ODs’ guide to MRIs
Know the types of magnetic resonance

Virtual reality, tablet devices capture visual fields in unconventional ways

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See sagittal view of the brain page 22
ODs’ guide to MRIs

Know the types of magnetic resonance imaging and how to order them

By James F. Hill III, OD, FAAO

The eyes are the outer extension of the human body’s nervous system. As the frontline primary eyecare provider, optometrists must have a clear understanding of the neurology that affects the visual system and neuroimaging that can help diagnose specific pathology.

Optometrists every day diagnose in their patients’ vision and by extension brain and neurologic conditions.

Common clinical findings can present as symptoms of serious medical problems:³ Optic nerve swelling, vision loss, pupil problems, diplopia, ptosis, proptosis, ophthalmoplegia.

Imaging

Many different types of neuroimaging are safe imaging techniques to indicate problems within the human brain, including:²

- X-ray
- Computed tomography (CT)
- Magnetic resonance imaging (MRI)

See MRI on page 22

Virtual reality, tablet devices capture visual fields in unconventional ways

By Mitchell W. Dul, OD, MS, FAAO, Dipl ABO

Visual field testing is an integral component of contemporary clinical practice because it measures outcomes that correlate directly with a patient’s quality of life.¹-⁴

New devices and technology provide visual field assessments in unconventional ways—away from clinical settings and/or with indirect supervision of a trained clinician.

Among these are tablet-based devices and head-mounted displays. Conducting visual field testing on a tablet has obvious limitations. If the test is unsupervised, then lighting conditions, viewing distance, and screen brightness are difficult to control.⁵

Head-mounted and virtual reality (VR) systems are not burdened with these limitations. VR headsets are inexpensive, readily available, lightweight, mobile, easy to transport.

See Visual fields on page 25

3 strategies for social media success

By Diana Canto-Sims, OD

By leveraging social media, ODs can take their practices to the next level. From expanding and scaling the practice itself to growing their patient base, having an online presence can benefit eyecare professionals.

While knowing this information is necessary, the most critical question to ask is: What is the end goal with a practice’s social media?

ODs need to be crystal clear on the goal every single time they post, upload, share a story, or film a live video. If an OD is posting on social media just to post, he is wasting his time. Patients are not impressed and
Don’t forget to check out research posters

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

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The American Academy of Optometry’s annual conference in San Antonio this year was a great meeting with world-class continuing education. Being around such thought leaders inspires me to be better at all aspects of optometry in which I have a role. I am always grateful to catch up with old friends and colleagues. Truly, some of the best ideas arise in a hallway outside of a lecture or over a pint at dinner.

I had a chance to sit down with a colleague for a few minutes to discuss the opportunities available to publish original work.

Optometry publishing

As for peer-reviewed journals, there certainly aren’t many opportunities for doctors of optometry to publish relative to other doctoral level professions. The profession has several non-peer-reviewed journal such as Optometry Times and others.

Then my colleague asked me if I had been down to the poster section of the exhibit hall. I had not, and I embarrassingly admit that it was not at the top of my mind. I was an author on a poster during my residency, but I had neglected this aspect of research ever since.

So, later that day, I walked down to the poster section and took a look. It wasn’t very crowded, and I scanned my badge on the way in and planned to peruse for a few minutes and then get back to whatever it was I was supposed to be doing at the time.

I ended up spending over an hour reading through different ideas, ranging from topics I was well versed in to topics which I found both highly interesting and downright esoteric at the same time. Some ideas were predicated upon aspects of the human eye and/or visual system with which we are already aware, while other ideas were truly de novo.

Many of these posters are authored by students and residents with faculty advisors, and I can think of no better way to begin to get involved with contributions to health care through research than starting with a scientific poster.

I can think of no better way to get involved with contributions to health care through research than starting with a scientific poster.

I am thankful to have discovered new interest in this modality of research publication, and I plan to spend considerable time to soak up conference poster sessions from now on. In fact, I have plans to author a scientific poster, either alone or with a colleague or two, in the near future.

Michael Ohlson’s take on medical observation starts on page 10.

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Focus On CONTACT LENSES

Look for small signs to prevent contact lens complications

ODs and patients need to be knowledgable about vision and comfort changes

The advances in designs and materials ODs and patients have seen from the contact lens (CL) industry have created a heightened awareness and buzz about contact lenses.

Patients perceive them as being healthier than in the past. They may even assume that now they can push the limits of CL wear even further, without the fear of consequences they had previously. ODs know this isn’t true, and risks are still very real.

Perhaps many complications wouldn’t become complications if patients were to pay closer attention. But because they are so highly motivated to wear their lenses, they tend to miss the signs.

Patients may tolerate and even ignore mild redness, discomfort, and blurriness. Some of this behavior might be subconscious or blatant, and some of it may not be their fault.

CL wearers tend to have less corneal sensitivity than non-wearers, so their threshold for discomfort is often much higher than a non-CL wearer.

Redness without pain is then overlooked as unimportant. This causes a delay in diagnosis and treatment and reduces their chance of having a favorable outcome.

Additionally, patients don’t often associate indiscretions in their lens care and wear regime with potential complications. They don’t realize the consequences until it’s too late.

Here are details surrounding a select number of CL complications.

CLARE
Contact lens-induced acute red eye (CLARE) is inflammatory. The problem with an inflammatory condition is that while ODs know it is a reaction to something, they don’t always know the underlying cause.

The patient often presents with circumlimbal injection, several small <2 mm nonstaining infiltrates, mild photophobia, and tearing, but no anterior chamber reaction.

Typical causes include: hypoxia, CL overwear (noncompliance), toxic effects from trapped tear debris, mechanical irritation from a poor-fitting lens, dehydration of the lens with extended wear, solution hypersensitivity or toxicity, or a reaction to bacterial toxins (blepharitis).

But because we often don’t know the cause, the initial course of action is to treat it, change the underlying wearing conditions, and monitor for recurrence.

In some cases, it is important to suspend lens wear immediately and initiate supportive treatments to include lubrication and mild steroids.

ODs should ask patients detailed questions about past episodes and remedies they may have tried. This is often the patient who routinely dips into that leftover bottle of Tobradex (tobramycin/dexamethasone, Alcon) from years ago.

After resolution, the lens material, fit, and solution need to be evaluated for their potential contribution to the inflammatory event. Ideally, the patient is converted to daily disposables.

Patient education is key for long-term resolution. Patients need to understand that the redness is a manifestation of unhealthy wearing conditions.

It’s not about fixing the red eye—it’s about changing the underlying conditions that created the red eye.

SEAL
Superior epithelial arcuate lesion (SEAL)
Focus On

In the superior cornea under the upper lid. The lesion can consist of coalescent or diffuse staining, with or without infiltrates. It can be just inside the limbus or further down, corresponding to the lid margin.

A patient may complain of a foreign-body sensation or be completely asymptomatic. The lesion might be due to mechanical injury by the contact lens, making it essential that the patient discontinues CL wear immediately. The condition could also be heavily influenced by the properties of the lens.

Even if a patient is asymptomatic, the problem should be identified and fixed because any epithelial break is an opportunity for bacteria to get a foothold into the cornea.

SEAL is influenced by lens material, lens modulus, lens design (back surface change or optic zone junction), and lid force that can trap tear debris and create a dry area.

Lubrication can be helpful to soothe patient symptoms and speed epithelial healing. If the abrasion is particularly large or deep, an antibiotic ointment may be incorporated as a prophylaxis. The lesion typically resolves within one week without scarring.

Patients must be refitted into a different lens, preferably of a different design and softer material. An ideal lens for patients experiencing SEALs may be a hydrogel daily disposable with its typically low modulus and thin design.

Because this condition is not induced by a lack of oxygen, it is not essential that a patient wears silicone hydrogel silicone hydrogel (sily) lens.

In fact, it may be more important that the individual may work in a nail salon, ally has had exposure to vegetation, or the individual has special interests in contact lenses and care products on the development of corneal infiltrates. Multicenter case-control study of the role of lens materials and care products on the development of corneal infiltrates. Optom Vis Sci. 2012 Mar;89(3):216-25.

Infectious etiologies

Infectious etiologies can have various etiologies: bacterial, fungal, protozoan (Acanthamoeba), and viral (herpetic). Because these require immediate and intense medical treatment, it is essential for ODs to ensure their staffs knows what combination of signs and symptoms indicate the need for immediate attention.

Infectious ulcers are a disruption of the epithelial surface with a secondary necrosis of the surrounding tissue. Unlike noninfectious infiltrates, these start on the surface and invade deeper into the cornea.

There is usually an insult to the outer epithelium that allows the organism to get a foothold into the cornea. However, patients with chronic conjunctivitis or keratitis are also at higher risk.

Infectious ulcers cause intense pain and an extremely red eye. The patient will likely have photophobia, discharge, reduced vision, focal epithelial defect with surrounding corneal haze, and an anterior chamber reaction.

Remind staff that if a CL patient calls in reporting a white dot on her eye, or if the patient has significant pain and a questionable reduction in vision, the patient should see a specialist immediately.

Treatment

Ulcers are treated with anti-infective drops and ointments specific to the causative organism.

