Optometry’s role in multiple sclerosis

Imaging aids diagnosis and treatment of optic neuritis, the presenting sign of MS

By Elizabeth A. Steele, OD, FAAO

Together with optometry’s expertise in examining the physical appearance of the prelaminar optic nerve, the technology at our fingertips—namely spectral domain optical coherence tomography (OCT)—positions ODs to play a pivotal role in the care of patients with multiple sclerosis (MS).

It is well known based on autopsy studies and clinical examinations that most patients with MS suffer from optic neuritis at some point in their disease course.¹ This sign of a neurologic condition can lead to a systemic diagnosis from imaging aids.

See Multiple sclerosis on page 26

Presbyopic patients are sometimes discouraged by the physical changes of age they are seemingly unable to influence. Instead of adding one more to the list, try opening a door for them. Make a suggestion to try contact lenses and envision how it might give them a spark or make their day. Even if your offer is declined, it’s a point of encouragement to know the possibility exists.

These five tips will help to encourage presbyopic lens wear.

See Presbyopic lens wear on page 17
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**Coronavirus disease 2019 on everyone’s mind**
*By Mike Hennessy, Sr.*

As this issue of OPTOMETRY TIMES® goes to press, Coronavirus disease 2019 (COVID-19) is all over network news, the internet, and people’s minds. More than 1,000 cases have been reported in the United States, schools and universities are closing for deep cleaning, and trade shows have been cancelled. The industry’s upcoming Vision Expo East meeting has been folded into Vision Expo West in September.

We will hear more, and it likely will get worse before it gets better. But get better it will.

Editor Emeritus Ernie Bowling, OD, FAAO, wrote an article on COVID-19 to help ODs better grasp what is happening and how they may help pinpoint patients at risk through clinical signs (“Coronavirus: A quick summary for optometrists”). Take a look here: https://buff.ly/38zaIEX.

Another hot topic is dry eye. Many practitioners aren’t sure where to start, and they ask experts how the condition is managed in their own practices. Good news: Tracy Swartz, OD, MS, FAAO, outlines how ODs can create an ocular surface disease protocol. She explains three published protocols offering different steps to manage patients.

A potential cause of dry eye is lagophthalmos. Amy Nau, OD, FAAO, offers suggestions for treating patients by improving nighttime lid seal.

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Identifying patients with early AMD is necessary to avoid suboptimal surgical outcomes.
New guidelines out for diabetes patient care

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 diabetes guideline is well over 100 pages long, but I would urge you to read it. Upon reading, I was surprised by how much useful contemporary information I had not ingested recently, and I am going to be on the lookout for more as advancements in diabetes continue.

That brings me to another point: these guidelines are updated periodically. So, in a way, they are never really complete.

I am not aware of a harder working group of ODs out there, and, by being a part of this committee, I am grateful to be inspired by such bright minds.

Plus, I’m incredibly fortunate to be able to call these people my friends.

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See Dr. Amy Neau’s look at nocturnal lagophthalmos on page 26.
There is one definitive quality of patients’ eyes that transcends all facets of optometric care. In fact, you can be a pediatric optometric physician, a cataract and refractive surgery specialist, a contact lens guru, or even an OD in the Veterans Affairs (VA) system who fancies himself a retinal maven: at the end of the exam our goal is a unified 20/20 vision or best corrected.

And with this being 2020, we have had a lot of time to realize that unless the tear film is stable, nothing we do to the visual system will matter.

In this year of 2,020 AD ODs should collectively take control of the marketing bonanza that befalls us and give it back to our patients. Keep reading, you will smell what I am stepping in.

**Visual integrity**

The technological advances that have afforded us the ability to read this article on a device, and forward it to 10 friends, is also responsible for inducing less than favorable changes to our tear film. It is an undeniable fact that when individuals view a screen, they don’t blink at the same frequency they normally would. Furthermore, ODs know that meibomian glands are not secreting when they normally would. Furthermore, ODs know that meibomian glands are not secreting when they normally would.

Inflammation, in turn, induces more glandular obstruction and osmolarity changes and churns the viscous cycle of dry eye disease.

I have said in the past that this 2020 reference to 20/20 vision is actually not great. I cared more for 2015—it was a good year and better vision.

Without getting too far into the weeds, I want to state that every interaction we have with our patients, unequivocally, should be focused on maintaining visual integrity.

However, ODs are not naive and know that while they can guide patients to the treatment, they cannot make patients actually fill a prescription for drops twice a day or use a heat mask for 10 minutes a day; this is where the marketing genius of 2020 comes in to help drive our point literally into their homes.

