior in an attempt to shape healthy habits. Positive clinical outcomes occur when ODs identify noncompliance hurdles before they appear, and steer patients clear of them.

Therefore, it is important that optometrists occasionally spend time connecting with patients to determine where gaps in knowledge lie. Doing so lets us discover our strengths and weaknesses and helps us become better educators.

I recently asked a contact lens wearer to tell me 5 things she wished her eye doctor had told her during previous visits. She replied not with 5—but with 11!

The most significant takeaway from our discussion was this: The topics that interested her most were the topics ODs address the most.

I asked her to rank them in order of importance.

**EDUCATE ME ON THE IMPORTANCE OF SUNGLASSES FROM INFANCY TO ELDERLY**

I love that she added “from infancy to elder.” Not unlike many of our patients, she cares for two children and elderly parents, and she wants to be a responsible caregiver. Additionally, remember that the mother is the CEO of the house. One piece of advice: Never forget her nurturing and logistical obligations because they make up what and who she represents to your practice.

We need a way to communicate with our patients that does not automatically put them on the defense

ODs often incentivize patients to add sunwear to their contact lens purchases. It is a target in many offices, but it still gets overlooked among the hustle and bustle.

I recall another patient conversation in which, despite our yearly persuasion attempts, it was the patient’s buddy’s cool sunglasses that motivated him to finally get a pair of glasses at all, enabling him to reduce his contact lens wear time and dependence.

Perhaps we should keep in mind that though glasses, contact lenses, dilation, pressure checks, and refractions may be fun for us (or not), they are definitely not enjoyed by patients.

So, let’s start talking up the importance of sun protection! It is an area that is seen as both functional and fashionable. Many patients also see sunglasses as something extra they are doing to be good to themselves versus the functional necessity of contact lenses and back-up glasses. Sunglasses are a breath of fresh air.

**EDUCATE ME ABOUT THE IMPORTANCE OF NUTRITION IN CARING FOR MY EYES**

She also wants to know what foods to incorporate into her diet, how much, how often, and why!

Again, I am so excited that a patient wants to hear this! But I fear that in many offices, patients want to know more than the doctor is equipped to answer when it comes to nutrition.

Nutrition is very trendy among younger generations. It is common for young patients to be into the effects of nutrition on all aspects of the body. Older generations also have an interest in nutrition, mainly for the preservation and recovery of the body.

This puts pressure on ODs to continually learn more and be able to provide information to patients. We have long been accustomed to recommending Age-Related Eye Disease Study (AREDS) supplements and more recently, omega supplements, to specific patients.

But I challenge optometrists to create more holistic value into their care by spending a couple of hours researching foods that are beneficial to patients.

**EDUCATE ME ON PREVENTATIVE THINGS I CAN DO TO KEEP MY EYES HEALTHY, LIKE TEA TREE EYEWASH**

Disclosure: This came closely following a breakout of lice at her child’s school.

Many times, ODs focus energy educating the “entitled” contact lens wearer who believes there are no consequences for abusing lenses. ODs can become labored by repetitive discussions with such a patient.

If nothing more, perhaps this patient’s comment can serve as a ray of hope and encouragement to not become cynical and to keep learning and digging for more ways to educate patients because they generally do want to be healthy and proactive.

**TAKE-HOME MESSAGE**

Communication and education are highly correlated with better patient adherence and when ODs spend time connecting with contact lens wearers one-on-one, the degree to which patients follow contact lens recommendations increases. Establishing rapport, asking questions and sharing knowledge with contact lens patients is a great way to guarantee clinical success.

**WHEN SHOULD I CALL MY EYE DOCTOR IF I THINK I HAVE SCRATCHED MY EYE OR HAVE REDNESS?**

The patient’s pre-existing belief was that she just needed to rinse and rest. But still, she wondered how to judge that (particularly on a weekend when she can’t get in touch with her doctor).

Another great question! It motivates me to create a postcard or rack card to educate contact lens patients on the importance of good care solutions, proper care, what to do before calling, and when to call.

It is also reminder to have a triage card at the front desk to guide staff when a caller needs to be seen emergently, urgently, or at the next available opening. This is especially important when the doctor is not in the office because once the patient calls, the practice is liable for what is said.

**EDUCATE ME ON THE IMPACT OF LONG-TERM CONTACT LENS WEAR**

She wanted to know if her eyes need a break, more than overnight. The fact that this question’s answer is not common knowledge at this point is disappointing, and it compels me to disclose that she is not a patient of mine. (I had to throw that in).

I hope most ODs are encouraging their contact lens wearers to take their lenses out as soon as they get home and have awake hours with their glasses on. I assume her doctor did too, but maybe it needed to be said by the technician as well, and perhaps even the front desk when she checked out and again when she picked her lenses up.

This is another great chance to restate important messages in writing.

More than I asked

Without previous discussion I had asked her for 5 things she wished her doctor had told her, and she spit out 11 concerns faster than you can imagine.

Here are the other 6:

- Are there exercises I can do for my eyes?
Contact Lenses

Contact lens care
Continued from page 9


11. Dumbleton K, Richter D, Bergenske P, Jones LW. Compliance recalled being told to avoid “topping off” their contact lens solutions

25 PERCENT of lens care recommendations by U.S. practitioners are hydrogen peroxide care systems

We could start with video education in the waiting room and online, but I think one of the best ways is to invest a few hours into writing key messages and printing them to accompany every contact lens exam. If nothing else, it will give the impression that you care about your patients’ wellbeing and wearing success.

Have a triage card at the front desk to guide your staff when a caller needs to be seen emergently, urgently, or at the next available opening

Updated care
This past year, I have made a lot of changes to the physical appearance and functionality of my practice. Physical changes have transformed the tone of the practice, and this in turn affects patient demeanor. When patients walk through my practice’s door, they experience an undeniable sensation that I care.

I provide bound booklets with information to help them, not only through products and treatments that we offer, but with lifestyle changes that will improve stress levels, quality of sleep, exercise, and diet.

I chose a a three-tiered, good-better-best format for these booklets, which allows patients the option to choose a lesser form of over-the-counter (OTC) treatment or go directly for the best care my office can offer.

This helps keep patient expectations in line with the treatments they have chosen and ensures that patients are constantly aware of the advanced options I offer without me “selling” a specific contact lens or treatment.

I am trying to continually improve, listen to patients, and deliver what they need in a way that will encourage them to listen, absorb, and implement.

Perhaps this will have to be a life-long quest, but I would like to think I can get there sooner than that.

Dr. Bowling received his Doctor of Optometry and Master of Science in Physiological Optics from the UAB School of Optometry.

crystalbrimerod@gmail.com

JUNE 2020
OptometryTimes.com
Lactoferrin levels can diagnose dry eye disease

New test allows distinction between causes of symptoms

By Jeffrey Anshel, OD, FAAO

It should come as no surprise to eye-care practitioners who address dry eye in their practices that a nutritional approach to this disorder is effective. Unfortunately, most practitioners do not adequately test for the source of dry eye and instead attempt to offer a “blanket” approach that might or might not work.

However, with proper testing, a comprehensive nutritional approach can be valuable for addressing both aqueous deficient dry eye (ADDE) and evaporative dry eye (EDE). This process would be more expedient if we could distinguish between the two forms quickly and accurately, as both confirm the diagnosis of dry eye disease (DED) versus allergic conjunctivitis.

Clinical tests

Because there are many causes of DED, it is a challenge to efficiently test for the cause of the disorder. Most practitioners rely on one of the many questionnaires that are available, but these take some time to complete and depend on patient recall of their symptoms. Dry eyes and ocular allergies can have many overlapping complaints, making it more challenging to determine the specific disorder needing therapy.

Many clinical tests are available to determine the source of DED. These include tear film breakup time (TBUT), which determines tear film integrity; Schirmer’s test and Menicon Zone-Quick (phenol red thread) for tear volume; TearLab Osmolarity System (TearLab) for osmolarity; vital dyes rose Bengal and lissamine green for cell integrity; lid wiper epitheliopathy to observe an increase in the friction between the lid margin conjunctiva and the ocular surface; and Advanced Tear Diagnostics TearScan 300 microarray to measure lactoferrin protein and IgE levels in the tear film.

Evaluating the tear layer involves using more than just any one of these tests. Because of the variety of causes and several factors involved in tear film instability, practitioners should incorporate these tests into a pre-examination routine. Any patient who complains of excessive or deficient tearing, redness, irritation, discharge, or any other typical anterior ocular complaint should be screened prior to seeing the doctor.

Getting to the “root”

While much of the media surrounding DED focuses on lipid layer enhancement due to meibomian gland dysfunction, just adding “fish oil” to a tear layer is not adequate to resolve the underlying source of the disease process.

One analogy to consider is a visit to the dentist with a cavity in one tooth. The dentist would not think of just “capping” the tooth without treating the underlying root to address the source of the degeneration. Likewise, simply enhancing the lipid layer of the tears without addressing the “root” of the tear layer (the mucin layer) will not manifest a complete solution to the problem.

Lactoferrin a DED indicator

Lactoferrin is an antiviral, antibacterial iron-binding glycoprotein that is vital to tear production. It is also a mucus-specific anti-inflammatory molecule. Serum lactoferrin is produced by acinar cells in the lacrimal gland and possibly also from tear neutrophils during infection and inflammation. By binding iron, lactoferrin prevents the pathogen from obtaining sufficient iron, which it relies upon for growth.1,2

The name comes from two root words: “lacto,” referring to milk (and specifically “first milk” from lactation), and “ferrin,” referring to its iron-binding nature. Due to its action in mucosal tissue, lactoferrin has been shown to be decreased in DEDs such as Sjögren’s syndrome.3-5 Lactoferrin was found to be negatively correlated to rose Bengal staining, indicating that reduced lactoferrin was a marker of ocular surface damage. However, in EDE in the absence of epithelial defects, tear lactoferrin was also found to be reduced.6

A rapid, portable test utilizing microfluidic technology has been developed (TearScan 300 MicroAssay System) to enable measurement of lactoferrin levels in human tear fluid at the point of care, with the aim of improving diagnosis of Sjögren’s syndrome and other forms of DED.7

Lactoferrin’s primary role is to bind to free iron and, in doing so, remove the substrate required for bacterial growth.1 The antibacterial action of lactoferrin is also explained by the presence of specific receptors on the cell surface of microorganisms. Lactoferrin binds to bacterial walls, and, in doing so, remove the substrate required for bacterial growth.1-3

Lactoferrin is its separation of viruses from their target by interacting with the cell membrane, lactoferrin directly binds to viral particles.4 Lactoferrin also suppresses virus replication after the virus has penetrated into a cell.4,5 Such an indirect antiviral effect is achieved by affecting natural killer cells, which play a crucial role in the early stages of viral infections.