Cycloplegic drops dilate the eye and decrease the pain from iris movement and prevent potential lens adhesion, which can occur with an inflamed eye.

In the case of bacterial ulcers, steroids are sometimes used once the antibiotic is showing successful regression of the infection (typically after 48 hours of antibiotic use). The purpose of the steroid is to potentially reduce residual scarring.

Ulcers will scar and can potentially reduce the patient’s vision permanently. If the ulcer is not treated successfully in a timely manner, it can cause a corneal perforation, iritis, or even endophthalmitis.

With fungal ulcers, the patient usually has had exposure to vegetation, or the individual may work in a nail salon. Acanthamoeba ulcers usually involve a contaminated water source (or a heating, ventilation and air conditioning source), and almost always CL usage.

What can ODs do to better influence the CL patient’s mindset? Perhaps patients would identify symptoms and be quicker to report them if ODs were to routinely ask purposeful questions before there is an actual problem.

ODs should encourage staff to ask patients at routine visits, in small talk, picking up their lenses, whenever there is an opportunity.

Ultimately, looking for complications will allow ODs to identify problems sooner, causing a speedier recovery and positive overall outcome for the patient and the patient’s vision.

Dr. Brimer has special interests in contact lenses and dry eye. She has received study or sponsor support from Alcon, Allergan, Bio-Tissue, BlephEx, iCare, and PRK. drbrimer@crystalvisionservices.com

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Sleep apnea: More than a snore and floppy eyelids

Recognizing the signs of OSAS can reduce the risk of ocular-vascular diseases

Some 18 million Americans suffer from obstructive sleep apnea syndrome (OSAS) while attempting to receive a restful night of sleep.1

While it is most common in overweight African or Latino-American males and their families, it occurs in all ethnicities, genders (2 percent women, 4 percent men), and ages.1

Patients can be afflicted with OSAS and not be aware of the risk to their overall health. That is where clinical optometry comes in, especially for a patient who is falling asleep during a refraction.

About OSAS

OSAS occurs in anatomically predisposed individuals when their tongues, or other soft tissues of their palates, obstruct or flops over their airways while they are sleeping.2

This blockage of breathing can last 10 to 30 seconds and repeat several hundred times during the night.

Typically, normal breathing starts again, sometimes with a loud snort or choking sound. The patient is ultimately left with mild or severe chronic exhaustion.

A second, far less common non-obstructive apnea called central sleep apnea occurs when the brain doesn’t synchronize with the breath cycle. Paradoxically, patients who attempt to self-treat these conditions with alcohol, sleeping pills, antidepressants, benzodiazepines or narcotics, actually worsen their conditions.

OSAS disrupts every aspect of a patient’s life. At a minimum, the patient will be fatigued during an eye examination. At worst, OSAS heightens the patient’s risk of hypertension, heart attack, atrial fibrillation, car accidents, job-related injuries, stroke and vascular dementia.3

Ocular disease impact

OSAS approximately doubles the risk of most ocular-vascular diseases, including low-tension glaucoma.4

This is especially true for patients with a low ocular perfusion pressure below 50 mm Hg. It plays a role in central serous retinopathy, central retinal vein occlusion, and notably increases the risk of non-arteritic ischemic optic neuropathy (NAION) by a factor of six times.3

Discern and refer

ODs noticing sleeping disturbances in their patients should refer them for a comprehensive sleep evaluation by physicians certified in sleep medicine, typically within a sleep clinic.

These facilities provide evaluations following high-tech overnight polysomnography.

Sleep studies often uncover the root cause of restless leg syndrome, narcolepsy, cataplexy, sleep paralysis, hallucinations, sleepwalking, sleep deprivation, and even sleep-related eating disorders.

Therapy often results in prescription of a continuous positive airway pressure (CPAP) machine, a bilevel positive airway pressure (BiPAP) machine, or even a dental mouth guard.

CPAP patients often experience dry eyes and can be assisted with lubrication and specialized moist rich sealing nightwear (EyeSeals, EyeEco).

ODs are also addressing two other sleep-related concerns—nocturnal lagopthalmos and recurrent corneal erosions.

Responsibility and opportunity

ODs are teaching students and residents to query their patients about total sleep time and quality while looking for facial characteristics like floppy eyelids.

OSAS is also a common comorbidity in patients with LTG and NAION.

Because there is no widely accepted, evidence-based treatment for NAION, prevention is key for protecting patients.

OSAS is also associated with excessive and worsened outcomes with anti-VEGF treatment of patients with advanced diabetic retinopathy.5,6

People with obstructive sleep apnea had a longer course of diabetes mellitus (P<0.01) and a higher prevalence of retinopathy (P<0.01), neuropathy (P<0.05), cardiovascular disease (P<0.01), and hypertension (P<0.01).6

OSAS is critically important in efficacious treatment of advanced age-related macular degeneration with anti-VEGF agents. In one study, the treated OSAS group received only 8±7 total injections, while the untreated OSAS group received 16±4 injections (P<0.05).6

Prior to referral to a sleep clinic physician, ODs should encourage patients to take strategic naps to avoid car accidents until fully treated.

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Dr. Richer is president of the Ocular Wellness and Nutrition Society. He is associate editor of Journal of the American College of Nutrition and associate professor of family and preventative medicine at Chicago Medical School. Dr. Richer is global scientific director of Zeaxanthin Trade Association, he receives research funding from ZeaVision, and he consults for Bausch + Lomb, Eyecheck, Douglas Labs, and Stereo Optical.
MY FIRST CHOICE FOR CONTACT LENS CARE: CLEAR CARE® PLUS

Jessica Crooker, OD
Owner, Scituate Harbor Vision Source
Scituate, MA

Dr. Crooker was compensated by Alcon for her participation in this advertorial.

As an OD, my priority is to deliver excellent outcomes for my patients. As a practice owner, I also want to take advantage of every opportunity to improve and grow my business. In my experience, helping more patients become happy contact lens wearers is a big part of practice success. My patients who wear contact lenses typically generate more revenue for the practice, on a per-patient basis, than my glasses-only wearers. This is for a variety of reasons, including their tendency to return for more frequent regular exams and to make additional eyewear purchases. Prescribing the right contact lenses for individuals’ vision and lifestyle needs is an essential part of meeting both patient and practice goals, but so is recommending lens care that is efficacious, user-friendly, and promotes comfortable lens wear.

One recent morning, I saw two patients with different vision care histories, but the same enthusiasm for wearing contact lenses. The first patient was a graduate student in his early twenties, who, after a few years of wearing glasses, was excited about the lifestyle and appearance benefits of vision correction for the first time, but who had no appetite for wearing contact lenses. The second was a professional in her mid-thirties needing glasses, was excited about the lifestyle and appearance benefits of a monthly replacement lens, and for both patients, my lens care recommendation was simple: CLEAR CARE® PLUS.

I make CLEAR CARE® PLUS my first-line lens care recommendation for monthly and weekly replacement contact lens wearers because I want them all to enjoy an outstanding lens-wearing experience right from the start. CLEAR CARE® PLUS, which features Alcon’s unique HydraGlyde® Moisture Matrix, provides the excellent disinfection efficacy and exceptional comfort that patients need to get the most out of their lenses. This is combined with ease of use that truly simplifies the lens care routine. For patients, my message is simple: “CLEAR CARE® PLUS is easy to use,” and it keeps your lenses clean and feeling like new so you can enjoy them!

In addition to making CLEAR CARE® PLUS my first-line lens care recommendation for patients just starting out with contact lenses, I also encourage multi-purpose solution (MPS) users to switch to CLEAR CARE® PLUS. In short, I want to give all of my reusable contact lens wearers the chance to use CLEAR CARE® PLUS, not only because it helps them love their lenses, but also because I have seen how it improves my patients’ lens care compliance. This is a big deal for practitioners—less time talking about compliance means more time dedicated to meeting patients’ evolving vision care needs.

In a survey of habitual MPS users who tried CLEAR CARE® PLUS for 21 days, 9 out of 10 participants agreed that they were happy with their eye care practitioner for recommending CLEAR CARE® PLUS. Patient and practice outcomes go hand-in-hand, and my experience is that more happy contact lens wearers means more referrals, more visits for eye exams, and practice growth. Making CLEAR CARE® PLUS your first-line lens care recommendation is another opportunity to set your practice apart—and to help reusable lens wearers love their lenses!

References
Why in-person care and technology must partner

Case study highlights need for partnership between technology and live examination

A 74-year-old male was recently diagnosed with diabetes. He had been referred by his primary-care physician for ophthalmic evaluation.

Except for diabetes, the patient was not managed for other systemic diseases. His visual acuity was correctable to 20/20 in each eye. He was phakic and—with the exception of refractive correction—had no ocular history.

**OCTA results**

During pupillary dilation, the patient’s ocular coherence tomography angiography (OCTA) was obtained. The overview is shown in Figure 1. The angiograph is presented in Figure 2.

The first impression, given the diagnosis of systemic diabetes, was that these findings represented capillary deficiency. Some of the data arguing against this interpretation is that the apparent capillary deficit continues through the entire retinal thickness. Projection artifacts are generally associated with anomalous vessel imaging.