**Make it relatable**

In order to cultivate compliance, ODs must demonstrate the cause-and-effect relationship that treatment decisions have on their patients. The 2020 gadgets at ODs’ disposal affect quality of tears as well as other environmental changes—but that doesn’t fit my narrative, so remember all the risk factors, but stay with me on this 2020 theme.

Patients understand that ODs have evolved understandings of the visual system, diagnostic capabilities, and treatment options. I mean, it is 2020.

Every OD should be advocating for their patients’ vision and providing practical ways to improve the ocular surface to maintain 20/20. Patients may not be symptomatic, but they are sympathetic. Play to your patients’ fears. Not being able to work, play, watch, or use their monitors can be the kick in the butt patients need to pursue treatment.

I envision clinicians across the United States saying the same thing: “Who doesn’t want to watch every episode of ‘RuPaul’s Drag Race’ in one night? In order for you to be able to see all that great drama, we need to ensure you have a good quality of tears on your eyes surface. We don’t blink enough when we are watching the stylistic efforts of those contestants. So, this is what ‘we’ need to do in 2020 so that your vision isn’t 20/30 in 2030.”

Obviously, ODs will want to get a sense of what TV shows or movies patients actually like, otherwise, they will be forced to guess. However, if patients are younger, I suggest bringing up a YouTube show or something on Disney+; but the gist is the same. And yes, this talk should start young.

Let us all make lemonade with the 2,020 lemon. We optometrists don’t have a lot of time, so start now—and don’t forget to forward this article to 20 friends.
Glaucoma

Unconventional clinical options for lowering IOP

Reach past conventional therapies and give alternatives a try

By Benjamin P. Casella, OD, FAAO

As stated in a previous editorial, I plan to delve a little deeper into what we know about the family of glaucomas besides the gross oversimplification of “lower intraocular pressure means less progression.”

While that equation has certainly been proven true by a host of landmark longitudinal studies, let’s turn our attention briefly toward a couple of concepts other than our conventional intraocular pressure (IOP)-lowering medications and procedures about which we hear.

Among a commonly overlooked slew of potentially IOP-lowering molecules to which our patients are exposed are those found in products which fall under the category of complementary and alternative medicine.

We have all seen the labels which explicitly point out that the Food & Drug Administration (FDA) has not evaluated claims made by the makers of many of these products, but that doesn’t mean we should look past this slew of products.

One reason such products deserve our attention is the fact that patients are widely exposed to them through advertising. Further, it is wrong to assume that complementary and alternative medicine is available only to affluent people who can afford to shop at boutique health food stores.

Patients from all socioeconomic backgrounds make use of such therapies. In my practice, the majority of users are patients who receive some level of government assistance from the state of Georgia. It is not uncommon for me to hear from a patient of a homeopathic remedy or alternative medicine being employed to combat a certain illness or condition.

While some of my patients come in taking something as simple as a tablespoon of apple cider vinegar, occasionally someone will present taking a variety of supplements.

Pile of supplements

Recently, a patient presented for an additional opinion regarding the state of her eyes and her vision. The 78-year-old Caucasian female was recently told that she had an “issue” with high IOP but that nothing needed to be done. She conducted independent research on eye health and supplementation and began taking several over-the-counter supplements daily (see Figure 1).

This is a veritable medicine cabinet for concern over high IOP. I told her we should complete the examination, see what we find, and then discuss supplements. Entering distance visual acuities through her habitual spectacles was 20/30 OD and 20/30^2 OS. Near corrected visual acuities tested OU were 20/20. Her medical history was remarkable for systemic hypertension, which was reportedly well-controlled with an angiotensin converting enzyme (ACE) inhibitor.

She had a family history of cataracts and no known family history of other eye diseases or conditions. She reported conventional cataract extraction several years prior with no complications. She had no history of smoking. Pupil function was normal for each eye, and extraocular muscle function was unremarkable.

Confrontational visual field testing showed a frankly full visual field for each eye, and the patient’s tonic binocular posture was essentially orthophoric. Best corrected visual acuities were 20/25 for each eye with a low hyperopic correction.

IOPs were 19 mm Hg OD and 23 mm Hg OS as measured by Goldmann applanation tonometry at 1:30 p.m. Anterior segment examination was unremarkable OU except for mild meibomian gland inspissation. Dilated fundus examination showed healthy optic nerve heads with moderate peripapillary atrophy consistent with myopia prior to cataract extraction. The patient exhibited scattered hard drusen in each macula. There was no corresponding atrophy, subretinal fluid, or pigmentary migration associated. The remainder of her retinal grounds were unremarkable, and her retinal and choroidal vasculature appeared to be functioning adequately. Posterior chamber intraocular lenses were also clear and well-centered in each eye.