Lactoferrin and lactoferricin, a similar but different protein, also act as antifungal agents, inhibiting the growth of fungi.6 Lactoferrin also acts against Candida albicans, a form of yeast that causes oral and genital infections.7 Lactoferrin seems to bind the plasma membrane of C. albicans, inducing apoptosis.8

Allergic conjunctivitis is also a common clinical presentation, especially during the spring. While the hallmark of itching can be useful in proper diagnosis, the condition features overlapping symptoms with dry eye. The immune system produces IgE antibodies in allergic reactions. These antibodies travel to cells that release chemicals which cause itching and other reactions. An increased total IgE level indicates that it is likely that a patient has one or more allergies. A test with high specificity can help with diagnosis and treatment protocol.

Summary

Differentiation of severe dry eye versus allergic conjunctivitis is important in a clinical setting. New technology is available to facilitate this process.
Prior authorizations, or PAs, are currently every medical optometrist’s nightmare, but there is hope if you know to plan ahead. A PA according to the Center for Medicare and Medicaid Services (CMS) is “an approval...before you get care or fill a prescription.” The doctor must contact the patient’s insurance plan to show medical necessary reason for a particular drug or treatment for it to be covered.

Simply put, when ODs decide the medicine our patients need, the insurance is asking, “Do they really need it?” Addressing PAs can become a tiresome and frustrating process for the doctor, the staff, and the patient. However, with proper charting techniques and knowing the right language, ODs may be able to obtain approvals faster, with more consistency, and with fewer appeals.

Medical need
A successful prior authorization process begins long before hitting the e-prescribe button. To prove a clear, medical need for a medication, detailed charting must back up the doctor’s recommendation. A PA can frequently be denied simply for a lack of supporting evidence. The purpose of the PA is to prove all other viable options have been exhausted, and there is a medical need for the medication.

With new medications, therapies, and treatments continually coming to market, it is more important than ever to document any and all prior treatments. From 2016 to 2019, 181 new medications were approved by the FDA, most notably for dry eye Xiidra (lifitegrast 5%, Novartis) and Cequa (cyclosporine 0.09%, Sun Pharma).

The recent increase in PA requests can be linked to increases in medication choices and more Rxs being written, leading to increased costs to medical insurances. Because of this, new medications are held to higher scrutiny during the PA process. By adding additional steps to approve Rxs and requiring generics or lower-cost medications to be used first, insurers reduce upfront costs as well as make it harder to prescribe new medications.

Medications
A well-documented chart ready for PA approval shows that all medications, including over-the-counter (OTC) treatments, have been tried and listed clearly in the chart. Avoid non-specific documentation such as “continue present management.” Note under medications and in chart notes what medication the patient is using. The adage, “If you don’t note it in the chart, it didn’t happen,” applies perfectly here.

Dry eye PAs will often get denied for simple things like not trying over-the-counter tears at qid dosage. The doctor will counter saying the patient has been using them for years, but nothing is noted in the chart—which means there is no documentation to prove that statement. Make sure doctors, technicians, or other staff write all medications by name and dose—and be specific. Do not list “artificial tears PRN,” or you are guaranteed a denial. Most insurances require documentation of 2 different OTC artificial tears used at least 2 weeks each with a dosage of 4 times a day. Without this documented in the chart, the PA will be denied, the patient will need to return to document failure of previous artificial tears, and the care plan goes backward.

It is important to list in the chart note adverse reactions to medications the patient may have. If the patient cannot handle the stinging from benzalkonium chloride (BAK) or has a preservative sensitivity, note it. This is especially helpful when the insurance company has a preferred formulary that does not work for the patient.

A separate point about medication charting is to describe why the doctor is switching medications. It can be as simple as “Formulary medication ineffective” or “Still dry with tears alone.”
Indication

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

Important Safety Information

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

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

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

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

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

Please see Brief Summary of Prescribing Information on adjacent page.

Prior authorizations

When completing the PA, these words can help make the case for the patient.

Testing

Testing is an integral part of charting for dry eye PA approval. In my experience, the more testing to document the condition, the better. At the very least, make sure to evaluate corneal or conjunctival staining with fluorescein or lissamine green and tear breakup time (see Figure 1). Chart notes must show how the patient has responded before and after treatment. This can demonstrate why the patient needs a change in therapy.

List treatments or procedures the patient has used.

The more documentation of failed treatment, the more likely the patient will receive a quick approval. Something as simple as trying and failing warm compresses or punctal plugs can make a difference.

While waiting

Fortunately, most pharmaceutical companies will offer coupons and product samples to help patients through the PA process. Some companies, such as Novartis, have set up an extensive program (Xiidra insider within Ask iiris) to help with cost lowering and PA approval. This company, as well as many others, also offers a patient assistance program to deliver the medication to patients who cannot afford it.

Summing up

With thorough documentation and notes, the PA process can be faster and less frustrating. However, some insurance companies will fight PAs. Clearly document what the patient has tried and why the doctor thinks those treatments have failed. When the insurance company is reviewing charts for keywords to base its approval or denial, it is important to use the terminology it is looking for. Such terminology varies based on the medication, but the insurance company is looking for proven therapeutic failure or intolerance of accepted formulary options.

In the case of exceptionally difficult PAs, the doctor may appeal the decision, and a well-worded letter of appeal along with exemplary charting will get the job done.
Swpt-source and multimodal OCT technologies offer clinical advantages

The expenditure of embracing new technologies is worthwhile

By Kerry Salsberg, OD

Contemporary optical coherence tomography (OCT) devices are providing clinicians with incredible visual data, reporting tools, and operational benefits. Although “trading up” comes with a considerable (and often intimidating) price tag, in my experience the clinical and business value inherent to these instruments justifies the expenditure.

The modern OCT devices available today—whether those devices offer swept-source (SS) or spectral-domain (SD) imaging technology—are multimodal, meaning clinicians can capture an incredible amount of information both quickly and easily. In one scan, for instance, ODs can observe a patient’s macular thickness, ocular nerve health, retinal nerve fiber layer (RNFL) thickness, cup-to-disc ratio, and more.

Beyond image acquisition, these systems often come equipped with highly sophisticated reporting functions. Software collates key images and data streams in one place, compares results to normative databases (where possible), and, ultimately, allows ODs to make a diagnostic decision with deep and wide data readily available.

The net sum of this functionality is an enhanced ability to quickly and confidently diagnose and monitor posterior segment and glaucomatous disease, as well as other applications in the anterior segment. Here, I’ll review some of the ways we have put modern OCT to work in our practice.

SS imaging benefits posterior segment

Many physicians use OCT to image, diagnose, and monitor posterior segment disease, such as diabetic macular edema (DME), retinal vein occlusion (RVO), and diabetic retinopathy. In this domain, SS-OCT imaging technologies, which scan at higher speeds and use a longer wavelength light source than SD-OCT devices, provide compelling clinical advantages.

The primary advantage of SS-OCT, as evidenced by recent literature and my own clinical experience, is superior visualization of deep anatomical topography, including the choroid. The longer wavelength compared to SD-OCT, combined with the increased signal-to-noise ratio inherent in SS-OCT, better penetrates ocular tissue and challenging media, such as blood and cataracts, to produce high-resolution images of key posterior segment structures. Although contemporary SD-OCT devices remain capable of captur-
OCT
Continued from page 15

To improve quality, high-fidelity B-scans, SS-OCT offers consistency across a broader range of anatomical structures.

As an added benefit, Topcon’s DRI OCT Triton swept-source device is capable of capturing 12×9 mm widefield scans, helping us assess both disc and macula in one scan.

OCT and glaucoma diagnosis
Another exciting area in OCT application lies in the realm of glaucoma, in which increasingly sophisticated imaging and reporting tools may facilitate confident, early diagnoses. Multimodal platforms available on the market today can produce a wide range of crucial images and data points, providing information we can use to find abnormalities associated with early glaucomatous disease.

More specifically, practitioners experienced at diagnosing glaucoma can use these systems to (among other applications) quantify circumpapillary RNFL thickness, identify defects of the retinal ganglion cell complex (RGCC), and assess optic nerve health. Clinical research has demonstrated that pathological changes to the RNFL and ganglion cell layer (GCL) in the macula can occur before noticeable changes to the optic nerve head and before identifiable visual field (VF) changes, making early, routine diagnostics workups valuable.3,4

The reporting capabilities offered by the most recent generation of OCT devices are remarkable in both scope and presentation, and these capabilities are especially pertinent in the area of glaucoma, where clinicians must lean on many data points—many of which, as we are learning, are not directly correlative—to make a confident, early diagnosis. The dense data sets enabled by the scanning speed of SS-OCT devices further strengthen this capability. Modern reporting tools collate a large amount of data and compare data to established normative databases in real time, increasing analytical confidence at the point of care.

Case studies
Macular analysis leads to immediate surgical referral
A female patient, age 46, presented with “blurred vision.” Visual acuity OS registered at 20/40−2. Using our swept-source system’s macula report function, we identified a small, full-thickness macular hole (see Figure 1). We immediately referred the patient for a pars plana vitrectomy. Postoperatively, the patient now sees 20/25+2 OS.