Shortly after the introduction of commercial OCTA, projection artifacts confused interpretation. Software evolution has minimized those to a great extent.1,2

In this case, a vitreous opacity was responsible for obscuring visualization that at first view, given the patient’s systemic diagnosis, appeared to represent capillary absence.

A vitreous float was observed and confirmed on stereoscopic fundus examination following pupillary dilation.

**Case points**

This case illustrates a number of points.

First is the importance of live examination of the patient. I have heard it said that some specialists perform fundus evaluation as a “courtesy” to the patient.

Next is not jumping to a conclusion based on data from an evolving technology. Not all instrumentation is infallible. In this case, the foveal avascular zone appears to be intact and of appropriate size.

Newer analytical software (AngioAnalytics, which was FDA-cleared in June 2018) play a quantitative role in this.3

Because the imaging study was completed before the patient’s pupillary dilation had taken effect, there was suspicion that superficial capillary dropout would be present.

This would potentially be consistent with the systemic diagnosis of diabetes. The initial observation heightened awareness for the possibility of more dire retinopathy being present.

With this in mind, the clinical evaluation initially focused specifically on that region of the macula.

However, before proceeding to the level of the retina, a large but asymptomatic vitreous float was seen.

By analyzing other frames of the angiograph, it became evident that the apparent capillary defect projected to other layers of the vasculature (see Figure 1).

Shadowing could also be seen on the cross-sectional presentation mirroring the float (see Figure 2). What was initially a red flag became a red herring.

**Future advancements**

Automated image analysis for diabetic retinopathy has recently been FDA cleared.4 In addition, automated analysis (artificial intelligence, deep machine learning) for age-related macular degeneration, glaucoma and cataract are on the horizon.5

**REFERENCES**


Dr. Semes is a founding member of the Optometric Glaucoma Society and a founding fellow of the Optometric Retina Society.
By Michael W. Ohlson, OD, FAAO

Today, comprehensive care in optometry requires observation of the entire patient. Historically, the term “general survey” or “general appearance” is a fundamental component of the physical examination in medicine. In addition, optometrists are familiar with the mandatory coding requirements of intermediate and comprehensive level ophthalmological exams, which include the poorly defined component, “general medical observation.”

Meaningful use requirements recently contributed to a general observation emphasis by adding height, weight, and body mass index to documentation.

Beyond Technology

Technological advancements (ocular coherence tomography [OCT], ultra-widefield imaging), scope of practice enhancements (oral pharmaceuticals, injections, lasers), and telemedicine have produced interesting times for ODs.

It is not difficult to envision opportunities to provide better care via technology. The ability to detect patterns or correlations in data (machine learning) will revolutionize many professions and specialties, possibly succeeding in improved diagnoses, predictive capabilities, and treatments.

However, we should consider the future of the physical components of comprehensive eye examinations, their emphases, and their possible de-emphases. It’s possible that decreasing the emphasis on complete physical examination will have associated negatives for patients.

The adage regarding nothing new existing under the sun applies here.

For example, cardiologist CK Phoon predicted a decreased role for physical examination for diagnosis over 17 years ago but reminded readers of the important positives of the physician-patient interaction, including:

- Careful listening
- Touch as part of the healing process
- Berger’s “hierarchy of clinical observations” (diagnosis, personal characteristics of appearance and behavior, interactions/functioning of the family, insight into physician’s own feelings and behaviors)
- Physician status
- Control of the relationship

I contend that general appearance, the inclusion of such observations, and the maintenance of the doctor-patient relationship are crucial to the proper and optimal care of optometry patients.

In addition, physical characteristics such as gender, race, and build obviously provide information related to probable or improbable visual and systemic diagnoses.

Body weight and diabetes

While the tall, slender build associated with Marfan’s syndrome is relatively rare in general practice, the problems of obesity and its associated disorders are common in the United States. The astute clinician, for instance, might note the general distribution of adipose tissue of obesity from the truncal distribution of fat seen in Cushing and metabolic syndrome.

As entry points into the medical system, optometrists could have a powerful effect on patients’ health via simple observation relating to prediabetes.

A recent survey of 140 primary-care providers (internal medicine, family medicine, internal medicine-pediatrics, nine nurse practitioners, and one physician assistant) found that only 6 percent correctly identified the 11 risk factors (Table 1) necessitating screening via the American Diabetes Association (ADA) guidelines. Plus, 30 percent of these providers were unfamiliar with the ADA guidelines.

Obesity and a large neck circumference are associated with obstructive sleep apnea—a condition with numerous ocular associations such as floppy eyelid syndrome, glaucoma, papilledema, nonarteritic anterior ischemic optic neuropathy, and retinal vein occlusion.

Furthermore, the OD might note obvious weight gain or weight loss in established patients, prompting concerns for endocrine disease, anorexia, or malignancy. Also, if a patient’s clothing does not correspond to the current temperature or weather, it may be an indication of poor circulation, thyroid disorders, or an altered mental state.

Physical movement

Another observation that the doctor should note would be the obvious deformities that relate to optimal care as well as assistive device usage such as canes and walkers. Common findings and their potential usefulness in geriatrics are summarized in Table 2.

Inspection of the patient rising from sitting and gait may provide evidence of orthostatic hypotension (OH), Parkinson disease (PD), mobility problems, visual difficulty, risk of falling, and other disorders.

OH—decreased blood pressure from gravity with change of position—by itself may not be linked to falls; however, OH in patients...
with uncontrolled hypertension or systolic OH after one minute from standing are at increased risk.8,9

Autonomic nervous system dysfunction, including OH, may also be associated with Sjögren syndrome, and falling risk can be exacerbated by vision loss.10,11

Patients with PD may exhibit motor symptoms:12

- Bradykinesia (slowness of movements with progressive amplitude or speed loss upon rapid alternating movements)
- Hypomimia (decreased blinking and facial expression)
- Hypophonia (softer voice)
- Rest tremor (when the body part is at rest and supported, the “pill rolling variant)
- Rigidity (increased muscle tone with passive movement)
- Postural or gait impairment (stooped, slow, short shuffling steps with decreased arm swing)

Nonmotor symptoms of PD include:12

- Apathy
- Anxiety
- Depression
- OH, excessive sweating
- Seborrhea
- Sialorrhea (drooling)
- Sleep disorders
- Hyposmia (decreased sense of smell)

These features may be noticeable years before the motor signs manifest, thus providing possible diagnostic value.12

Facial features

In addition to noting physical appearance, ankle...
Patient observation
Continued from page 11

other fundamental observation doctors should note is the presence or absence of eyewear, strabismus, and so on. Even simple observations should include height and arm length as they relate to the likely working distances in the presbyopic population—an important visual concern—as well as observations of the head, faces, ears, and neck.

Remarks about the eyes and face are second nature in optometry, revealing dermatological (rosacea) and autoimmune (lupus) disease, cranial nerve dysfunction (ptosis, asymmetry), skin cancers, edema (kidney failure, Cush- ing syndrome), and temporal wasting (giant cell arteritis).

Simple inspection of the nose and external ear is recommended for both dermatological and eyewear concerns. Keep in mind that an earlobe crease (Frank’s sign) may be related to coronary artery disease (Figure 1). Additional- ly, facial expression may quickly demonstrate a mask-like appearance from Parkinsonism, depression, agitation, pain, or anxiety; and Acanthosis nigricans (AN) on the neck has been associated with diabetes. In a population of pediatric patients, AN was associated with poorer outcomes in the treatment of obesity.

While often benign, AN has associations with:
- Obesity
- Hypothyroidism
- Acromegaly
- Polycystic ovary disease
- Type 1 diabetes
- Cushing and Addison diseases
- Pinealoma
- Pituitary basophilism
- Ovarian hyperthecosis
- Stromal luteoma
- Ovarian dermoid cysts
- Prader-Willi syndrome
- Leprechaunism
- Lipoatrophic diabetes
- Pineal hyperplasia syndrome
- Alstrom syndrome

Furthermore, methamphetamine use can cause significant dental problems and breath odor may indicate poor hygiene, ketoacidosis (fruity), infection, tobacco, or ethanol.

### TABLE 2 General Observation

<table>
<thead>
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<th>GENERAL HEALTH</th>
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<td>Appearance consistent with age</td>
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<td>Fit/healthy or frail/weak</td>
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<td>Weight gain or loss in established patients</td>
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<td>Awake and alert v. slow thought processes or speech</td>
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<td>Signs of pain, emotional distress</td>
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<td>Insights into patient’s medical and social situations</td>
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<td>Clothing, grooming, hygiene</td>
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<td>Jewelry, tattoos</td>
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<th>DISEASE SIGNS</th>
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<td>Abnormal fat distribution, muscle atrophy</td>
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<td>Hearing deficits</td>
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<td>Odor</td>
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<td>Edema</td>
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<th>MENTAL STATE</th>
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<td>Posture, facial expression</td>
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<th>ANCILLARY OBSERVATIONS</th>
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<td>Social support, interests, lifestyle</td>
<td></td>
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<tr>
<td>Interpersonal dynamics with present family/friends</td>
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**Figure 2.** Osteoarthritis with Heberden nodes on distal middle digit.