I questioned the patient for symptoms indicative of dry eye, and she said that her eyes watered a bit from time to time. I explained to her the fact that her meibomian gland dysfunction may be to blame and recommended warm compresses with digital massage daily. She stated that her artifi-

TAKE-HOME MESSAGE

As medical and surgical methods for glaucoma treatment continue to expand, non-traditional and holistic therapies are worth being familiar with as they affect patients from all walks of life. Not all therapeutic modalities are created equal, and it is important to understand the science and efficacy of each.
cial tears worked well to alleviate her symptoms but agreed to commence with my recommendation. Though the scattered drusen in each macula was a new discovery for the patient, she recalled another doctor recommending an Age-Related Eye Disease Study (AREDS) 2 (Bausch Health) supplement.

Based on her clinical appearance, I diagnosed her with mild-to-moderate non-exudative age-related macular degeneration (AMD) and explained that there was good evidence to suggest that taking an AREDS supplement would reduce the chances of her progressing to advanced AMD.\(^1\)

As far as the other supplements were concerned, I told her that there was good deal of overlap and that I couldn’t tie any of them specifically to glaucoma—except for one: Mirtogenol (Horphag/Indena).

Mirtogenol is an oral supplement containing French maritime pine bark extract and bilberry extract. It has been shown to have a significant IOP-lowering effect when taken in isolation or in combination with latanoprost.\(^2\) The combination with latanoprost reduces IOP more so than either substance alone. As well, Mirtogenol has been shown to improve ocular blood flow.\(^3\)

Impairment of ocular blood flow may have a role in the pathogenesis of glaucoma.\(^4\) I explained the relationship of Mirtogenol to IOP and ocular blood flow in light of glaucoma and told her it would be interesting to know what her IOPs were prior to starting this particular supplement.

At the time this article went to press, I did not yet have those values. I was unable to find a strong and direct link between glaucoma and any of her additional supplements.

I advised that I would be obtaining optic nerve head photos and inviting her back in a week or two in the morning time for baseline glaucoma testing, but that I was not yet convinced that she needed anything for her IOP. Baseline IOPs from previous medical records will be helpful, but it’s possible that she may be getting a little ahead of herself.

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65% of Americans experience symptoms of digital device overuse on a daily basis

10% report their symptoms to their Optometrist

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A 72-year-old male with Type 2 diabetes came to my office for a dilated retinal examination. He reported that his diabetes arose 10 years ago and that his HbA1c was “good,” but he felt unusually tired the last several months and was having trouble catching his breath. His previous eye exam from one year earlier, showed no diabetic retinopathy and mild nuclear sclerosis in each eye with best-corrected visual acuities of 20/20.

His current medications included losartan, fenofibrate, and metformin, and he noted an internal medicine doctor’s diagnosis of diabetic peripheral neuropathy but no evidence of kidney dysfunction.

Clinical data
Corrected visual acuities were again better than 20/20 with minimal refractive change. Both lenses showed early nuclear sclerosis, and the irides were normal. Intraocular pressure measured 19 mm Hg OD, 18 mm Hg OS by applanation.

Dilated fundus exam showed dot and blot hemorrhages in the posterior pole, which appeared more numerous in the mid-peripheral retina with binocular indirect exam. I did not detect retinal thickening with a fundus lens.

Montage ultrawide-field retinal imaging confirmed predominantly peripheral retinopathy, right eye more than left (Figure 1). Closer inspection of the images showed a few intra-retinal hemorrhages with a white center. Spectral domain optical coherence tomography (SD-OCT) was performed to rule out subclinical macular edema and was normal and unchanged compared to SD-OCT captured a year earlier.

I performed in-office glycosylated hemoglobin (HbA1c, A1cNOW, PTS Diagnostics) which gave the following error reading: “The blood sample may have too little hemoglobin (Hb) for the test to work properly.” A spot glucose reading was performed and measured 161 mg/dl.

Given fundus appearance and clinical history, moderate, non-proliferative, diabetic retinopathy and predominantly peripheral, diabetic retinopathy lesions (PPL), both risk factors for sight-threatening diabetic retinopathy (DR), seemed probable. The white-centered hemorrhages were less typical of diabetic retinopathy and careful review of previous fundus imaging showed no retinopathy.

Moreover, the HbA1c error message and self reported malaise/dypsnea made me suspect a hematologic disorder. I sent a report to the patient’s internist and asked him to return in eight weeks.

At that visit, the patient said he had been hospitalized twice for severe anemia, receiving multiple transfusions and referral to hematology. His vision and retinas remained unchanged.

He returned to my office the following week to tell me he had been diagnosed with aplastic anemia and was started on several new medications, including cyclosporine A and prednisone.