IN BRIEF
TLC parent company Vision Group Holdings files for bankruptcy

WEST PALM BEACH—LVII Intermediate and 17 of its affiliates including the Laser Vision Institute and TLC Laser Eye Center brands, doing business as Vision Group Holdings, filed for voluntary protection from creditors in Delaware under Chapter 11 of the U.S. Bankruptcy Code.

The filing will facilitate the sale of the company’s business as a going concern. The company’s plan is to quickly transition to a new ownership group through an expected 90-day process and use the time to restructure and strengthen its balance sheet and debt profile, while continuing to operate normally. The company’s investment banking advisor reports strong interest from multiple potential acquirors, including the company’s current financial backers. The company expects to close a sale sometime in September.

“The action we are taking is largely the result of the negative impact that the COVID-19 pandemic has had on the economy,” says Lisa Melamed, interim CEO for Vision Group Holdings.

Based in West Palm Beach, Vision Group Holdings oversees and manages 2 of the leading LASIK surgery providers in the nation: The LASIK Vision Institute and TLC Laser Eye Centers. The company has performed more than 3.2 million LASIK eye procedures and serves multiple markets—63 cities—in the U.S. and Canada.

The planned sale will position the company for future growth, provide access to capital, and cement the company’s position, according to the company.

Melamed confirmed that stay-in-place orders and the mandatory closure of non-essential businesses including elective medical procedures forced the company to close all locations and temporarily lay off most of its team members. She advised however, "while our centers were closed in response to the pandemic, we are excited to report that we have started to reopen and are currently treating new patients.”

“We expect to emerge from the proceedings stronger than ever,” she added. “Already we are seeing strong demand for our services at the centers we’ve reopened.”

IN BRIEF
TLC parent company Vision Group Holdings files for bankruptcy

WEST PALM BEACH—LVII Intermediate and 17 of its affiliates including the Laser Vision Institute and TLC Laser Eye Center brands, doing business as Vision Group Holdings, filed for voluntary protection from creditors in Delaware under Chapter 11 of the U.S. Bankruptcy Code.

The filing will facilitate the sale of the company’s business as a going concern. The company’s plan is to quickly transition to a new ownership group through an expected 90-day process and use the time to restructure and strengthen its balance sheet and debt profile, while continuing to operate normally. The company’s investment banking advisor reports strong interest from multiple potential acquirors, including the company’s current financial backers. The company expects to close a sale sometime in September.

“The action we are taking is largely the result of the negative impact that the COVID-19 pandemic has had on the economy,” says Lisa Melamed, interim CEO for Vision Group Holdings.

Based in West Palm Beach, Vision Group Holdings oversees and manages 2 of the leading LASIK surgery providers in the nation: The LASIK Vision Institute and TLC Laser Eye Centers. The company has performed more than 3.2 million LASIK eye procedures and serves multiple markets—63 cities—in the U.S. and Canada.

The planned sale will position the company for future growth, provide access to capital, and cement the company’s position, according to the company.

Melamed confirmed that stay-in-place orders and the mandatory closure of non-essential businesses including elective medical procedures forced the company to close all locations and temporarily lay off most of its team members. She advised however, “while our centers were closed in response to the pandemic, we are excited to report that we have started to reopen and are currently treating new patients.”

“We expect to emerge from the proceedings stronger than ever,” she added. “Already we are seeing strong demand for our services at the centers we’ve reopened.”
Suspected glaucoma revealed as nutritional deficiency
Another 46-year-old female patient presented to our prac-
tice without complaint. A fundus exam revealed sub-
temporal optic nerve head (ONH) pallor OU. OCTs revealed bilateral temporal RNFL thinning as well as bilateral diffuse macular GCL thinning (characterized by reduced average thickness). The patient’s best-corr-
ected VA was 20/25 OD/OS. The patient also exhib-
ted difficulty with color vision testing. No other neuro-
logical symptoms were apparent (Figures 2-5).

The patient is a vegetarian and adhering to a low-cal-
orie diet. The patient was sent for blood tests and results
indicated severely low vitamin B12 levels, most likely
resulting in this optic neuropathy. The patient was imme-
diately placed on weekly intramuscular injections of cya-
nocobalamin for 5 weeks, then oral B12 and folate acid.

Important patient and practice benefits
Beyond raw imaging power and usability, modern OCT
devices provide several advantages in the patient expe-
rience and practice development. Chiefly, the fast image
acquisition speed inherent to newer devices, especially
swpt-source devices, reduces patient chair time. In addi-
tion to expediency, this is typically more comfortable for
patients and also helps reduce the number of “re-takes”
required in my experience.

Tangentially, we have found that implementing state-
of-the-art technology increases patient confidence. The
visualization inherent to our SS-OCT device makes patient
education easy and engaging, and we find that patients
often respond well to our perceived technological sav-
viness. As a practice that emphasizes patient-physician
dialogue and constructive consultation, our device has
been a boon in this regard.

From a business standpoint, our device’s rapid speed
and ease of use allows us to provide comprehensive,
high-quality care to more patients in a shorter amount of
time. We are able to accelerate a key part of our work-
flow, meet with more patients, and positively impact our
bottom line.

New horizons for imaging technology
As an eyecare professional who is passionate about deliv-
erying my patients the best care possible, I view the assess-
ment and integration of new technology as imperative.
Although it inevitably costs time and resources to onboard
a new OCT system, the value of new iterations cannot be overstated. Even the most ex-
perienced clinicians benefit from having deep and wide topographical data at their disposal.
Ultimately, contemporary OCT offers a compelling argument for why clinicians should con-
tinue to invest in new and innovative sys-
tems as a whole, and imaging devices in par-
ticular.

REFERENCES
1. Miller AR, Rosman L, Zhang Q, Zheng F, Rafael
de Oliveira Dias J, Yehoshua Z, Schaal KB, Feuer W,
Gregori S, Chu Z, Chen CL, Kulkab S, An L, Sletson
PF, Durbin MK, Wang RK, Rosenfeld PJ. Comparison
between spectral-domain and swept-source optical
coherence tomography angiographic imaging of choroidal
retinoscleroticus. Invest Ophthalmol Vis Sci. 2017
2. Qiao Y, Tan C, Zhang M, Sun X, Chen J. Comparison
of spectral domain and swept source optical coherence
tomography for angle assessment of Chinese elderly
RN, Medeiros FA. Rates of retinal nerve fiber layer loss
in contralateral eyes of glaucoma patients with unilateral
progression by conventional methods. Ophthalmology
4. Medeiros FA, Zangwill LM, Bowd C, Mansouri K,
Weinreb RN. The structure and function relationship
in glaucoma: implications for detection of progression and
measurement of rates of change. Invest Ophthalmol Vis

Lactoferrin
Continued from page 11
cess, which produces results within the span of a
single patient visit. Thus, a practitioner can be
confident of the diagnosis and proper treatment
protocol on the first visit and while the patient is
still in the chair. The reimbursable tests can be
performed by a technician and can help to estab-
lish the practice as a leader in dry eye resolution.

REFERENCES
1. Farnell S, Evans RW. Lactoferrin – a multifunctional
protein with antimicrobial properties. Mol Immunol.
2. Xanthou M. Immune protection of human milk. Bil
lactoferrin: detection, quantitisation, and characterization
of lactoferrin in serum by SELDI affinity mass spectrometry.
7. Karm K, Herr AE. Human tear protein analysis enabled by
an alkaline mucofluidic homogenous immunosay. Anal Chem.
2011 Nov 1;83(21):8115-8122.
8. Sojar HT, Hamada N, Genco RJ. Structures involved in
the interaction of Porphyromonas gingivalis fimbrine and human
a lactoferrin-derived peptide possessing binding activity to
21;278(12):10162-10173.
lactoferrin saturated with metal ions on early steps of human
immunodeficiency virus type 1 infection. Int J Biochem Cell
given in food facilitates dermatophytosis cure in guinea pig
Synergistic activity of the N-terminal peptide of human
lactoferrin and fluconazole against Candida species.
13. Chao C, Tong L. Tear lactoferrin and features of ocular
allergy in different severities of meibomian gland dysfunction.
BPI® Blepharospasm and Headache protection!
Say goodbye to light induced headaches!

Reduce your patients’ eyestrain, tension headaches, and migraines


Rose-colored sunglasses. Preliminary research at the University of Utah suggests that specially tinted lenses may help some people with photophobia. Anecdotally, many photophobic patients prefer an FL-41 tint on their sunglasses instead of green or yellow. The FL-41 tint, which has a pinkish look to it, is a mixture of colors that blocks the blue-green wavelengths.

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

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

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

Newest protection and vision enhancement for color blind patients

BPI® Diamond Dye 550/570nm™ Cut-Off tint
Newest protection and vision enhancement for color blind patients

BPI introduces another cut off tint, joining the ranks of BPI UV-Blue Barrier 440, BPI Winter Sun 450, BPI Diamond Dye 500/550, and BPI Deep Red Monochrome 600.

This red-orange to red tint is beneficial when the short wavelength end of the spectrum (violet, blue green) needs to be blocked. These uses include blue blocking for greater out-of-doors contrast against the blue sky and blocking of blue/violet for ARMD purposes. It may also provide a higher transmittance lens option for red-green color blind patients.

For those seeking a true 550nm cut-off, this tint will reach that point much more quickly than the 500/550 tint. BPI® Therapeutic tint, 4oz bottle PC: 37889

Prevent cataracts, macular degeneration and retinal damage

BPI® UV - Blue Barrier™ 440 Protective Series
Newest protection and vision enhancement for AMD patients

Sunlight contains UV and blue light. UV light is part of the non-visible light spectrum that we are exposed to every day. It can cause damage to our eyes, particularly the surface and deeper layers of the cornea and the crystalline lens of the eye by cataract formation as well as the increased potential for dry eyes, dystrophies, pinguecula and pterygium of the cornea. Blue light, which is part of the visible light spectrum, may also be a cause for concern. It reaches deeper into the eye than the UV and its cumulative energy effect can cause irreparable damage to the retina. Blue light is one of the main causes of damage to our eyes as we age and is an important factor that can cause the worrisome loss of sight-enabling pigmentation in the back of the eye.