**Figure 3.** Patients with arthritis often have difficulty instilling drops for dry eye or glaucoma.
The patient’s voice may provide diagnostic clues for disease (hoarseness with hypothyroidism), mood, or relationships (both positive and negative) with those accompanying the patient to the examination.

**Hands**

Shaking hands can provide evidence of muscle weakness, frailty, joint tenderness, poor circulation, endocrine disease, or anxiety.

Some patients wear magnets or copper jewelry for presumed relief from osteoarthritis (OA) (Figures 2 and 3) or rheumatoid arthritis (RA) stiffness and pain; while not demonstrated as effective, observation may indicate a relevant problem.17,18

Ocular pseudoexfoliation syndrome, a systemic condition, may also be associated with OA of the knee as well as hypertension (HTN), coronary artery disease, cerebrovascular accident, sensoneurial hearing loss, and Alzheimer disease.19

Moreover, the impaired hand function (pain, inflammation, muscle weakness, deformities, and reduced grip force) caused by RA is a major cause of disability.20 In addition, noting the presence of hand deformities is clinically useful because onset occurs early in the disease process.21

Inspection of the hands may be crucial for the patient with dry eye or glaucoma because significant OA or RA may limit the ability to instill ophthalmic solutions, emulsions, suspensions, and gels.

A recent occupational therapy study found that 62 percent of RA patients had difficulty instilling eye drops; this population was 4.5 times more likely to have difficulty when compared to a population of ophthalmology clinic patients.22

**Pediatric patients**

Infants and children could have undiagnosed deformities, abnormal head size or shape, abnormal facies, poor nutritional status, and size or build inappropriate for age. Note that ODs are mandatory reporters of suspected abuse.

As with adult patients, the doctor may observe abnormal gait or tics.

While beyond the scope of this article, it’s not unusual for ODs to examine pediatric special populations such as cerebral palsy, Down syndrome, autism, attention deficit hyperactivity disorder, and developmental delay as well as those of all ages with acquired brain injury, psychiatric illness, and neurodegenerative disease.23 General observation of these patients may be beneficial in the multidisciplinary/team approach (Table 3).

**Gross observation**

Observing a patient’s shoes can provide evidence of altered mental status or mood; ankle edema could indicate kidney or...
cardiovascular disease.

A shoe altered to allow an open toe could indicate gout.

Ocular manifestations of gout may include deposits of uric acid crystals in the conjunctiva, cornea, iris, and sclera; and hyperemia of the conjunctiva and episclera. Relevant comorbidities of gout include dry eye disease (DED), uveitis, cataract, glaucoma, metabolic syndrome, chronic kidney disease, and congestive heart failure.

Shortness of breath or wheezing may be noted, heightening concerns for patients treated with beta blockers, which may indicate asthma, chronic obstructive pulmonary disease, cardiovascular disease, and obstructive sleep apnea. Ophthalmic timolol largely avoids the first-pass metabolism with about 80 percent of the medication systemically absorbed; this may result in symptomatic bradycardia, bronchospasm, heart conduction disorders, OH, syncope, and falls.

Likewise, physical appearance and behavior provide clues to the mental status of the patient. Relevant aspects to optometrists may include grooming, emotional status, body language, mood, feelings, consciousness level, memory, attention span, voice quality (rate, volume, tone, coherence), and comprehension.

While the relationship remains unclear and prospective studies are needed, there is an association between DED symptoms and depression.

A systematic review and meta-analysis found the overall prevalence of depression in eye disease patients to be 25 percent with the highest prevalence found in DED patients (29 percent). There is also a statistically significant association between DED and anxiety.

Affect, the optometrist’s observation of the patient’s emotional state, is important, and mood, the patient’s subjective report or perception of his internal emotional state over the last weeks, may be clinically useful for management.

These conditions are not rare; Lee et al utilized a single question (“Do you often feel sad or depressed?”) to screen geriatric eye patients for depression with 20 percent noted as positive. Recommending referral, further evaluation, and treatment could provide life-altering benefits to the patient and her loved ones.

When creating treatment plans, ODs should also observe and consider:
- Thought process (flow of thought)
- Thought content (obsessions, phobias)
- Insight (understanding of conditions)
- Judgment (the ability to identify consequences of actions)

REFERENCES


Dr. Ohlson received his doctorate from the University of Houston College of Optometry. He earned Diplomate status in the American Academy of Optometry Comprehensive Eye Care Section and the American Board of Certification in Medical Optometry. He is a Distinguished Practitioner and Fellow of the National Academies of Practice and was named Optometrist of the Year from the Iowa Optometric Association. Dr. Ohlson is a past president and life member of the Association of Regulatory Boards of Optometry. His volunteer efforts include InfantSEE, Lions Clubs International-Special Olympics Opening Eyes, and Volunteer Optometric Services to Humanity/International. For his contributions providing eye care to Head Start, he was presented the Iowa Governor’s Volunteer Award. When not seeing patients, he enjoys spending time with his spouse Joleen and daughter Samantha.
Daily disposable contact lenses roundup

See what options are available, including choices for toric and presbyopic patients

By Mile Brujic, OD, FAAO

Evolving technologies have offered patients opportunities to wear contact lenses more comfortably and conveniently than in previous years. This has been brought about through the evolution of daily disposable contact lens options. These have traditionally been available in a range of spherical options providing this demographic of patients opportunities to benefit from these technologies.

Daily disposables have continued to be utilized at increasing rates by practitioners for several reasons.

First, daily disposables provide a hygienic wearing experience for patients by placing a new lens on their eyes every day, avoiding the chance for microbes to adhere to the lens.

Next, because patients are wearing a new lens every day, deposition on the surface of the lenses that can accumulate and can cause irritation are minimized because of the daily replacement modality.

Finally, because there is no cleaning and disinfection required with daily disposable lenses, compliance with this modality of lens is likely the highest of any lens-wearing option.

Fortunately, the companies that have created these technologies have extended their lines into astigmatic and presbyopic correcting options for us to prescribe to our patients.

Here we will review the current options to optimize the wearing experience to our patients requiring toric or presbyopia correction.

Alcon

Alcon produces Dailies AquaComfort Plus Toric lens. It is made of nelfilcon A and is 69 percent water. It leverages a dual-thin design to stabilize the lens. Markings at the three and nine o’clock positions allow the clinician to determine if the fit is appropriately aligned.

The lens has an “OK” marking located 90 degrees from the toric lens markings (Figure 1). The back of the “K” is 90 degrees from the markings at three and nine o’clock. When the lens is viewed at the slit lamp, it will be located at the six or 12 o’clock position.

Alcon also produces daily disposable lenses in a multifocal modality. These lenses are available on the Dailies AquaComfort Plus platform and on the Dailies Total 1 platform. Dailies Total 1 is a silicone hydrogel lens made of delefilcon A, which is 33 percent water. Interestingly, this describes the core of the lens. The surface of the lens is a different in consistency than the core of the lens and is 80 percent water.

The design of the multifocal is the same in both Dailies AquaComfort Plus and Dailies Total 1 platforms. It is an aspheric design with near optics located at the center of the lens and progresses to distance optics away from the center of the lens. It is available in low, medium, and high add designs.

Bausch + Lomb

Bausch + Lomb produces Biotrue ONEday lens. This lens design features surface active technology. The lens is made of nesofilcon A and is 78 percent water. The lens retains 98 percent of the water throughout the day because of the interaction of the surface active technology which retains moisture within the lens. This technology is available in both toric and multifocal technologies.

Biotrue ONEday for Astigmatism’s design is balanced utilizing a peri-ballast. This will keep the powers stable on the eye. There is a small vertical laser edged mark located at the six o’clock position. Additionally, there is a second small line—an axis indicator—located along the superior portion of the lens (Figure 2). The second line is laser edged but is less noticeable than the line at the six o’clock position. It will be present at the axis of the lens, giving the practitioner an opportunity to confirm that the patient is wearing a lens with the correct axis.

The multifocal is a near center-distance periphery design. It is a three-zone progres-

TAKE-HOME MESSAGE

Daily disposable options are available for more than just spherical patients—toric and multifocal patients are able to wear these lenses, too. Know what choices are on the market to better advise patients and make product recommendations.

Figure 1. Toric markings are seen by arrows at 3 and 9 o’clock on Alcon’s Dailies AquaComfort Plus Toric. “OK” is seen at the 6 o’clock position.

Figure 2. Arrow highlighting the axis marker Bausch + Lomb’s Biotrue ONEday for Astigmatism.
The root cause of anterior blepharitis is the overproduction of oils. Surfactants in OCuSOFT® Lid Scrub® Eyelid Cleanser dissolve and remove oil, debris, and desquamated skin. When the most severe conditions occur, the combination of OCuSOFT® Lid Scrub® and OCuSOFT® HypoChlor® (0.02% Hypochlorous acid) is ideal.

To achieve optimum results, CLEAN all oil, debris, and other contaminants associated with eyelid irritations using OCuSOFT® Lid Scrub® Eyelid Cleanser and then SPRAY OCuSOFT® HypoChlor® for fast action against microorganisms.