Unfortunately, the patient died three weeks later from acute intracranial hemorrhage.
Atypical retinopathy, aplastic anemia

This case represents atypical retinopathy, likely resulting from idiopathic aplastic anemia in a patient with concomitant diabetes but no previous evidence of diabetic retinopathy. Reduced Hb levels in this patient made accurate HbA1c analysis impossible, but the assay error message pointed to the underlying etiology of his symptoms and signs.

The white-centered hemorrhages are Roth spots, typically associated with bacterial endocarditis but seen in systemic conditions including anemia, leukemia, retinal phlebitis, Candida infection, collagen-vascular diseases, sepsis, and viral pneumonia. They are linked to human immunodeficiency virus (HIV) retinopathy, prolonged intubation during anesthesia, and diabetes/DR. One analysis showed that roughly 15 percent of patients with DR had at least one white-centered intra-retinal hemorrhage; the white center represents accumulation of fibrin-platelet emboli extruded through damaged retinal capillaries, but it has also been associated with focal ischemia akin to cotton-wool spot formation. Roth spot formation has been correlated with aplastic anemia.

Aplastic anemia refers to chronic, primary hematopoietic failure from injury leading to diminished or absent hematopoietic precursors in the bone marrow and attendant pancytopenia (pathologically diminished numbers of red and white blood cells, as well as platelets).

Symptoms include weakness and shortness of breath from hypoxia, infection, and poor healing. Incidence is very low (0.6 to six cases per million) and requires bone marrow biopsy for diagnosis.

Two-thirds of cases are idiopathic; the balance are attributed to hereditary (Fanconi) anemia, seronegative hepatitis, and other viral infections including HIV, Epstein-Barr and cytomegalovirus, toxins (e.g. benzene exposure), telomerase defects that prevent maturation of hematopoietic stem cells, and some drugs, including chloramphenicol, carbamazepine, felbamate, phenytoin, quinine, and phenylbutazone.

Common ocular findings include intra-retinal hemorrhage (24 percent) which increases with severity of the anemia (69 percent if Hb <80g/L and platelets <50x10^9/L).

Treatment consists of blood transfusion and immunosuppressive therapies including cyclosporine A and prednisone plus bone marrow transplant. Survival depends on age, disease severity, and response to initial therapy. Five-year survival is >75 percent for patients who undergo bone marrow transplant from a suitable donor. The majority of untreated patients die within one year from disease-related complications including bleeding, infection, or transformation to lymphoproliferative disorders including leukemia and lymphoma.

This case underscores the importance of considering alternate or coincident pathologies in patients with significant, new-onset, retinal findings, despite initial clinical impressions.

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Use dark adaptation to screen before multifocal IOL implantation

Identifying patients with early AMD is necessary to avoid suboptimal surgical outcomes

By Pamela Lowe, OD, FAAO, ABO, and Jeffry Gerson, OD, FAAO

The symptoms of age-related macular degeneration (AMD) and cataract are quite similar, with night vision difficulties being a common finding in both conditions. A standard comprehensive eye exam will usually determine which disease is driving the symptomatology in patients with intermediate to late-stage AMD.

However, it is easy to overlook early and subclinical AMD when looking only for drusen. This could put these patients who are considering a multifocal intraocular lens (IOL) at significant risk of less than optimal surgical outcomes.

Here, we discuss why patients who have early AMD may not be ideal candidates for a multifocal IOL and present a simple practice tool for identifying early disease so that patients and surgeons can make better informed choices preoperatively.

Multifocals compound risk in AMD patients

Multifocal lenses help patients see at different distances by splitting light into multiple foci. The tradeoff for visual improvement at both distance and near is an expected (but hopefully mild) reduction in contrast sensitivity. However, because macular degeneration and multifocal IOLs both reduce patients’ contrast sensitivity, one would face a compounded reduction in contrast sensitivity and perhaps decreased visual outcomes.

Almost 40 percent of seemingly healthy patients over the age of 60 had macular function disorders that could affect their candidacy for a multifocal IOL

Beyond contrast sensitivity, good macular function is required to achieve normal reading speed with multifocal IOLs, which again should urge us to look more carefully for any signs of AMD.

In short, implanting a multifocal IOL in a patient with AMD may be risky, and the outcomes may not be acceptable to patients who likely have very high expectations because they are paying out of pocket for a premium procedure and product.

At the very least, these patients deserve more in-depth counseling, and optometrists should carefully consider and emphasize the informed consent with patients.

Minimize risk by assessing macular function

Structural signs of macular degeneration, at any stage, can be difficult to view or detect, and through a cloudy cataract this task is likely to be even more difficult. However, the need to identify these patients using any means necessary cannot be overstated.