BPI® Diamond Dye 460/510nm a new addition to our protective series

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

BPI® Diamond Dye 460/510nm™ Cut-Off tint

NEW!
Tints have been the world standard for 50 years!
“Every major lens manufacturer recommends BPI® tints”

Tint your own therapeutics or let BPI® do it for you

Reduce the scattered blue/violet light within the eye with BPI® Blue Filter Vision 450™. A saturated yellow tint that blocks blue/violet light with wavelengths shorter than 450nm. It blocks a minimum of the visible spectrum.

Macular Degeneration. BPI® Total Day™ is a tan colored tint that provides blue/violet attenuation with minimal color distortion.

Night driving. BPI® Total Night™, a light saturated yellow tint, is especially useful in blocking the blue/violet component of HID headlamps encountered in night driving.

Retinitis Pigmentosa, Macular Degeneration. BPI® Diamond Dye 500/550™ is an orange to red/orange tint, which blocks wavelengths shorter than the 500nm to 550nm range.

Blue light absorbing BPI® Blue Filter Vision 480™. A true sunglass brown with no color distortion that blocks still further into the visible spectrum.

Useful in bright light situations, BPI® Blue Filter Vision 540™. A dark amber brown tint that blocks wavelengths shorter than 540nm. A sunglass color that blocks violet and blue.

Red / Green color blindness. BPI® Deep Red Monochrome 600™ has long been used to allow those afflicted with red/green color blindness to differentiate between red and green.

BPI® Melanin™, is a yellowish-brown tint which mimics the absorption spectrum of natural melanin. This color reduces the destructive high-energy side of the visible spectrum while allowing passage of enough blue light to provide natural perception of color.

Helpful with brain trauma and also useful for patients with dyslexia, BPI® Omega™ is magenta in color.

May help patients with dyslexia, BPI® Mu™ needs to be applied to tintable prescription lenses. It is lime green in color.


Parkinson’s Disease Tremors, BPI® Electric Blue™ has been beneficial to those suffering from tremors such as those sometimes associated with Parkinson’s disease.

Reduce photosensitive epilepsy seizures with BPI® Deep Blue Zee™. This dark blue tint was found to reduce the number of seizures dramatically in about 95% of the patients using it (see a study in Epilepsia, 2006 Mar;47(3):529-33: “Suppressive efficacy by a commercially available blue lens on PPR in 610 photosensitive epilepsy patients.” by G. Capovilla, et al).

Verify proper tinting densities with a BPI® Spectrometer

- Absolute Spectrum, the intensity of light received at each wavelength, plotted as a graph, and the basis for all other measurements.
- Illuminance, the human perception of the brightness of visible light received at the eye (lux).
- Chromaticity, the color of light based on the wavelengths and intensity that combine to make a color.
- Correlated Color Temperature, the temperature of a black body light source that would produce similar shade of white to the measurement-how blue or red a white light appears.
- Color Rendering, how truthfully a color is shown by the light measured compared to if the color was lit by bright sunlight.
- Flicker, the speed and characteristics of repeated changes in light intensity particularly noticeable with LED lighting or fluorescent.

Choose from 28 digital and analog tinting systems available at BPI®

Every BPI lens tinting system includes a free set-up kit. Tints, chemistry and accessories!

Valued at $250
Space-saving Mini Tank™ systems
High production systems
Computer-controlled & direct heating systems

BPI® CALL: 1-800-CALL-BPI & FAX: 1-888-CALL-BPI & BPI USA CALL: 305-264-4465

© 2020 BPI®. All specific names mentioned herein are trademarks of Brain Power Inc. Miami, Fl. The following are registered trademarks with the US Patent Office and with similar offices in other countries: Transchromatic, Solar Sun®, There isn’t a lens we can’t improve, Solar, “Designed Spectrum,” Blue Barrier,” Brain Power Inc.; “BPI” Buy now, save later; “Dye Hard”; EVA; “Spectracolor”; Solar; “The Pill” and Zipfit.” The BPI® bottle shape and design are trademarks of BPI®. BPI® is not responsible for typographical errors. Offers are subject to change without notice. Prices quoted do not include sales tax or shipping charges. Item availability and price are subject to change without notice. OT / April 2020
Telehealth success hinges on better tools

Communication and respect for everyone’s time needed as well

By Sandeep Jain, MD, FCCP, FAASM

While the practice of telemedicine is hardly a new concept, there is no question that the current COVID-19 health care crisis has jump-started this new approach to patient care.

Due to the virus, it is clear that telemedicine, once viewed as simply a convenience, is now an essential method of treating patients. At its best, telemedicine is an efficient way for doctors to manage time, make appointments, “meet” with patients and next of kin, and provide treatment such as medications, referrals, and further investigations. However, there is a risk of overwhelming doctors with demands on their time at all hours of the day. The key is in the development of a communication platform that is available to the doctor at all times and yet limits distractions.

New way of communicating

For telemedicine to succeed, a totally new way of communicating is necessary that is direct and respects the patient’s needs as well as the doctor’s time. The communication may be synchronous, as in a video call, or asynchronous, with messaging and sharing information that balances patient convenience with minimal distraction for the doctor.

It is most efficiently implemented through phone apps because everyone—doctors, patients, next of kin, and hospital personnel—are familiar with these devices and use them all the time.

The platform should allow direct communication among doctors in addition to data sharing to reduce data overload and avoid errors

The following are some of the criteria that must be met if the practice of telemedicine is to succeed during the current crisis and beyond:

– All parties should be connected on one platform. Today, doctors use their own electronic health record (EHR) system to conduct telemedicine or traditional medicine, then fax or electronically send their consultations to other doctors. These voluminous notes have to be signed off, even if not urgent, and create more work. At times, the essential point is lost in the long notes written mainly to justify the billing.

– The platform should allow any doctor to send a message about any office or hospital patient to any other doctor on that patient’s care team, no matter what location, organization, or electronic health record. The messages should be prioritized and sent in an optimal way to avoid unnecessarily disturbing that doctor. The receiving doctor should get this message in a delayed but reliable manner to reduce distraction but yet be able to request this message sooner if the need arises. A feature such as this can encourage doctors to opt in to connect with their colleagues and provide timely attention to their patient’s needs without getting overwhelmed.

– The platform should allow direct communication among doctors in addition to data sharing to reduce data overload and avoid errors. Though EHR systems are in the process of becoming interoperable, simply allowing any doctor to access data from other doctors will cause data overload unless the doctors communicate.

– Patients must be an integral of this platform and be able to add all of their health care providers and give consents to encourage communication among their doctors. The patients should share their appointments and treatments with all of their doctors on a single app rather than sign into different portals to connect with different doctors. They can thus encourage their doctors to talk to each other.

– The platform should be usable anytime from anywhere and yet respect the doctor’s time and privacy. Communication with patients should not be limited only to the time a doctor is in the office. The doctors should be able to communicate with patients at all times as necessary and still maintain a record of that communication to add to the EHR later.

– The platform must allow doctors to secure consent from the patient and create a note for the EHR to assure payment from the insurance company, Medicare, or Medicaid.

– Doctors should have access to a platform that allows simultaneous secure video communication with patients inside isolation rooms as well as the next of kin at home during the viral epidemic and beyond. This same platform could be used for hospital rounds to communicate with other doctors and for charge capture.

Extend the visit

This type of practice management and communication apps is much more than technology. It gives doctors the ability to “visit” with clients not only during scheduled video appointments but also at other times when a patient needs help but without creating undue distraction to the doctor.

Today, due to the extreme levels of contagion, doctors are likely to make in-office visits short. They are wearing protective equipment that hides the face and limits the ability to “connect” with a patient.

Doctors can use a video chat after the in-office visit to discuss care with patients and family at the same time via app.

While this doesn’t replace the actual face-to-face meetings, it does relieve stress, isolation, and possible depression that COVID-19 patients experience.

The current situation has identified the urgent need for universal distraction-free communication technology that literally allows physicians a connection with their patients and their doctors at their fingertips.

Sandeep Jain, MD, FCCP, FAASM, is the developer of ListenMD, a HIPAA-compliant messaging app.

Dr. Jain is a Diplomate of the American Board of Internal Medicine, Pulmonary, Sleep and Critical Care Medicine. He has been practicing in Broward County for over 20 years. ListenMD gives healthcare professionals the ability to securely connect with patients and their doctors at all times on their phones. The patented app is an intelligent patient-centered universal health care communication platform designed for doctors, office staff, and patients.

TAKE-HOME MESSAGE

While modern day healthcare is in the early phase of digitization, it is also on the cusp of a significant conversion. The key to telehealth’s success lies in the tools available for practitioners to support it. The most important tool needed for telehealth to succeed is a platform that connects patients to medical providers as well as their electronic health records, ideally in the form of a mobile phone application or messaging service.

– The platform should be private, secure, and Health Insurance Portability and Accountability Act (HIPAA)-compliant to allow video telemedicine consultations without concerns about loss of privacy. This is not the case today because parties are using WhatsApp or Facetime on their phones or other computers without proper security protections.
Glaucoma

Contrast sensitivity manifests in glaucoma patient with no cataracts

A comment from a patient prompts a doctor’s change in testing and discussion

By: Benjamin P. Casella, OD, FAAO

I have spoken to glaucoma patients and suspected glaucoma patients about the risk of visual field loss many times for several reasons. They need to know, they have a right to know, it is part of my fiduciary obligation, and it may improve compliance. I usually end the conversation by saying “if glaucoma goes untreated for long enough, it can affect your central vision, as well”.

A recent conversation with a glaucoma patient of mine led me to the unfortunate conclusion that I really need to rephrase my concluding remarks in this conversation (which I have often).