**OCuSOFT® Clean ‘n Spray™**

For more information and to order, call (800) 233-5469 or visit www.ocusoft.com
Contact lenses

Daily disposables
Continued from page 16

tative design that provides visual consistency at near, intermediate, and distance. Biotrue ONEday for Presbyopia is available in both low and high add powers which provides appropriate transition from early to more advanced levels of presbyopia.

CooperVision
CooperVision produces clariti. It is a silicone hydrogel lens made of somofilcon A, which is 56 percent water. The Dk/t of the lens is 86.5 This material is used for clariti 1 day, clariti 1 day toric, and clariti 1 day multifocal.

The toric lens design is prism ballasted which stabilizes the lens. It has a laser edged mark located at the six o’clock position when the lens is appropriately aligned.6

The multifocal lens is available in both low and high add powers. The design is center near, which progresses to distance vision away from the center of the lens. It is critical to know the patient’s dominant eye when fitting this lens in order to optimize the fit. Per this lens design’s fitting guide, the initial powers selected for the patient are based on the patient’s distance refractive error. Myopes and emmetropes follow a slightly different strategy.7

Johnson & Johnson Vision
Johnson and Johnson Vision produces two daily disposable toric contact lenses. 1-Day Acuvue Moist for Astigmatism is a hydrogel lens composed of etafilcon A, which is 58 percent water. It is stabilized on the eye utilizing Blink Stabilized technology.8 Regions at superior and inferior portions of the lens center-distance periphery lens. The lens offers 183 optical designs based on varying pupil characteristics of patients with varying refractive errors—the company calls it pupil size-optimized design. It is available in low, mid, and high add designs.20

Visioneering Technologies
Visioneering Technologies produces NaturalVue Multifocal, made of etafilcon A which is 58 percent water. The lens design is based on extended depth of focus. It features a center-distance near- periphery with one universal extended depth of focus design add power.21

Wrapping up
With the number of daily disposable designs available for both toric and multifocal patients, it is incumbent upon ODs to offer these options. With the convenience and health options that daily disposables offer, ODs are able to provide patients with convenient options to correct their visual needs.

REFERENCES

Dr. Brujic is cofounder of Optometric Insights, a service providing career coaching to optometry students. He graduated from the New England College of Optometry in 2002. 

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By Jerry Robben, OD

As ODs understand more about dry eye disease (DED), we are finding out that it is more prevalent and complex than previously thought.

A German populations-based study found the incidence of dry eye disease to be over 50 percent, and U.S.-based studies show a notable increase among those aged 18 to 34 years. Younger people are affected as modern, computer-centric lifestyles exacerbate the condition and damage the meibomian glands, ocular surface and lacrimal function unit (LFU) as a whole.

In order to combat this increasingly prevalent condition, a more proactive approach is necessary. In my experience, ODs need to approach dry eye care as dentists approach oral hygiene. Dental care used to be reactionary rather than preventative. It wasn't until the 1950s and 1960s that researchers demonstrated that fluoride and preventative oral care could eliminate microbial pathogens, resulting in fewer edentulous people and millions less spent on dental care. As a result of this understanding, we no longer wait until we have a cavity to start brushing and flossing our teeth.

Eye care should be no different. In my experience, whether or not symptoms are present, proactive eye care can help keep the ocular surface healthy and prevent, or at least slow, future problems. For that reason, I initiate a basic dry eye regimen with every patient that I see—even for those whom I may not diagnose with dry eye disease.

Establishing good habits

In my office, every patient starts his exam with a Standardized Patient Evaluation of Eye Dryness (SPEED) questionnaire to assess his symptoms. If the SPEED is positive for symptoms, then further dry eye evaluation is performed and medical treatment is initiated. If the patient has no symptoms and no dry eye findings upon examination, he is still started on a preventative regimen.

In my practice, a basic eye care regimen includes HydroEye (ScienceBased Health), Eye-eco (Eye-eco) eyelid scrub, and Oasis Tears (Oasis Medical) lubrication drops. Thermal therapy with warm compresses using a heat mask (Bruder or Eye-eco Dry Eye Relief [DERM] is also recommended for eight to 10 minutes twice per day).

Just as the most diligent flosser may still develop cavities even with proactive dental hygiene, dry eye problems may still occur for those who are using preventative treatment. However, I have found that the inci-

Figures 1 and 2. OD (Figure 1) and OS (Figure 2) show baseline meibographies for a patient who presented with dry eye signs and symptoms. She was started on HydroEye Vitamins and other supportive treatments two years ago. These images show mild dilation and early truncation to the glands OU. Her baseline lipid layer thickness measurements were 47 nm OD and 60 nm OS.

TAKE-HOME MESSAGE
Dry eye disease is chronic and progressive and a shift to preventative care would greatly benefit patients. Both preventative care and therapeutic treatment should address the three primary aspects of DED: inflammation, breakdown of the ocular surface, and obstruction to the meibomian glands.
Thorough approach to pathology

Any patient with a SPEED score of 1 or higher is further evaluated for DED, with the results of the questionnaire guiding the diagnostic testing options.

For instance, if a patient responds positively to a question geared toward ocular allergies, we know to perform a test specific to allergies in addition to our standard dry eye testing battery.

Another area of the questionnaire steers us toward possible autoimmune problems and determines if the patient should be tested for Sjögren’s disease.

Our standard battery of diagnostics include:
- Evaluation of tear osmolarity
- Lipid layer thickness
- Blink pattern analysis
- Meibomian gland evaluation
- Meibography
- Ocular surface scatter
- MMP-9 inflammatory marker

The use of a meibomian gland evaluator helps to examine the glands and determine abnormalities in their function or full obstruction at the slit lamp. This evaluation is performed independent of the patient experiencing symptoms.

DED is multifactorial, it can have a variety of causes, and it is easy to get lost in the weeds when treating it. I focus on three specific goals to keep DED in check:
1. Treat the inflammation
2. Address the ocular surface breakdown
3. Address any obstruction to the Meibomian glands

**STEP**

**1. Treat the inflammation**

ODs have multiple means of treating inflammation in DED, and in my experience it is best to start with overall nutrition.

I recommend HydroEye to all patients, not just those who test positive for MMP-9. It is the basis upon which I build my DED treatment regimen. It has a combination of gamma-linolenic acid (GLA), omega-6 fatty acid to help combat dry eye, and omega-3s eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

The combination of GLA with EPA suppresses pro-inflammatory mediators as well as stimulates anti-inflammatory production.

In conjunction with HydroEye, I may prescribe an immunomodulator such as Restasis (cyclosporine, Allergan) or Xiidra (lifitigrast, Shire) depending on the individual patient. In my experience, Xiidra provides results quicker with an effective and direct proposed mechanism of action, but Restasis has a broader proposed mechanism of action that is appealing in the long term.

In either case, if a patient is seeking any ocular surgery in the short term or has significant inflammation and/or symptoms, I may prescribe Restasis or Xiidra plus a corticosteroid. These determinations are made on a case-by-case basis. If the patient’s medical insurance does not cover Xiidra or Restasis, I may opt for Klarity-C (cyclosporine, Imprivis). Remember that Cequa is newly approved from Sun Pharma and will soon be available for use in this class.

**STEP**

**2. Address ocular surface breakdown**

If the patient’s blink rate is not frequent or complete to maintain a smooth, continuous layer of tear film over the cornea, the ocular surface can be exposed to the point of increased evaporative stress and later breakdown and injury.

Providing something to protect and soothe the ocular surface until inflammation is reduced and the lacrimal functional unit (LFU) is working properly is important for patient comfort and preventing further corneal damage.

For a patient with DED, I will prescribe a different lubricant than what I recommend for preventative care. Options include Oasis Plus (Oasis Medical), Retaine MGD (OcuSoft), or a combination of the two. In more severe cases, I will add an ointment, such as Retain PM (OcuSoft).

For patients with a significantly damaged corneal surface, I recommend use of amniotic membrane application and autologous serum eye drops sooner rather than later. For amniotic membrane, I have found that cryopreserved Prokera (Bio-Tissue) is the best option for that patient’s surface. With proper patient education and observation, tolerance for this device is not a concern. I use Vital Tears (Vital Tears) autologous serum drops, which has made access to these drops for the patients much easier then in the past.

**STEP**

**3. Clear meibomian glands**

Meibomian glands play an essential role in keeping the tears stable and the ocular surface clean, healthy, and well-lubricated. ODs know that gland dysfunction causes dry eye for many patients. We also know that the glands can be affected and disrupted for many reasons.

No matter the cause of MGD, it decreases the quality and quantity of gland secretions, which can progress and become permanent. Other treatments cannot be effective in the long term if the meibomian glands are not appropriately treated.

Gland therapy in my office begins with clearing the glands of any obstructions and maintaining their proper function. I begin with LipiFlow (TearScience) thermal pulsation treatment. Some patients may have sig-
significant obstruction that may not respond to LipiFlow alone. For these patients, we perform distal meibomian gland probing just prior to LipiFlow treatment.