In a 2014 report, the American Society of Cataract and Refractive Surgeons (ASCRS) Cataract Clinical Committee noted that photostress testing is useful for assessing macular function in multifocal IOL candidates.

Since the publication of this report, the AdaptDx dark adaptometer (MacuLogix) has been commercialized, improving the objectivity of this type of testing and providing measurable data to further assist in patient selection. The test is easy for technicians to learn, no pupil dilation is needed, and test results are not impacted by the presence of cataracts. While continuously focusing on a fixation light, patients are exposed to a mild bleaching flash and then asked to indicate when a progressively dimmer stimulus light appears.

AdaptDx can detect subclinical AMD at least three years earlier than it is clinically evident. It works by measuring a patient’s rod intercept (RI) time—the number of minutes it takes for the eye to adapt from bright light to darkness. This RI number provides an objective measurement of retinal function with 90 percent sensitivity and specificity.

In essence, an RI of less than 6.5 minutes indicates a healthy dark adaptation function and no signs of AMD. However, an RI higher than 6.5 indicates impaired dark adaptation.

Helping patients

Shortly after the first AdaptDx was put in practice, Marta McKeague, MD, and Mark Pyfer, MD, conducted a study and presented the results at the XXXIV Congress of the European Society of Cataract and Refractive Surgeons. Asserting that screening is needed because multifocal IOLs may reduce contrast sensitivity and impair visual function in patients with subclinical macular disease, the researchers set out to determine whether dark adaptation could be used as a screening method in patients undergoing cataract surgery evaluation.

Their retrospective chart review was conducted in a comprehensive ophthalmology practice and identified 193 patients who underwent dark adaptation testing within a 13-month period. A total of 27 patients had both a normal fundus exam and normal corneal topography, making them candidates for multifocal IOLs.

Of these 27 eyes, 17 (63 percent) had normal dark adaptation and 10 (37 percent) had abnormal dark adaptation. In other words, if all 27 of these patients opted to undergo cataract surgery with a multifocal IOL, more than one-third of them would potentially experience problems that could not have been anticipated if dark adaptation had not been measured preoperatively.

These results are consistent with research in our own practices. For example, at Grin Eye Care in Kansas, we looked at a series of 100 consecutive patients over age 60 with no clinical findings of AMD based on dilated fundus exam and optical coherence tomography (OCT).

At the end of the study, 61 patients had normal dark adaptation, and 39 participants had impaired dark adaptation—meaning that almost 40 percent of seemingly healthy patients over age 60 had macular function disorders that could affect their candidacy for a multifocal IOL.

Loss of contrast sensitivity is present even in mild forms of AMD, making implantation of a multifocal IOL a relative contraindication—or at least a reason to proceed with caution. As these studies indicate, structural testing alone is not sufficient to screen patients for early AMD that may impact cataract outcomes. For this reason, macular function testing using the AdaptDx dark adaptometer can provide optometrists with essential information prior to referring patients for premium cataract surgery.

REFERENCES


TAKE-HOME MESSAGE

various factors, including a compounded reduction in contrast sensitivity and reduced reading speed, mean that multifocal IOLs are not ideal for patients with early or subclinical AMD. It is therefore imperative to identify such patients—using a simple practice tool—and enable them to make an informed choice preoperatively.

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MARCH 2020
OptometryTimes.com
During a pre-op exam, the retina may show no visible signs of drusen. However, invisible layers of cholesterol are forming along Bruch’s Membrane, blocking transport of vital nutrients and impairing dark adaptation function, which can significantly affect cataract surgery outcomes.

Images courtesy MacuLogix

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Update on iris melanoma
Case study shows multiple factors determine best course of treatment for this rare disease

By Barbara J. Fluder, OD

Although uveal melanomas are rare, they are the most common primary malignancy of the eye in adults. For most melanomas, approximately 90 percent arise from the choroid and ciliary body. Only about 10 percent arise from the iris (see Figure 1).

Treatment options depend on numerous factors, including the size and location of the tumor, the patient’s age and overall health, as well as his life expectancy. These tumors generally develop in older individuals.

Prognosis depends on the cell type of the tumor, size, location, the amount of ciliary body involvement, and evidence of extraculcular involvement.

Regarding cell type, tumors consisting of spindle-A cells have the best prognosis, and epithelioid cell tumors have the worst prognosis. There can also be a combination of the two: a “mixed-cell” type. Iris melanomas arise from melanocytes of the iris stroma. They tend to occur more frequently in light-skinned individuals with blue irides. About 80 percent of iris melanomas are located in the inferior quadrant of the iris.