Initial presentation
A Caucasian male who is now 51 years old first presented to me in 2015 for a comprehensive eye examination. He was a low myope and an early presbyope looking to update his current glasses. Best-corrected visual acuity (BCVA) was 20/20 OU. His family history was noncontributory.

Of note, his intraocular pressures (IOP) were 20 mm Hg OD and 21 mm Hg OS in the early afternoon. Upon posterior segment examination through dilated pupils, his right optic nerve head appeared suspicious for glaucoma with a slightly larger cup than his left optic nerve head. I thought his retinal nerve fiber layer, as examined with the use of a pre-corneal lens and a red-free filter, appeared asymmetric as well. There was no frank history of trauma. I took photos of his optic nerves and invited him back in a week or two for baseline glaucoma testing.

Follow up
He eventually returned in October 2019. He apologized and stated he remembered our conversation about the need for glaucoma testing well but that he had just gotten busy and put it off until the present time. At that visit, his BCVA was 20/20 in each eye. IOPs were measured at 32 mm Hg OD and 16 mm Hg OS in the mid-morning.

Unfortunately, his right optic nerve appeared to be obviously glaucomatous with a vertical cup-to-disc ratio of 0.8 and a clearly evident notch superiorly at 11 a.m. His left optic nerve looked unchanged from his previous exam in 2015. Gonioscopy showed relatively symmetric angles open to the ciliary body OU with mid pigment. There was no evidence of angle recession. Central corneal thickness values were 533 µm OD and 537 µm OS.

Spectral-domain optical coherence tomography (OCT) studies OU showed a thin ganglion cell complex and diffuse retinal nerve fiber layer thinning OD. The OS study was essentially clear. Visual field studies were conducted, and the OD showed dense arcuate defects superiorly and inferiory. OS was unremarkable.

I told the patient that he had unilateral open-angle glaucoma OD and that he needed to be treated. He consented to treatment, and I started him on a prostaglandin analog at bedtime OD with a target of 50 percent pressure reduction in that eye.

When he returned in a month IOPs were 14 mm Hg OD and 17 mm Hg OS at the same time of day. The dense arcuate defects in the OD visual field were repeatable, and the OS field remained unremarkable.

Contrast sensitivity

This man is a highly intelligent and astute observer. A comment from a patient prompts a doctor’s change in testing and discussion

TAKE-HOME MESSAGE

Contrast sensitivity evaluates how well a person can distinguish an object from its background and it is an often overlooked symptom of glaucoma.

Contrast sensitivity is an often-overlooked aspect of one’s visual quality of life

I congratulated him on his right eye’s remarkable response to glaucoma monotherapy and invited him to return again in 3 months for an IOP check. At that visit in February 2020, his IOPs were unchanged. It was at that visit that he intrigued me with a comment and a piece of paper he brought with him.

Contrast sensitivity

This man is a highly intelligent and astute observer.

BY BENJAMIN P. CASELLA, OD, FAAO
Practices in Augusta, GA with his father in his grandfather’s practice

Figure 1. The print which the patient reported having difficulty seeing with his right eye due to reduced contrast sensitivity.

COOKING INSTRUCTIONS

For food safety and quality, please follow these cooking instructions. If purchased frozen, keep frozen until ready to prepare. If purchased refrigerated/thawed, keep refrigerated (38°F or below) until ready to prepare. Do not refreeze.

CONVENTIONAL OVEN INSTRUCTIONS:
Place oven rack in center of the oven. Preheat oven to 400°F. Place fish in a single layer on a shallow baking pan. Bake for 15 - 19 minutes from frozen, 7 - 11 minutes from thawed.

NOTE: Since appliances vary, these cooking instructions are only a guideline. Cook to an internal temperature of 165°F minimum.

SHELF LIFE INFO: If thawed, this product has a five day total shelf life. It should not be consumed after the retailer’s stated “Use By” date.

FVA - 0717 - A1527P
Pediatric glaucoma: Types, tests, and treatments

Continued from page 1

patients will require significantly more surgeries than adults with glaucoma. Pediatric glaucoma can become aggressive very quickly. Children can lose vision from the glaucoma itself but, unlike adults, can have permanent vision loss from amblyopia and corneal scarring that occur before treatment. Treating an infant, child or adolescent with glaucoma requires a team approach, and optometrists have an important role to play.

Childhood blindness occurs in 0.03 percent of children in high-income countries and up to 0.12 percent in undeveloped countries worldwide. Glaucoma accounts for 4.2 to 5 percent of childhood blindness. The main cause of vision impairment in children with glaucoma is amblyopia.3

Primary congenital glaucoma

Accounting for 50 to 70 percent of childhood glaucoma, primary congenital glaucoma (PCG) is the most common form.

PCG is diagnosed from birth to early childhood (80 percent in the first year of life). There is reduced aqueous outflow through an abnormally developed filtration angle/trabecular meshwork, which begins to form in the fourth gestational month and reaches adult structure by age 8.1-4 PCG has an autosomal recessive inheritance.4 It is bilateral 70 to 75 percent of the time and can be asymmetric.1,4

Early diagnosis is imperative because PCG can be aggressive, and children can lose vision quickly. Interestingly, if treatment is successfully performed early enough, glaucomatous cupping can actually be reversed, owing to the immature, elastic lamina cribrosa.1,2,4,5

Unlike silent glaucoma in older children or adults, PCG presents as a triad of epiphora, photophobia, and blepharospasm. These symptoms are due to the extremely elevated intraocular pressure (IOP), which causes corneal clouding and buphthalmos at the corneoscleral junction, eventually overburdening the endothelium and leading to Haab striae of Descemet’s membrane. This, in turn, can lead to permanent corneal scarring and vision loss.1,2,5,6

As opposed to adults with glaucoma, whose outflow system becomes faulty over many years of use, children born with faulty drainage systems that cause PCG require surgery as first-line treatment, usually goniotomy or trabeculotomy if the cornea is clear.7 If the cornea is not clear, or if the angle surgeries do not control the IOP, the next step is trabeculotomy or aqueous shunt devices (e.g., Molteno, Ahmed, Baerveldt implants).1

Minimally invasive glaucoma surgery (MIGS) shows emerging potential for reduced trauma to the conjunctiva, preserving this area in a population who may need multiples surgeries, but further investigation is needed.7,8

Cyclodestruction is the last resort for a blind, painful eye that is refractory to other treatments.1,4,5

Medications are used for PCG as a secondary option. For infants and young children, they can be used to lower IOP and reduce pain and photophobia prior to surgery or in those with only partially successful surgical outcomes.4,9 A total of 70 to 90 of true PCG patients who undergo 1 to 2 procedures after 3 months of age but before 2 years of age are cured of the condition without further surgical or medical intervention.3,9,5

The success rate is lower for those who receive surgery from birth to 2 months of age, most likely due to the more severe filtration anomaly and thus immediate diagnosis and treatment.4

Children with PCG are at a lifelong risk of retinal detachment and increased risk of age-related cataract surgery complications.2

Secondary to cataract removal

The second most common form of childhood glaucoma is secondary to congenital cataract removal.

This type of glaucoma is usually open angle and can occur immediately or years after surgery. Anyone who has had congenital cataract surgery is a lifelong glaucoma suspect. The risk of developing glaucoma is 17 percent at 5 years post-surgery and is similar for those receiving initial intraocular implant and those initially left aphakic.1,10

Early cataract surgery is associated with improved visual outcomes but increased risk of glaucoma development. This secondary type of childhood glaucoma is treated first with medications.1,10

Juvenile open-angle glaucoma

The final type of childhood glaucoma is another primary glaucoma, juvenile open-angle glaucoma (JOAG), which is considered to be diagnosed from age 4 to age 35 and accounts for 0.2 percent of glaucomas. This disease has autosomal dominant inheritance and affects 1 in 50,000 people.

JOAG is often more severe than POAG and can be markedly asymmetric. Risk factors for JOAG include ocular hypertension (often above 40 mm Hg), being male, myopia (can be significant progression as compared to adults. Additionally, the steroid response may not be reversible, and the patient can be asymptomatic.

Stereids cause increased IOP by increasing the resistance within outflow pathways. Many ocular conditions in childhood are treated with topical steroids, including uveitis, blepharoconjunctivitis, and vernal keratoconjunctivitis.

See Pediatric glaucoma on page 24
Why stop at the last page?

Visit *Optometry Times®* online.

The magazine in your hands is only the beginning. Breaking news, topic centers, event coverage and engaging partner content make [optometrytimes.com](http://optometrytimes.com) an ideal resource for the smart clinician.
Pediatric glaucoma

Continued from page 22

Topical steroids are the most common cause of steroid response or glaucoma in children. Topical steroids with the lowest effect on IOP are fluorometholone, loteprednol (Lotemax, Alrex; Bausch + Lomb), timoxolone (Voxel, Alcon), and medrysone (HMS, Allergan). An alternative option is topical cyclosporine (Restasis, Allergan; Cequa, Sun Pharma), which has been shown to be effective at treating ocular surface inflammation in children. 15

He was kind enough to leave this with me so I could test contrast sensitivity on glaucoma patients. I thanked him and told him I would brush up on something about contrast sensitivity.

His BCVA is normal and symmetrical, and his cornea, aqueous, and vitreous humor are unremarkable.

The effect of glaucoma on contrast sensitivity is well documented. 1,4 This parameter of visual function is related to numerous activities of daily living. 1 Contrast sensitivity has been postulated to be a likely culprit of visual complaints in glaucoma patients with good visual acuity. 5 Indeed, contrast sensitivity is an often-overlooked aspect of one’s visual quality of life.

I often talk about contrast sensitivity with patients with cataracts, but I am going to do a better job of addressing this aspect of glaucoma, as well. I am equipped to test for it, and I am going to do so more often after having this conversation with my patient. I am also going to rework how I explain visual function in glaucoma to include something about contrast sensitivity.