I supplement these therapies with heated meibomian expression with the iLux device (Tearfilm Innovations) every four to six months after LipiFlow. I also treat the biofilm by performing Blephex (Rysurg) on the lids to eliminate scurf and bacterial biofilm to improve the overall health of the lid margin and prolong the effects from the thermal pulsation. Blephex is preformed prior to LipiFlow and thereafter at four- to six-month intervals with iLux.

These treatments will likely need to be repeated at times throughout the course of the patient’s life. Some like Blephex and iLux will need to be performed more frequently than LipiFlow and gland probing.

The patient may also need to upgrade her home lid cleansing routine from the basic regimen. For this I take a case-by-case approach. I recommend Ocusoft Lid Scrub (OcuSOFT) if I see a staph-bleph presentation, Cliradex Eyelid Wipes (Bio-Tissue) if demodex is present, and Avenova (Novabay) if a patient demonstrates rosacea without demodex or if she is presurgical.

Additionally, nearly every patient may benefit from one of the newest treatment options in our dry eye arsenal, TrueTear (Allergan). I have been using it personally for about 18 months and with my patients. It is a great tool to help enhance a patient’s control of his dry eye disease.

TrueTear is an FDA-approved intranasal stimulator that utilizes neurostimulation to activate the LFU on demand. This activation naturally stimulates the lacrimal gland, goblet cells, and meibomian glands to produce their contribution to the tear film in unison instantly. This technology is being used as an adjunctive option to better help dry eye patients.

**Patient education**

For these treatments to be successful, the patient must be compliant. Education plays a significant role in this, and educating patients can be time consuming and complex.

To relieve the doctor of the education burden, staff helps the effort in my practice.

Receptionists, technicians, doctors, and counselors are fully educated on the disease, treatments, and practice philosophy toward providing patients with the best possible outcomes. All practice staff who come in contact with the patient will reinforce our treatment approach.

In addition, patients who score 1 or higher on the SPEED questionnaire, or who are undergoing dry eye treatment, meet with a dry eye counselor prior to seeing the doctor at each visit.

The counselor will review diagnostic results with the patient, explain anything he does not understand, review the treatment recommended by the doctor, and educate the patient in detail on dry eye disease. The patient will return to the counselor after seeing the doctor to reinforce treatment plans, answer follow-up questions, and schedule needed interventions.

The diagnostics we use play an important role in education because they identify the severity of the disease and track its progress or improvement in a way that is visible to the patient. Plus, counselors show patients interactive educational videos to explain DED and the importance of treatment compliance. Currently, we show educational videos from Rendsia on a tablet.

Dry eye is a serious condition and should be treated as one. Our proactive approach requires not only investment in advanced tools and equipment but also in staff training and patient education.

While such a protocol may be daunting to some doctors, I imagine that it also seemed daunting to teach the public to brush and floss daily, to visit the dentist twice yearly for exams and cleanings, or to add fluoride to public water systems a half century ago. But with a unified effort and persistence in knowing what was best, the dental community and its patients now enjoy more successful dental outcomes.

ODs need to have the same conviction and persistence with dry eye disease.

**REFERENCES**


Dr. Robben is adjunct clinical assistant professor at Arizona College of Optometry. He is a founding member of Dry Eye University and clinical director at Dry Eye Access Dr. Robben is a paid speaker for Allergan, Shire, and Johnson & Johnson Vision. He has received past honoraria from ScienceBased Health and Sun Pharma. Dr. Robben has two young boys and enjoys spending time with his family.

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Diagnostics & Imaging

**ODs guide to MRIs**

Continued from page 1

- Functional MRI (fMRI)
- Positron emission tomography (PET)
- Electroencephalography (EEG)
- Magnetoencephalography (MEG)
- Near infrared spectroscopy (NIRS)
- Magnetic resonance angiography (MRA)
- Digital subtraction angiography (DSA)

This article will focus specifically on MRI modality, review what it does, how it is applicable, and how to order this test.

**MRI**

The MRI is the study of choice for tumor, multiple sclerosis, and ischemic stroke.

With the addition of gadolinium, evaluation of tumors such as meningioma, inflammation, and infection can be visualized. This is due to providing valuable imaging of orbital soft tissues and the brain.

The MRI uses strong magnetic fields, magnetic field gradients, and radio waves to generate images of organs in the body. This is accomplished by atomic nuclei absorbing and emitting radio frequency when placed in an external magnetic field.

Most MRI machines use protons (hydrogen atoms), which are abundant in water and fat. Radio waves excite the nuclear spin energy transition, and the magnetic field gradients localize the signal in space. As the hydrogen atoms pulse and relax, contrasts are generated between the properties of different tissues.

MRI does not involve X-rays or the use of ionizing radiation, giving a better safety profile than CT or PET scan technology.

A contraindication of MRI is patients with magnetic metallic items from previous surgeries such as pacemakers, defibrillators, cochlear implants, and other medical devices.

If these are known or suspected, it is very important to consult with the radiologist and other health professionals to ensure patient safety.

**Viewing MRI images**

When viewing an MRI image, it is important to understand where in space the patient is in respect to the direction of magnetic field.

MRI consists of three common image scans; they are displayed as: sagittal, coronal, and axial (see Figure 1).

A sagittal scan (see Figure 2) is often easiest to interpret due to the clear anatomical picture of seeing the head from the nose to the back of the skull. Sagittal scans are side or profile views of the body or brain. The image looks as if the patient has been sliced vertically, from head to the back of the skull.

A coronal scan (see Figure 3) shows a head-on view of the body. The image shows the patient’s features vertically from the front as if the patient were standing facing the camera.

An axial scan (see Figure 4) is viewed as thin slices of the brain from the top down. A visualization of this is horizontal slices from the head to the toes.

**Weighted images**

MRI scans are further differentiated into different weighted images. The two most common sequences used for brain imaging are T-1 weighted and T-2 weighted sequences.

A T-1 weighted scan represents the time it takes tissue to recover from a radiofrequency pulse. In a T-1 image, fluid is extremely dark, water-based tissue is gray, and lipid-based tissues are bright.

These images are useful for brain parenchyma in which the brain appears medium gray, the cerebrospinal fluid (CSF) is dark gray, and water looks nearly black. Most tumors appear dark with low signal intensity. Sensitivity helps to view images, depending on scan protocol—tissue images as white (high signal intensity), as gray (intermediate intensity), and dark gray or black (low signal intensity).

A T-2 weighted scan represents the time the signal lasts after giving a radiofrequency pulse. This type of scan uses a gradient echo (GRE) sequence, which can help with suspected intracranial microhemorrhage.

These images provide contrast between...
Coaching for Dry Eye Success: SYSTANE® Complete

Dry eye is more important to your patients than you may realize. In my experience as a Dry Eye Coach, patients with dry eye are very concerned by the effect it has on their vision and ability to function, especially at work. My own history as a dry eye sufferer has helped me to understand its impact. I try to follow a healthy lifestyle that includes daily runs. On those days where I experience dry eye symptoms and don’t have my lubricant eye drops handy, my daily workouts are abbreviated or even cancelled because it’s too uncomfortable to pursue outdoor activities.

Although I’m familiar with the symptoms my dry eye patients may be experiencing, when patients come in for help, I still need to listen and uncover their needs—how long they have been suffering, the remedies they have tried and stopped using, what they would consider successful relief from dry eye all play a part in how I formulate a successful, individualized symptom management plan. I believe SYSTANE® Complete is an excellent option for managing dry eye symptoms in many cases.

SYSTANE® Complete is an important addition to the armamentarium for managing dry eye symptoms because it is formulated to provide relief for every major type of dry eye and supports all layers of the tear film. That is a significant attribute because the recent DEWS II Report described dry eye as a multifactorial condition that can be aqueous deficient or evaporative in nature, but more likely a combination of both. SYSTANE® Complete’s patented formulation is designed to supplement and stabilize the tear film. It accomplishes this through the use of advanced lipid nanotechnology that allows for the optimization of HP-guar concentration and improved cross-linking. This enhanced HP-guar meshwork results in better retention of the active lubricant on the ocular surface vs SYSTANE® Balance which locks in moisture for long-lasting relief.

Managing dry eye symptoms effectively is not just important to your patients, but also to your practice. Happy patients come back. Patients that don’t find dry eye relief will continue to seek out other eye care providers until they do. With SYSTANE® Complete, you can meet the needs of your patients and provide relief for every major type of dry eye and I can keep doing my morning runs.

Dr. Hauser was compensated by Alcon for her participation in this advertorial.

MRI
Continued from page 22

Ordering MRI
ODs need to answer three questions in ordering MRI for their patients.
1. How and what do you need to let the radiologist know?
2. Where do you send the patient?
3. What action do you take when you receive the results or interpretation?

One important point to note is that if you order the MRI, you are responsible for what it reveals. Ordering neuroimaging is not unlike ordering any other diagnostic testing for a patient in the office setting. The optometrist should clearly state the reason for the testing and document it well in the chart.

Most radiologists welcome suggestions and comments for the reason the MRI order. If pathology is suspected, optometrists with the suspicion of pathology and the ability to obtain testing should feel confident in doing so.

It is also important to understand the liability that comes with this privilege and the importance of following up and getting the patient the appropriate provider referral once the presumed diagnosis is made.