Tumors can present as circumscribed or diffuse, lobular or flat, with variable pigmentation ranging from deeply pigmented to amelanotic.

Secondary findings may include ectropion iridis, secondary glaucoma, cataract, and prominent vasculature. Patients may be asymptomatic or present with large tumors causing vision loss, visual field defects, spontaneous hyphema, corneal edema, and band keratopathy due to corneal compression. Patients presenting with diffuse melanomas often have hyperchromtic heterochromia and secondary glaucoma, and these tumors are more likely to produce metastatic disease.

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<td>5 years</td>
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<td>Optical neuropathy</td>
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<td>3.6% (±2.4)</td>
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<td>2.8% (±1.64)</td>
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<td>Retinal detachment</td>
<td>1.7% (±1.15)</td>
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<td>5 years</td>
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<td>3% (±1.5)</td>
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<tr>
<td>Glaucoma</td>
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<td>5.7% (±2.11)</td>
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<td>10.6% (±3.14)</td>
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Barbara J. Fluder, OD, has been in practice for 26 years and currently practices at Georgia Florida Eye Centers in Valdosta, GA.

TAKE-HOME MESSAGE A number of known identifiers of poor prognosis for uveal melanoma are available that can determine patients at a high risk for developing metastasis and who may benefit from targeted treatment.

Case report
A 64-year-old Caucasian male presented to the local retinal specialist with a subconjunctival hemorrhage, hyphema, and vitreous hemorrhage in July 2018. The patient reported noticing decreased vision in his right eye after an episode of vomiting and coughing. He had also been experiencing ocular discomfort intermittently for several months.

The patient was already prescribed timolol (Timoptic, Bausch + Lomb) twice daily, Pred Forte (prednisolone acetate, Allergan) four times daily, and atropine once daily from an ophthalmologist for unknown reasons. The patient has a history of blood clots and was being treated for hypertension, diabetes mellitus, and cardiovascular disease, which required stent surgery placement.

Visual acuity was hand motion at one foot OD and 20/50 OS. Intraocular pressures (IOP) were 16 mm Hg OD and 9 mm Hg OS. A B-scan was performed to confirm the vitreous hemorrhage and to rule out retinal detachment and tumor. A spontaneous hyphema of unknown etiology was noted, and no notation of an iris melanoma was made. Cataracts were noted as well.

Follow-up
At a one-week follow-up visit with the retinal specialist, records show a resolving subconjunctival hemorrhage, hyphema, and vitreous hemorrhage. Pain was still noted and vision was hand motion at one foot OD, 20/50 OS. IOPs were 15 mm Hg and 16 mm Hg, respectively. A notation was again made that these findings seem to be of unknown etiology.

The patient was referred to the University of Illinois at Chicago, who saw the patient in mid April 2019, and confirmed the diagnosis of malignant melanoma of the iris with posterior extension of the lesion into the periphery on the inferior quadrant.

No evidence of extraculcular extension was noted. A systemic assessment was performed, and no metastatic disease was present.

Treatment strategy
Treatment options for this condition include brachytherapy, surgical resection, or enucleation surgery. This patient’s tumor has far too large a base to warrant surgical resection. The patient opted for iodine-125 brachytherapy.

In May 2019, treatment was initiated with a 16-mm plaque to a treatment depth of 5.5 mm. The patient was placed on Pred Forte, atropine, and oxofloxacin (Ocufllox, Allergan). There is no documentation on how long the plaque therapy lasted. The patient was seen for follow-up in June 2019 and reported moderate discomfort. Visual acuity was 4/200 OD. The tumor appeared stable and unchanged in size and appearance. The ocular irritation reported by the patient was due to the radioactive plaque placed over the corneal surface. Artificial tears were added to aid with discomfort, and postop drops were continued.

The patient was seen again in July 2019, and vision was 1/200 OD. The vision remained compromised due to cataract formation and a small degree of corneal edema. The tumor remained unchanged in size and appearance both anteriorly and posteriorly prior to brachytherapy treatment.

The patient will be seen again to reassess and discuss the possibility of cataract surgery.

According to the retinal specialist, the majority of primary uveal melanomas are treated with brachytherapy. If the cancer has spread from the lung or breast to the eye, it is generally treated with external beam radiation because these tumors are more radiosensitive. Brachytherapy demonstrates about an 80 to 90 percent success rate in terms of tumor containment.

iris melanoma was noted (Figure 2).

The lesion measured 12 mm across the base with a thickness of 5.5 mm. Tumor and iris vascularity were noted. A cataract was present as well. The fundus evaluation was limited due to poor pupillary dilation and cataract. A photo of the tumor was taken and shown to the patient along with an explanation of the severity of the condition.