REFERENCES

If treatment is successfully done early enough, glaucomatous cupping can actually be reversed, owing to the immature, elastic lamina cribrosa.

Scanning of the optic nerve can be helpful as well, although there is no normative database for ages less than 18 years. Confirmation of larger than average discs (and therefore larger cups) can be documented, and changes over time can be monitored when comparing back to baseline. Ocular coherence tomography (OCT) has confirmed that the ISNT rule (inferior ≥ superior ≥ nasal ≥ temporal) applies in children.11

Clinical pearls
Evaluate the parents of childhood glaucoma suspects to determine if there is a family history of glaucoma or hereditary large optic nerves.11 If an OD is suspicious of glaucoma in a child, consider obtaining a modified diurnal curve of IOP. In children without glaucoma, the IOP will vary only 1 to 2 mm Hg between eyes and over time, but in glaucoma IOP can vary 10 mm Hg or more over time and 3 mm Hg or more between eyes.5

When following a child with ocular hypertension (OHTN) and no evidence of glaucoma, keep in mind that one study showed that 25.6 percent of patients who had two or more episodes of elevated IOP (on different days) went on to convert to glaucoma.12

The decision to treat OHTN to decrease risk of conversion to JOAG should be based on the likelihood of visual impairment (pediatrics have many more years to lose vision), cost (many more years to pay for treatment), side effects of treatment (decades to produce side effects and/or failure) and quality of life, which can be affected by a complicated dosing schedule.5,12

Medications have increased side effects in children because children’s enzyme-metabolizing systems are not yet fully developed.1 Consider preservative-free glaucoma drops for children who will be on prolonged topical glaucoma treatment.13 Also, recommend punctal occlusion and remind parents/caregivers to pay close attention to adverse side effects in this population, who may not be able to verbalize them.3

The Childhood Glaucoma Research Network (CGRN) can be a resource for anyone who sees pediatric patients. There is information available for parents and caregivers of children with glaucoma, including a visual impairment toolkit and a link to connect with others.3,14 Optometrists should not hesitate to seek the support of a pediatric glaucoma specialist, pediatric ophthalmologist, or adult glaucoma specialist for surgical consultation, especially in infants. ODs must remember that children are not just miniature adults and have different clinical considerations as patients.

REFERENCES
What a practice owner would advise her younger self

An OD looks back 30 years of running a practice and recommends developing CEO skills

By Dori M. Carlson, OD

I am intrigued by the articles floating around the internet. One that always makes me pause is related to a theme about what you would tell your younger self. Often, it involves advice about smelling the roses, not sweating the small stuff, traveling more, or advice about life being short and to spend more time with the people you love.

This year will mark 30 years since my optometrist husband and I opened our office in a 500-square-foot space in the basement of the community hospital in our rural part of America. We have since grown to two locations, each occupying a space 8 times that of where we originally started.

We took out loans. We paid them off. We built new offices. We hired more staff and doctors. We took on more loans. We had sleepless nights and worrying over different aspects of the business.

CEO skills

As I look back at those years, I cannot help but pause and wonder what I would tell my younger self as it relates to business. I would say to myself to be more intentional about working “on” the practice instead of “in” the practice.

As doctors, we often believe we must spend all of our time seeing patients. Yes, we know we should delegate, but no one else can see patients, all of our time seeing patients. Yes, we know we should delegate, but no one else can see patients, and we spend all of our time seeing patients.

As part of my master’s program, I had to do such a project. The teacher made me pause and think about what I would tell my younger business owner if I were to tell her back, pick the easiest to change, and let go. I’m a huge fan of John Maxwell’s writings. In his book, Developing the Leader Within You 2.0, he writes that all leaders should have a vision. As ODs in the year 2020, it may sound cliché to talk about vision, but I think practices with a vision and mission statement have a clear direction for their businesses. They are the direction that acts as a guiding star for all ODs do in their offices.

If you have not created one for your business, it is easy enough to search the internet for advice to create one. I advise creating one with your team’s input. People will support that which they create.

Vision applies to yourself as well. While ODs might have a vision and mission statement for their businesses, few have one for themselves. Creating your personal vision and mission statements can be a rewarding exercise that allows you to grow as a leader in all aspects of your life.

As part of my master’s program, I had to do such an activity. The process made me pause and think of what was important to me.

Work smarter

So, what would I tell my younger business owner self? I would ask her to take the time to develop her CEO skills. I found that even as little as 2 hours a week spent working “on” the business helped me get more organized, be more efficient, and reduce the stress of running the business. It is about working smarter, not harder.

TAKE-HOME MESSAGE

Having gone through the highs and lows of running a practice, an optometrist reveals what she would tell her younger self: To be more intentional about working “on” the practice instead of working “in” the practice.

REFERENCES


Dr. Carlson served as the first woman president of the American Optometric Association. She will earn a MA in leadership in October 2020.
dori.carlson@gmail.com
Providing Education for Optometrists

As the official provider for Optometry Times, PER® is leading the way in advancing CME, while continuing our tradition of delivering world-class conferences. Whether taking place in-person or virtually, PER® will still provide the same high-impact education clinicians have trusted for more than 20 years.

Up-to-date evidence-based clinical information that can be immediately implemented into patient care

Unrivaled interaction with renowned thought-leaders

On-demand programming that provides access whenever and wherever you need it

Visit gotoper.com/go/OptometryTimes to check out our virtual conferences and webcasts, and we’ll see you in-person soon!
10 things I wish I knew earlier about vision therapy

How to take on the challenge of providing therapy to improve vision

By Marc B. Taub, OD, MS, FAAO, FCOVD, FNAP

Vision therapy is both an art and science. Even though I graduated from optometry school in 2001 and have been teaching vision therapy in an academic setting since completing my residency in 2004, I am still learning. I learn from my colleagues, mentors, students, and, yes, my patients. While I am sure the learning process will continue until the day they pry the Brock string from my dead hands, there are so many things that I wish I knew before I started on this journey.

1. No such thing as too much education

I love learning. I can’t even fathom the number of hours of education that I have taken since graduating, but it was the courses related to vision therapy and pediatrics from which I have learned the most.

I have taken, and taught at, many of the major meetings, and they have excellent 1- to 2-hour educational bites on a variety of topics to whet the beak. It is through organizations like the Optometric Extension Program Foundation (OEPF), College of Optometrists in Vision Development (COVD), and Neuro-Optometric Rehabilitation Association (NORA) that I have developed my model of vision. Each provides education in larger chunks ranging from 10 to 35 hours on a specific topic.

Learning extends past formal education as well. COVD and NORA offer fellowship processes, while OEPF publishes a multitude of books. Both OEPF (Optometry & Visual Performance) and COVD (Vision Development and Rehabilitation) publish world-class open-access journals as well, so the opportunity for life-long learning abounds.

2. You won’t know everything; keep it simple

I promise that the complicated and puzzling cases will find their way to your offices, but, for the first few, stick to the easier ones. You need to prove to yourself, the office staff, other doctors in the office and community, and the patients that you know what you are doing.

Start with the basic binocular cases of the accommodative and/or vergence genres. Do not start with a 40-year-old esotrope with a history of three strabismus surgeries who has never seen stereo or an autistic child who is non-verbal.

3. Start low and go high over time

Patients love the amazing technology they get to use at my clinic…and so do I. It is great for moti-
vation and allows you to challenge the patient in a different manner.

The concern of course is that technology can be expensive for a new office. Start with a low-tech approach. Yes, buy Brock strings, lens flippers and vectograms...they will never steer you wrong (Figure 1). Over time, consider adding a computer program or larger-ticket item like a touch screen to enhance your therapy offerings and get that “wow” factor from the patients. There are many options, so do your research on the web, at meetings, and by talking to those in the field.

4 Results take time
You may have been taught that a “basic” convergence or accommodative therapy case will take 12 weeks to treat. Perhaps that is true for a handful of hard-charging patients who actually do the home activities prescribed or whose conditions are not embedded, but it is not true most of the time.

The longer I perform therapy, the more time I estimate is needed. I adjust my projection based on the findings but also on the patient demographics and parental involvement.

A young child will inherently require more time, and perhaps breaks in the therapy process, than a teenager. A patient with amblyopia, strabismus, developmental challenges, or who has suffered a brain injury will take significantly longer.

Be honest at the start with the patient, parent, or family member—it is OK to tell them that treatment may take a year. In most cases, patients have taken a lifetime to develop their adaptations to survive; it will take more than 3 months to break them back down and build the patients back up.

5 Every patient has a different ceiling
Honesty is the best policy. It is no different in the therapy room. In the consultation process, I always talk about removing vision as a barrier for the patient.

If she is in school, we are working toward school performance and attention but never promise that vision therapy will improve grades—this will only lead to disappointment for all involved. We are, on the other hand, working to reduce the visual challenges to allow natural abilities to flow unimpeded.

For patients suffering a brain injury, we strive to get them back to pre-injury levels visually and cognitively. As with school-age children, we must not make promises we cannot keep; in most cases, the stopping point will be well below the desired endpoint. Our goal with all patients is to enable meaningful change and improvement to the highest level possible, but never make promises.

6 Meet patients where they are
Within a given activity, there are infinite levels. Be flexible with the activities and demands so that the patient has an opportunity to learn and make meaningful change. It is essentially the story of Goldilocks: you want the activities not too hard or too easy, but just right. If they are too easy, the patient does not have to work to make change; if too hard, the patient is likely to fail and there is no opportunity for learning to take place (Figure 2).

For example, take everyone’s favorite activity, the Brock string. You can make it easier by using a string with larger beads, or you can make it harder by having the patient stand on a balance board, Bosu ball, or foam pad to add balance to the mix.

It is important to remember that age can be used as a guide to find the appropriate level, but patients are surprised in their abilities. Younger patients often advance quickly, while patients suffering a brain injury or with special needs may need to start at a much lower level than their age dictates. Finding the starting level for a given patient takes time, and even after 15 years, I am still learning.