REFERENCES

Dr. Hill received his Doctor of Optometry degree from the University of Alabama at Birmingham School of Optometry. He pursued a residency in low vision and esotropia at the Birmingham VA Medical Center and Blind Rehabilitation Center. He enjoys being outdoors and loves to fish. He is a self-proclaimed college football junkie and loves to cheer on the Citadel Bulldogs and South Carolina Gamecocks.

hiljf@musc.edu.
2 SIMPLE STEPS TO FITTING MULTIFOCAL CONTACT LENSES THAT HELP PATIENTS SEE, LOOK AND FEEL THEIR BEST

Susan Resnick, OD, FAAO, FSLS
Farkas, Kasalow, Resnick & Associates
New York, NY

Dr. Resnick was compensated by Alcon for her participation in this advertorial.

Today’s presbyopes do not want to be slowed down by their vision.1 Multifocal contact lenses are a great option for many presbyopes, and yet the proportion of presbyopic patients wearing multifocal contact lenses remains surprisingly low.2 This suggests that many eye care professionals are missing out on a big opportunity. The good news is that with Alcon’s multifocal contact lenses, there are just two simple steps to successfully fitting multifocal contact lenses that can help them see, look and feel their best!3

With DAILIES TOTAL1® Multifocal, DAILIES® AquaComfort Plus® Multifocal, and the newest addition to the Alcon portfolio, AIR OPTIX® plus HydraGlyde® Multifocal contact lenses, I can offer my patients lenses with daily disposable and monthly replacement schedules that promote compliance and provide all-day comfort and seamless vision at all distances.4-8 All Alcon multifocal contact lenses feature Alcon’s unique Precision Profile® Design and are fit using the same simple 2-step process.9

STEP 1 of Alcon’s fitting process is selection of the initial lens. Initial lens power is determined using the vertex-corrected, most plus, spherical equivalent distance prescription, then adding +0.25D for each eye. After lens selection, I encourage my patients to spend 5–10 minutes walking around the office and outside while performing everyday activities (e.g., reading, using smartphone, viewing objects at distance) in order to experience real-world vision with the lenses.

STEP 2 is to perform a distance over-refraction for each eye separately, using hand-held lenses, with both eyes open. Plus power is added in 0.25D steps until the patient reports a decline in distance vision. If, for example, a plano and +0.25D have the same visual results, with no decline in distance vision, add another +0.25D. In the case that this over-refraction with +0.50D results in blurred distance vision, then use the +0.25D endpoint and keep the ADD the same. After verifying results binocularly and confirming that the patient’s distance and near vision are functional, the new lenses are dispensed, and the patient schedules a one-week follow-up visit to evaluate their response, address any vision concerns, and confirm or adjust the prescription.3

Studies demonstrate that this simple multifocal fitting process leads to high rates of fit success, with an 80% fit success rate with one lens per eye, and a 96% fit success rate with 2 lenses or less per eye, when the Alcon multifocal fitting guide is followed.10,11 Further, more than 9 out of 10 surveyed eye care professionals who fit patients with DAILIES TOTAL1 Multifocal contact lenses agreed that they are easy and efficient to fit.10 If I use the fitting guide for every patient I fit with Alcon multifocal contact lenses, including those switching from one Alcon multifocal lens material to another, with tremendous success.

Fitting presbyopic patients with contact lenses is a priority for me. A few minutes invested in discussing the benefits of contact lens wear with each patient is rewarded many times over in loyalty and referrals. Lifestyle prescribing, whether it be for full-time or part-time wear, offers patients the visual freedom and flexibility they desire. I consider all patients as presbyopes and give them a try. Once you have incorporated Alcon’s simple 2-step fitting process into your daily practice, you will be amazed by how efficiently you are providing your presbyopic patients with multifocal contact lenses that help them see, look and feel their best.

EXCEPTIONAL COMFORT FOR A BETTER CONTACT LENS–WEARING EXPERIENCE

With the Alcon 3.2.1 Multifocal Advantage, eye care professionals can offer three different materials and two convenient replacement schedules, all with the same industry-leading multifocal optical design12 to help address the varying needs of our presbyopic patients. Presbyopes are among the most challenging contact lens patients I encounter daily. In addition to their frustration with reduced accommodation, age-related ocular changes in this population often contribute to decreased lens wearing comfort. Given presbyopic patients’ needs for sustained near activities and their desire to maintain the comfort and vision of their youth, Alcon multifocal contact lenses are my lenses of choice. By fitting Alcon multifocal lenses, I can customize material and wear schedule for each patient, as well as deliver the quality of vision they have come to expect.

Important information for AIR OPTIX® plus HydraGlyde® Multifocal (lotrafilcon B) contact lenses:

- For daily wear or extended wear up to 6 nights for near/far-sightedness and/or presbyopia.
- Risk of serious eye problems (i.e., corneal ulcer) is greater for extended wear. In rare cases, loss of vision may result. Side effects like discomfort, redness or tearing may occur.

References
Virtual reality, tablet devices capture visual fields in unconventional ways

Continued from page 1

to use for screening outside of the clinic, and they can be used with a variety of input devices.

Head, hand, and eye tracking can be used as inputs, as can both traditional (Xbox, Bluetooth Android) and positionally tracked (Oculus Touch, HTC Vive, Google Daydream View) game controllers.

Because most headsets are worn by the patient, patients do not have to keep their heads stationary in a chin/forehead rest. Headsets are able to be used while sitting, standing, or lying down. Alternatively, headsets can be mounted on a stationary stand while using hand or eye tracking in place of a response button.

Why innovation is needed

The most common form of visual field testing in practice is static automated perimetry (SAP). It is used primarily as a functional assessment to assist in the diagnosis and management of diseases of the eye, optic nerve, and visual pathway.

SAP, however, is not typically used routinely. Here’s why:

- It is time consuming (it takes four to seven minutes per eye)
- Patients new to the device often fail even if they are healthy (many false positives)\textsuperscript{6-10}
- Prevalence of true positives is low (three to five percent of the general population has a visual field loss; that number climbs to 13 percent for patients over age 65)\textsuperscript{11}
- There is cost associated with performing the test, and there is no reimbursement in the absence of a corresponding diagnosis code

As a consequence, SAP is typically used to refine a screening analysis, to assess the presence of functional loss when it is suspected (for example, in the setting of high intraocular pressure [IOP] or suspicious appearance of the optic nerve/retinal nerve fiber layer) or to monitor the stability or progression of disease.

Unfortunately, the value of SAP is limited in many patients by their inability to give accurate test results.

With annual visual field testing in glaucoma, for example, it can take five years or more to detect even rapid visual field progression (2 decibels loss [dB]/year).\textsuperscript{12}

It is possible to improve the ability to reliably estimate progression rates within a shorter period if more visual fields are used.

However, despite the potential benefits of increased testing frequency, typical glaucoma patients receive only two to three visual fields in the first two years after diagnosis. In fact, some patients take in excess of 10 years to obtain the six visual fields recommended by some clinical guidelines.\textsuperscript{13-15}

It would therefore be useful to consider alternative ways to acquire visual field data.

Several head-mounted visual field devices available in various stages of development.\textsuperscript{16-20} The “imo” (CREWT Medical Systems) and Vivid Vision Perimetry (Vivid Vision Inc.) are expected to be on the market soon, and Virtual Field was launched in fall 2018.

“imo”

This head-mounted perimeter “imo” (Figure 1) consists of a main perimeter unit, a user control tablet, and a patient response button.\textsuperscript{20} A computer unit and a lithium-ion battery are built in the perimeter unit (W22 cm × D38 cm × H24 cm, 1.8 kg).

During testing, the examiner operates the

TAKE-HOME MESSAGE

Static (or standard) automated perimetry (SAP) is an essential element for clinical assessment and management of conditions of the eye and visual pathway. Despite its importance, SAP relies on stimuli and technology that were developed 70 years ago. Technology innovations have allowed for novel approaches to perimetry by using virtual reality and tablet devices, such as “imo,” Vivid Vision Perimetry, and Virtual Field.
**Visual fields**

Continued from page 25

control tablet connected to the perimeter unit by Wi-Fi. Patient responses are obtained using the response button connected by Bluetooth. A stationary stand is available if the patient prefers not to wear the device.

During the exam, a test target is displayed using two sets of full high-definition (HD) transmissive liquid crystal displays and high-intensity light emitting diode (LED) backlights separately for the right and left eyes.

The unit has built-in eye tracking and many adjustments, including for interpupillary distance.

Spherical lens correction between -9.00 D to +3.00 D can be accounted for with internal focusable lenses. Astigmatic correction requires an additional removable magnetic cylindrical lens system.

**Vivid Vision**

The Vivid Vision perimeter (VVP) is a software product that runs on consumer-grade VR headsets, such as Oculus Rift and mobile headsets that do not require a separate computer.

The value of SAP is limited in many patients by their inability to give accurate test results

Most VR headsets weigh about 500 g, which is too heavy for frail adults unless testing is performed supine.