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The patient will be seen again to reassess and discuss the possibility of cataract surgery.
Retrospective study
A retrospective study for patients treated between January 1990 and December 2000 by iodine-125 plaque brachytherapy for uveal melanoma anterior to the equator has been conducted. The tumors were 18 mm or less in diameter. Local or general anesthetic was used for plaque insertion. The diameter of the tumor was determined and was covered by the plaque, allowing for a circumferential safety margin of 2 mm. Plaque diameters used were 12, 14, 16, 18, and 20 mm. The application time was calculated to deliver a total dose of 90 Gray (Gy) to the tumor apex. The time varied in relation to the tumor thickness, plaque diameter, and iodine grain radioactivity.

Follow-up visits included at one month and every six months, including intermediary visits with the patient’s local ophthalmologist. These visits included visual acuity, systemic assessments for complications associated with irradiation, cataract evaluation, and checking for increased IOP, keratitis or dry eye, and intraocular inflammation. An internal evaluation was done to assess for maculopathy and optic neuropathy. The goal of the study was to evaluate the efficacy of the treatment of local and systemic tumor control, along with any associated complications with lesions anterior to the equator. The study included 136 patients (45 men, 91 women) with a median age of 65 and a mean age of 61, and a median follow-up of 62 months. A total of 67 of the tumors were in the right eye, 69 in the left. The median dose delivered to the tumor apex was 101 Gy, and the mean dose was 112 Gy. The mean length of the dose delivered was six days. The mean visual acuity at the time of diagnosis was 20/50.

At the end of follow-up care, 121 patients (89 percent) were alive, and 15 (11 percent) had died. Five patients died due to metastatic melanoma, a second cancer for one patient, intercurrent disease in four patients, and an unknown cause of death in five patients. The overall survival rate was 93.8 percent at two years and 88.3 percent at five years. The metastasis-free interval was 98.3 percent at two years and 96 percent at five years. Mean visual acuity at the last follow-up was 20/40. Ocular complications included cataract, glaucoma, keratitis, inflammation, retinal detachment, maculopathy and optic neuropathy (Table 1). Risk factors for overall survival were age >65 years and initial tumor size >4 mm. Ciliary body involvement did not appear to be a significant risk factor. Risk factors for cataract formation were patient’s age, gender, and tumor diameter. Risk factor for glaucoma was only gender, and factors for intraocular inflammation were tumor thickness and ciliary body involvement.

Collaborative Ocular Melanoma Study
In September 1985, funding was granted by the National Eye Institute to develop the Collaborative Ocular Melanoma Study (COMS). This was a multicenter investigation designed to evaluate therapeutic interventions for patients who have choroidal melanoma.

The COMS reported an overall 5-year survival rate of 82 percent with brachytherapy while showing no significant difference compared to patients treated with enucleation.

Indicators of prognosis
In addition to clinical features, histologic, cytogenetic, and gene expression markers can now help estimate the prognosis of uveal melanoma. This additional information can identify those patients at a high risk for developing metastasis and who may benefit from targeted treatment.

Tumor sample for testing is obtained from enucleation surgery or intraoperative fine-needle aspiration biopsy. Tumor features presenting with the following are indicative of a poor prognosis:
- Epithelioid cells, high mitotic activity
- High values of mean diameter of the 10 largest nucleoli (MLN)
- High microvascular density
- Extravascular matrix patterns
- Tumor-infiltrating lymphocytes
- Tumor-infiltrating macrophages
- High expression of insulin-like growth factor-1 receptor (IGF-1R)
- High expression of human leukocytic antigen Class 1 and 2

Genetic factors—including monosomy 3, 1p loss, 6q loss, and 8q gain—are also indicative of poor prognosis. Regarding cell type, a study of 2,652 enucleated eyes with uveal melanoma, the 15-year mortality for spindle-A tumor was 19 percent, spindle-B was 26 percent, mixed spindle B and epithelioid was 59 percent, and epithelioid was 72 percent. Spindle-cell melanomas have the best prognosis followed by mixed cells, and epithelioid have the worse prognosis.

See Iris melanoma on page 16
BPI® 550/570nm Cut-Off tint

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 cut-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 PC: OT 37889

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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 irreversible 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.

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 460™. 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.

Reduce photosensitive epilepsy seizures with BPI® Deep Blue Zoe™. 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).

Reduce eye strain, blepharospasms and migraines! BPI® FL-41™, a rust red/pink tint, has proven useful in reducing the incidence of blepharospasms and migraines.

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.
Every major lens manufacturer recommends BPI® tints!