7 Vision therapy affects the Rx, and the RX can affect VT
“Eyeglasses/lenses have both positive and negative attributes. In some cases, they can enhance overall visual functioning, while in other cases they can deeply embed maladaptive behaviors. For these reasons, eyeglasses/lenses should always be prescribed judiciously.”

I could not agree more with this statement from former New England College of Optometry professor, Richard Laudon, OD, FAAO, in a personal email. I have always fit into the “less is more” philosophy when it comes to prescribing, and my experiences have only strengthened in that regard.

If there is no test that I can point to that backs up a change in, or even giving, the prescription, it is not going to happen. This is especially true if I am recommending the patient for therapy or the patient is in an active therapy process.

There is no harm in waiting until therapy is completed, then reassessing the visual system to provide the prescription that best supports the patient and the gains that he has made.

8 A good vision therapist makes the difference
The importance of a vision therapist who has the right training and works independently from the doctor cannot be understated. This can happen only if the doctor spends time with the therapist in the therapy room and therapy programming for the patients.

While this can impact the bottom line because it is not efficient use of the doctor’s time, this practice will reap benefits down the line. In a busy office, the therapist is seeing patients at the same time as the doctor, so setting the stage early on with good training is crucial.

A good therapist is also vital to patient outcomes. Therapists need to think outside the box and find not only what motivates each patient but also what activities patients enjoy and how to find the appropriate level of challenge.

9 The proof is in the results
You will always have your fans and your haters—show them the same attention, but always take the high road. Don’t try to prove the haters wrong; show them they are wrong through your patient care.

There will always be those in the medical community who not only disregard but actively put down vision therapy as a treatment option. Don’t waste time sending them research studies—they most likely won’t read them. Instead, show them the impact through patient care outcomes. Let the patients and their families be your ambassadors to spread the news of success to those doubters and to anyone who will listen.

10 Vision therapy is not for everyone
Despite your best intentions, not everyone is ready to commit to the therapy process. This hesitation can be due to parent or patient concerns. The child may not be on board because he is “too cool” for therapy or he does not see a need in the first place. There can also be family challenges, including financial or divorce. This can lead to problems with show rate and homework compliance, leading to poor outcomes.

Choosing patients and their families who are ready to make the commitment to the therapy process is just as important as the therapy itself.

11 Take the leap
For those who are ready to take on the challenge of providing vision therapy, my last piece of advice is to take the leap.

Be smart; do your research. Don’t forget that you are not alone. You will find that vision therapy doctors will literally give you the plans to their offices and therapy; don’t hesitate to ask for help.

Go to a meeting, shadow an office, and join the DOC List (a listserv with over 1,000 clinicians worldwide; email me for more details) or VTODs on Facebook.

There is no need to reinvent the wheel. Vision therapy is not only fun, but it can change lives, yours and the patients’. What are you waiting for? 😊
A 55-year old patient with a 20-year history of insulin-dependent diabetes presented for periodic ophthalmic evaluation. He was new to our area and did not recall the timing of his previous examination.

**Symptoms**
He reported no visual symptoms. In addition to his history of diabetes, he had also been treated for systemic hypertension (medications unreported) for 20 years. Significant in his history was the admission of blood sugar levels in the 140 to 200 range. He was unaware of his HbA1c levels.

At examination, best-corrected visual acuity was 20/25 in each eye. The appearance of the right and left fundi is depicted in Figure 1. Note the vascular abnormalities in each eye consistent with diabetic retinopathy, including hemorrhages and microaneurysms, cotton-wool spots, intraretinal microvascular abnormalities, and a specific cluster of exudates affecting the left eye within 500 µm of the macula. In the fundus photo of the right eye, note particularly the vascular irregularity associated with cotton-wool spot superior temporal to the optic disc.

**Diagnosis**
The patient was diagnosed with moderate to severe diabetic retinopathy, and optical coherence tomography (OCT) was ordered. Normal foveal contour with mild thickening as well as absence of intra- and sub-retinal fluid are noted in the cross-sectional presentation of each eye. See Figure 2.

Topographical analysis revealed mild thickening within the posterior pole of each eye. See Figure 3. The retinal nerve fiber layer (RNFL) profile captured a portion of the cotton-wool spot superior temporal to the optic disc of the right eye. See Figure 4.

The patient refused consultation with a retinologist and was subsequently advised to follow up in 3 months. At this visit, his visual acuity was unchanged, but there were some changes to the fundus appearance in each eye. See Figure 5 for changes to the right eye.

Most significantly, the prominent cotton-wool spot in the right eye had resolved but left in its wake a distinct RNFL defect. Refer to Figure 5.

The OCT at this visit revealed intra-retinal and sub-retinal fluid perilously close to the center of the fovea of the right eye. See Figure 6.

This was considered potentially treatable although not center-involving, and the patient was referred to a retinal specialist.

**Resolved cotton-wool spot leaves RNFL defect in its wake**

Imaging reveals diabetic retinopathy, cotton wool spot, and resulting RNFL defect
He received a single treatment to the left eye but was lost to subsequent follow-up.

REFERENCES

Assessment
It is well known that cotton-wool spots are consistent with underlying ischemia, perhaps of a single retinal arteriole. They have been reported to correspond with arcuate visual-field defects.

The specific pathophysiology for the manifestation of CWS appears to begin with retinal arteriolar obstruction. As such, CWS can be regarded as sentinels for neovascularization.

A previous report of CWS resolution with subsequent RNFL defect was published. The case involved a patient with severe arterial hypertension whose CWS appeared inferior to the optic disc. Upon CWS resolution, the patient exhibited a distinct wedge-shaped RNFL defect. The report also included OCT analysis showing characteristic inner retinal tissue loss.

On further follow-up, the current patient eventually developed center-involving macular edema in the right eye and high-risk vitreous hemorrhage (nasal to the optic disc) in the left eye.
OCT, OCTA show promise in screening for DR

Continued from page 1

Other retinal imaging technologies have been suggested as prime platforms for screening, particularly optical coherence tomography (OCT) and OCT angiography (OCTA). OCTA is a novel imaging technique that provides depth-resolved images of retinal vasculature. With a focus on OCTA’s application in DR, this article will highlight advantages and disadvantages of OCTA and provide a short preview of new avenues of research.

OCTA basics
Fluorescein angiography (FA) remains the standard of care in examining ocular perfusion and retinal vascular abnormalities. FA involves the intravenous injection of sodium fluorescein dye. This introduces the possibility of adverse reactions, the most serious of which is an anaphylactic reaction.

Using FA, a dynamic examination of retinal vasculature can be made. Transit time and dynamic dye changes (leakage, pooling, staining) can be used in order to distinguish among ocular pathologies. However, leakage can obscure underlying structure detail from view. Additionally, FA is limited to a 2-dimensional view of all retinal vasculature; the depth of an abnormality cannot be examined. While FA remains the standard of care, it is important to recognize the advantages and limitations of the technology.

OCT angiography (OCTA) offers certain advantages over traditional FA. A refresher on the fundamentals of OCTA is important in understanding its potential advantages and disadvantages. OCTA is an application of existing OCT technology to identify flow signals within a section of tissue. When repeating OCT B-scans in a single location, pixel by pixel differences within a short allotment of time suggests motion. Extraction of these differences allows for the creation of a 3-dimension matrix of flow signals that can be visualized using in-en-face methods or flow signal overlay onto OCT B-scans.

Significant advantages arise from this methodology. Most importantly, OCTA is a non-invasive, non-contact method to visualize the vascular architecture. This allows for repeated image acquisition in order to monitor disease progression or response to treatment over time. For example, Ishibazawa et al found that OCTA could be used to quantify neovascularization at the disc and could be repeated frequently to monitor response to treatment with intravitreal injections of ranibizumab.

OCTA images are not obscured by dye leakage that can obscure pathology in traditional FA. The images are depth-resolved and can allow for the localization of pathology to the superficial or deep retinal vascularplexus.5 Suzuki et al examined OCTA images in patients with macular telangiectasia type 2 and found that vascular changes occur in primarily in the deep capillaryplexus.6

Most importantly, for the application to telemedicine and automated screening, several vascular characteristics can be quantified, such as fractal dimension and vessel density, which will be discussed in some detail later.

While OCTA offers advantages and exciting possibilities, the current limitations of the technology must be considered. OCTA images are limited in size, offering at most a 6x6 mm acquisition area in commercially available versions. It is possible to piece together multiple images in a montage to expand the area of examination. In order to acquire a reliable image, patients are required to fixate precisely for several seconds. If unable to do so, motion artifacts degrade the quality of the scan.7

Due to the robust data that is created, interpretation of the images can be lengthy and challenging, particularly with significant retinal pathology. The inability to detect vascular leakage is a disadvantage in several settings. Without leakage information, similar-appearing pathology such as neovascularization and intraretinal microvascular abnormalities (IRMA) may be difficult to differentiate in en-face images.7

Further limitations that can result in misinterpretation of OCTA images include projection artifact (the visualization of flow signal from superficial structures onto deeper slabs) and segmentation artifact (incorrect identification of the depth of a lesion). In addition, OCTA’s ability to detect motion has limitations in both slow movement (such as stagnant blood within a retinal maculoneuvasculum or polyp) and fast motion (in high-flow choroidal vessels).

Nevertheless, OCTA has already become a powerful tool for assessing retinal vascular pathology, such as DR. The natural history of DR is a step-wise progression of vascular changes that can ultimately result in vision-threatening disease. OCTA can reliably identify and quantify these features, making OCTA a useful tool in the management of diabetic patients.

OCTA in DR

In the office setting, OCTA can detect early diabetic retinal changes before they are visible in a fundus examination. Thompson et al found that 40 percent of diabetics with no retinopathy on clinical exam had microaneurysms visible on OCTA versus fundus examination.11

When compared to color fundus photography, OCTA demonstrated significantly higher detection rates of microaneurysms and IRMA.12 This shows that OCTA can identify subclinical retinopathy. Whether this translates to improved clinical outcomes is yet to be seen, but the earlier identification of vascular changes may provide an opportunity for earlier counseling and lifestyle intervention for diabetic patients.