VVP was originally developed from the Damato test in which patients are encouraged to move their heads and eyes during the test. The fixation marker changes location from trial to trial, and rather than monitoring eye position with a camera, the test exploits the fact that patients fixate accurately when performing high-precision tasks.

Patients respond to targets by moving their heads or a hand-held pointer in the direction of seen targets, which allows false positive responses to be properly classified on a trial-by-trial basis.

VR headsets used with the VVP typically have fixed focus optics—often set at about 2 m—but commercially available lens holders can be used when needed.

The perimeter has a programmable interface and several pre-programmed tests, one of which is similar to a traditional 24-2 test. Two other tests use dark-on-light targets with locations in a radial pattern, which are intended for vision screening, and measuring fields with known defects, respectively.

As with “imo,” stimuli for the left and right eyes are intermixed into a single test lasting six to eight minutes. Maximum luminance in Oculus Rift is 250 apostib (80 cd/m²), which is lower than traditional SAP tests can provide.

**Virtual Field**

Virtual Field, Inc. launched its VR platform at last month’s American Academy of Optometry meeting.

The system includes a VR headset, computer, and clicker. Available tests are traditional 24-2 and suprathreshold VF tests. The company plans to release as platform updates 10-2, 30-2, kinetc, and frequencing doubling tests.

According to the company, the device tests both eyes simultaneously without requiring an eye patch. It also features fixation and sleep monitoring to reduce invalid test results.

**The future of field testing**

Static automated visual field tests are time consuming and often disliked by patients. The devices require dedicated office space and technicians to administer and observe the test, and testing must occur one eye at a time.

Head-mounted VR displays make it possible to give visual field tests that are bilateral, mobile, inexpensive, and could be conducted more frequently and inexpensively—even at home.

**REFERENCES**


**Figure 2.**

Glaucomatous visual field measured with the Humphrey and Vivid Vision Perimetry in a patient with glaucoma. Images courtesy Vivid Vision, Inc.
New devices provide visual fields away from clinical settings and/or with indirect supervision of a trained clinician

3 strategies for social media success

Continued from page 1

won’t be engaged.
Here are three tips to follow for success before hitting that publish button.

1 Establish the ideal patient
If an OD is talking to everyone, he is speaking to no one. Make sure value is being provided to ideal patients in every post in an authentic manner. If patients don’t think you are speaking directly to them, they will tune out or—in social media terms—keep scrolling.

Here is an example of a generic post that speaks to everyone and engages no one:
“Make an appointment for an eye exam at XYZ Optical. We have many frame styles to match your lifestyle.”

Compare that to:
“Are you tired of not finding eyewear that fits right? Or frames that constantly slide down your nose? Call us today to make an appointment with one of our stylist opticians for a discovery style session to find the perfect eyewear for you!”

The first post is broad and speaks to no one specific, while the other post is written for a specific category of patients.

2 Create a CTA in every post
Posting just to post is a wasted effort. What should a potential patient do? Call to make an appointment? Click to book an appointment online? Go to your website? Let the patient know the next step.

I have seen and read great posts until the end and thought, “Well that was insightful, now what?” and I go on to the next post.

A call to action (CTA) is imperative to tell potential patients the next step to take.

For example: “Experts say that roughly 80 percent of what a child learns in school is processed visually. Good vision is vital to reach full academic potential. Has your child her eye exam this school year? Call us today to make an appointment: [insert your practice phone number].”

The CTA is, “Call us today to make an appointment.”

3 Check analytics for every post
If an OD has a business page or account on social media, he has the opportunity to go behind the scenes and identify how well his posts or videos performed.

This data is called insights or analytics. Know what works and what doesn’t. Do more of what works and stop doing what doesn’t. These tools are also great for finding ideal followers.

With such data, ODs can speak to the audience that is already engaging on their social media.

Value of social media
Experts have said that social media is here to stay. The numbers may fluctuate, with surveys showing that Facebook is losing traction, but other platforms like Instagram and Snapchat are rising to take its place in popularity.

Gary Vaynerchuk, CEO and founder of VaynerMedia, says: “Your phone is the new television. Social media is like channels on your TV. You may have favorite channels like CNN, PBS, ESPN, and you frequently go back and forth on these channels to satisfy your need for information or entertainment. Social media is the same thing.”

Some people prefer Facebook, and some people favor Instagram. Some go back and forth between the two. Some chime into Pinterest for inspiration once a month or when they buy a new home.

To be successful in social media, an OD needs to focus on which platforms his ideal patients are using so he can post and reach them effectively.

An OD cannot be all things to all people. And although he should have a presence across all social media platforms, the OD should concentrate on only one or two. Preferably the platform the ideal patient frequents.

Engagement
Another way to know if social media is effective is by asking new patients how they knew about a specific OD or practice.

Many patients have said they found out about our practice through a tweet of a family member or a “check in” on Facebook from a friend.

Remember, engagement is key. This can include posting on social media and people commenting, liking, tagging friends, and sharing posts. No matter which form of social media the practices uses, make sure that every post invites engagement.

A common thread of success in social media is the engagement received with each post.

Facebook shows posts more frequently when people engage. Otherwise, it costs to boost posts for more people to see it.

ODs shouldn’t assume that just because they are posting article relevant to their industry, they are going to have success on social media. Without engagement, a post will be buried among all other unengaged posts.

Finding success
The best way to create success is by establishing an end goal. If the CTA is to book appointments, then track the clicks to make an appointment, clicks to the practice’s website, or calls to the office.

Likes and followers are excellent overall. Engagement, however, is more important. If an OD wants to grow a practice’s social media presence organically and not pay to boost posts or for ads, then he should monitor the engagement his posts create.

ODs need to allow their expertise to shine on social media to grow their practice. Example: If you are an expert in dry eye treatment, post about your expertise and how you can help with a CTA.

Additionally, remember to display the current logos of social media platforms on which you are active. These logos should also be incorporated in all literature, business cards, and signage around the office.

REFERENCES

Dr. Canto-Sims is CEO and founder of La Vida Eyewear, designed for Latinos by a Latina. She is a member of Transition Optical’s advisory board and Change Agent group.

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Optometry Times

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Ingryd Lorenzana, OD  
Neuro-optometrist and founder of Vision and Sensory Integration Institute, Schaumburg, IL

Convergence insufficiency, neuroplasticity, and hanging upside down over a cliff

How did your world change when you learned your convergence insufficiency could be treated? I felt cheated. I didn’t understand why I had to suffer for so long because I wasn’t diagnosed until I was in optometry school. My passion for vision therapy helped me get through optometry school, but once I was a doctor, I thought there has to be something more. That’s what led me to develop the program I now call CogniVision that focuses on training vision pathways in the brain instead of just training the eye and its muscles.

Why pediatrics? I connect with kids. I see myself as their vision advocate. When I diagnose vision problems in them, I’m the one who needs to make the case for them to their parents, to their teachers, and to their schools because they don’t know to speak up for themselves. They just think they’re in trouble. That’s what I lived, and that’s how I connect with them.

What keeps you in private practice instead of going into academia or industry? I was in academia my first eight years. I taught at Illinois College of Optometry in the pediatrics clinic and then a year at Southern College of Optometry. I wanted private practice because I had more control over what choices I made professionally, and I could build stronger relationships with my patients. You do build relationships in academia, but because of the students the continuity of care isn’t as consistent. You may get a patient today, but then my colleague may get him next month for a follow-up. That’s what keeps me in private practice: I want to build stronger ongoing relationships with my patients.

How can vision therapy be a holistic treatment to improve patient quality of life? I’ve learned it’s not about the eyes, it’s about the brain. The eyes are giving me signs of what’s going on in the brain. If a patient has an eye muscle imbalance, that tells me this is a brain that is not functioning at high performance. That ties into things psychologically; this might be a person who is under higher stress with less productivity. I read the eyes to let me know what’s going on in the brain.

What’s something your colleagues don’t know about you? I don’t tout my vision problems. I think it’s been more recently, and I’ve been struggling with if I should write a book to tell my story from a perspective of me as a patient. My colleagues are very respectful, and I don’t think they realize how hard I have had to work to get to where I am. If you’re someone who has it easier to absorb information visually, then you don’t experience the difficulty. Therefore, it’s harder for you to relate to others who do. I know a few of my colleagues are in this arena from their own vision problems, but more of them should be aware that these patients struggle.

What’s something your guilty pleasure food? Food. [Laughs] I love to travel because I love trying different foods. There is research that says chocolate gives you the oxytocin endorphin, which induces more neuroplasticity, so I do love chocolate. [Laughs]

What is the craziest thing you ever did? Hanging upside down over a cliff in a vortex in Sedona, AZ. [Laughs] There are areas where supposedly the magnetic fields are higher, and you can see it because the trees grow in a spiral formation. I went hiking, and in one of those areas I hung upside down over the cliff. I have always loved hanging upside down and watching the sky and my relationship of me on earth as the sky moves. Because this was a special place and that’s what I like to do, I thought, “Let me do the two hand-in-hand.” [Laughs]

—Vernon Trollinger

To hear the full interview with Ingryd Lorenzana, listen online: optometrytimes.com/IngrydLorenzana

Photo courtesy Ingryd Lorenzana, OD
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