In clinically apparent DR, the ophthalmologist’s ability to accurately stage the severity of retinopathy is crucial to establishing appropriate interventions. The progression from moderate/severe non-proliferative DR (NPDR) to proliferative DR (PDR) can be subtle.

Proliferative neovascularization can mimic IRMA on clinical exam, and, in 50 percent of cases, arises adjacent to areas of IRMA, making differentiation between the two difficult. Segmentation slabs on OCTA can simplify this task.

Unlike other diabetic retinal changes, neovascularization will breach the inner limiting membrane and sit above the surface of the retina or optic nerve. As such, the vitreoretinal interface slab or B-scans with flow signal overlay can screen for and detect preretinal neovascularization.13 If present, patients should immediately be referred for evaluation by a retinal specialist.

In the office setting, OCTA can detect early diabetic retinal changes before they are visible in a fundus examination.

Diabetic macular edema and macular ischemia are two further complications of DR. Diabetic macular edema is the most common cause of visual loss in patients with DR and is readily identifiable with biomicroscopy or structural OCT.14 However, diabetic macular ischemia (DMI), which occurs in up to 40 percent of patients with DR, is independently associated with poor visual function.15

DMI by EDRS classification is partly assessed by measurement of the foveal avascular zone on FA. OCTA can identify and quantify enlargement of the foveal avascular zone, areas of capillary dropout, and an overall decrease in density of the parafoveal vessels in a non-invasive manner and may prove to be a reliable indicator of DMI.16

It is important to remember that diabetic mac-
ular ischemia predicts retinopathy progression (research to date shows that patients with NPDR, DMI, and DME may progress to PDR despite monthly anti-vascular endothelial growth factor (VEGF) treatment). Additionally, the more ischemic the macula, the worse the visual prognosis. If optometrists can identify ischemia early on, proper counseling can be provided.

OCTA may allow optometrists to intervene sooner and make better recommendations

Early detection and prompt treatment of DR can prevent severe vision loss in 90 percent of diabetic patients. The noninvasive technology with OCTA now detects these changes quickly and reliably. Ultimately, the use of OCTA may allow optometrists to intervene sooner and make better recommendations for improved long-term patient outcomes.

Future research

Current research in OCTA involves further refinement of the quantification techniques of vascular anatomy. Vascular density, non-perfusion area, and the foveal avascular zone area have been suggested as quantitative biomarkers to identify disease and track disease progression. Fractal dimension analysis is a concept with growing importance in analyzing the stages of DR with OCTA. It allows for an assessment of the microvascular disease present in DR. Fractal dimension is a dimensionless number providing an index of “self-similarity” within an image. The basic premise is that the retinal vascular tree holds some degree of self-similarity as it progresses from first-order vessels down to third-order and fourth-order vessels, in terms of branching morphology. Perturbations in branching morphology may suggest development of vascular abnormalities such as DR and may manifest as changes in the fractal dimension of an OCTA image. Other avenues of research in OCTA include the quantification of blood flow volume and velocity. Variations of blood flow volume and velocity.

Future clinical applications

OCT and OCTA technology have greatly advanced ODs’ ability to diagnose and manage retinal disorders. Currently, OCTA has a qualitative ability to identify diabetic changes in early stage DR, to distinguish early neovascularization, and to identify diabetic macular ischemia. Refinement of quantitative techniques remains the next great challenge.

REFERENCES

HOMEOSTASIS IS THE HOLY GRAIL IN DRY EYE DISEASE
As knowledge of ocular surface disease increases, it becomes critically important to continue to siphon down the information into clinically relevant, actionable items that empower eye care practitioners to provide treatments that allow measurable improvements.
OptometryTimes.com/Homeostasis

TOP HEADLINES
Check out what your colleagues are reading.
1 At-home therapy can alleviate contact lens discomfort
OptometryTimes.com/WarmCompress
2 Engineer a specialty contact lens practice
OptometryTimes.com/SpecialtyCLPractice
3 Why I wear scrubs in the office during COVID-19
OptometryTimes.com/COVIDScrubs

TOP SOCIAL
See what others are reading on Facebook, Twitter, and Instagram.

1 Misdiagnosis when clinical findings don’t make sense
OptometryTimes.com/Misdiagnosis
2 5 facts about contact lens wear with COVID-19
OptometryTimes.com/5Facts_COVID19
3 NASA awards $5 million to artificial retina development efforts
OptometryTimes.com/NASA_retina

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

Content

GROUP CONTENT DIRECTOR
Sheryl Stevens
sstevenson@mjhlifesciences.com

CONTENT CHANNEL DIRECTOR
Gregory M. Bailey, MCLC, FAAO
gbailey@mjhlifesciences.com

ASSISTANT EDITOR
Brooke Berry
bberry@mjhlifesciences.com

PUBLISHER
Erin Schlussel Stever
eschlusse@mmhgroup.com

NATIONAL ACCOUNT MANAGER
Cherie Pearson
cpearson@mmhgroup.com

NATIONAL ACCOUNT MANAGER
Kyle Feller
kfeller@mjhlifesciences.com

ACCOUNT MANAGER
RECRUITMENT ADVERTISING
Joanna Shippoli
jshippoli@mjhlifesciences.com

CORPORATE
CHAIRMAN
Mike Hennessey, Jr

VICE CHAIRMAN
Silas Inman

SENIOR VICE PRESIDENT, I.T. & ENTERPRISE SYSTEMS
John Maricic

SENIOR VICE PRESIDENT, AUDIENCE GENERATION & PRODUCTFULFILLMENT
Joy Puzzo

VICE PRESIDENT, HUMAN RESOURCES & ADMINISTRATION
Shari Landersberg

VICE PRESIDENT, BUSINESS INTELLIGENCE
Chris Hennessey

EXECUTIVE CREATIVE DIRECTOR, CREATIVE SERVICES
Jeff Brown

Corporate

Circulation

Vice President, Marketing & Audience Development
Joy Puzzo
Director, Audience Development
Kristina Bideaux
Audience Development Manager
Kelly Kemper

Optometry Times blogs
The strongest voices in the optometric field are featured each week in Optometry Times® blogs with tips, techniques, breaking news and what it means to you and your practice. Read a physician’s perspective on the latest and greatest in glaucoma, retina, dry eye, refractive surgery, contact lenses, technology and practice management at OptometryTimes.com/topic/blog.
XIIDRA® (lifitegrast ophthalmic solution), for topical ophthalmic use
Initial U.S. Approval: 2016

BRIEF SUMMARY: Please see package insert for full prescribing information.

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

4 CONTRAINDICATIONS
Xiidra is contraindicated in patients with known hypersensitivity to lifitegrast or to any of the other ingredients in the formulation [see Adverse Reactions (6.2)].

6 ADVERSE REACTIONS
The following serious adverse reactions are described elsewhere in the labeling:
- Hypersensitivity [see Contraindications (4)]

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

In five clinical studies of DED conducted with lifitegrast ophthalmic solution, 1401 patients received at least one dose of lifitegrast (1287 of which received lifitegrast 5%). The majority of patients (84%) had ≤ 3 months of treatment exposure. One hundred-seventy patients were exposed to lifitegrast for approximately 12 months. The majority of the treated patients were female (77%). The most common adverse reactions reported in ≥5% of patients were instillation-site irritation, dysgeusia, and reduced visual acuity.

Other adverse reactions reported in 1%-5% of the patients were blurred vision, conjunctival hyperemia, eye irritation, headache, increased lacrimation, eye discharge, eye discomfort, eye pruritus, and sinusitis.

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

Rare cases of hypersensitivity, including anaphylactic reaction, bronchospasm, respiratory distress, pharyngeal edema, swollen tongue, and urticaria have been reported. Eye swelling and rash have been reported [see Contraindications (4)].

8 USE IN SPECIFIC POPULATIONS
8.1 Pregnancy

Risk Summary
There are no available data on Xiidra use in pregnant women to inform any drug-associated risks. Intravenous (IV) administration of lifitegrast to pregnant rabbits during organogenesis produced an increased incidence of omphalocele at the lowest dose tested, 3 mg/kg/day (400-fold the human plasma exposure at the recommended human ophthalmic dose [RHOD], based on the area under the curve [AUC] level). Since human systemic exposure to lifitegrast following ocular administration of Xiidra at the RHOD is low, the applicability of animal findings to the risk of Xiidra use in humans during pregnancy is unclear [see Clinical Pharmacology (12.3) in the full prescribing information].

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

8.2 Lactation
Risk Summary
There are no data on the presence of lifitegrast in human milk, the effects on the breastfed infant, or the effects on milk production. However, systemic exposure to lifitegrast from ocular administration is low [see Clinical Pharmacology (12.3) in the full prescribing information]. The developmental and health benefits of breastfeeding should be considered, along with the mother’s clinical need for Xiidra and any potential adverse effects on the breastfed child from Xiidra.

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

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

Manufactured for:
Novartis Pharmaceuticals Corporation
One Health Plaza
East Hanover, NJ 07936
T2019-110
Indication

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

Important Safety Information

• Xiidra is contraindicated in patients with known hypersensitivity to lifitegrast or to any of the other ingredients.
• In clinical trials, the most common adverse reactions reported in 5-25% of patients were instillation site irritation, dysgeusia and reduced visual acuity. Other adverse reactions reported in 1% to 5% of the patients were blurred vision, conjunctival hyperemia, eye irritation, headache, increased lacrimation, eye discharge, eye discomfort, eye pruritus and sinusitis.
• To avoid the potential for eye injury or contamination of the solution, patients should not touch the tip of the single-use container to their eye or to any surface.
• Contact lenses should be removed prior to the administration of Xiidra and may be reinserted 15 minutes following administration.
• Safety and efficacy in pediatric patients below the age of 17 years have not been established.

Please see Brief Summary of Prescribing Information on adjacent page.