“BPI® tints have been the world standard for 50 years”

188 colors in liquid tints and 16 colors in pill form available now!

BPI® tints have colored nearly 5 billion lenses in the last 50 years.

The unique chemical structure of our tints makes them more stable and reduces tinting time. The tint molecules bond to the lens and become part of the lens structure. The lens actually cures in the tinting process and has a more scratch resistant surface. Choose from more than 188 BPI® colors. BPI® Tints are available in 3 ounce (88 ml) plastic bottles and money saving six-packs. Each 3 ounce bottle makes one quart (946ml) of solution and tints hundreds of lenses. Some colors are available in quart (946 ml) bottles.

BPI PC: OT 1204

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- 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.
- Equivalent Melanopic Lux, a measure of the light intensity in wavelengths that promote alertness (melanopic range), which can cause sleep and health problems.

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Iris melanoma
Continued from page 13

Tumors with high cellular proliferation or mitosis have a poor prognosis compared to tumor cells with less mitotic activity. Large MLN is seen in tumors with epithelioid cells and is a poor prognosis indicator. Microvascular density (MVD) is a quantitative measurement of tumor vascularity and, along with a large MLN, can influence a poor prognosis. Microvascular patterns can be an indicator of prognosis as well. The presence of at least one closed vascular loop in a uveal melanoma is associated with the presence of epithelioid cells and is the most significant vascular pattern associated with mortality from malignant melanoma. Increased tumor-infiltrating lymphocytes and macrophages are also indicators of poor prognosis. These tumors also present with epithelioid cells and have an increased MVD. Increased lymphocytes in tumor cells result in increased production of inflammatory mediators, generating a tumor-promoting inflammatory microenvironment. M2 phenotype macrophages promote phagocytic activity, tissue remodeling, tumor progression, and angiogenesis. Increased IGF-1R levels in tumors significantly indicates a poor prognosis. IGF-1R is mainly produced in the liver, the most common site. IGF-1R blockade may be a treatment option for metastatic disease, and serum IGF-1R levels may be a biomarker for metastatic uveal melanoma. Regarding cytogenetic features, a complete loss of one copy of chromosome 3 (monosomy 3), seems to be the most common and most important factor. It is associated with other factors, including large tumor diameter, ciliary body tumor location, epithelioid cell type, high mitotic rate, vascular loops, and extracocular extension.

The tumor suppressor gene BRCA1-associated protein 1 has been mapped to chromosome 3p21.1 and has been associated with metastatic uveal melanoma. Early detection of uveal melanoma when the tumor is small and at the least risk of metastasis is the most effective treatment. In addition to clinical assessment, histologic, cytogenetic, and transcription markers are also available to estimate the prognosis of uveal melanoma.

WestGroupe to launch Life Italia Kids Eyewear Collection

WestGroupe will launch Life Italia Kids in Canada and the USA in early 2020. Created to meet the needs of parents and their little ones, the collection offers unsurpassed durability, a comfortable fit and adorable styles for kids aged three to 16 years old. Innovative Multi-Flex technology means these frames are constructed from medical rubber and can flex 270 and jump back to their original position. The result is safe, hypoallergenic, functional eyewear with less need for replacement of broken temples.

For younger children, styles NI-130 (41-15-115) and NI-132 (43-13-115) feature a medical rubber front creating a soft, comfortable feeling.

Style NI-124 (44-16-125) is a modified round with a semi-translucent front in a matte finish. The ribbed hinge stands out in a tonal hue to match the front and temples in color combinations of royal blue, pink violet, and navy aqua.

Style NI-133 is a modified rectangle available in pink lemon, rose fuchsia, and aqua blue. All four styles have a dropped bridge to ensure the proper fit for young children with underdeveloped nasal features.

REFERENCES

Dr. Fluder is a member of the American Optometric Association and the Indiana Optometric Association. She has no financial interest in any of the devices discussed.

eyedive3@gmail.com
5 tips to keep presbyopes in contact lenses

Continued from page 1

Myopic patients with contact lens wear.

1. Make it convenient
    Perhaps we shouldn’t stereotype or make generalizations, but entering your forties sometimes comes with a new-found perspective. I may be a long-time member of the penny pinchers club, but I find myself paying for convenience much more frequently than I did in my twenties.

    Well-meaning friends have said, “Which do you have more of: time or money?” and “You can make more money, but you can’t make more time.” Frequently, patients over 40 can finally afford conveniences that were previously sacrificed, and they now appreciate the time that affords.

    What’s the answer to the convenience question when it comes to contact lenses? Daily disposables, of course! I cannot think of even one over-40 contact lens patient in my practice who has not been fit into daily disposables.

    A great rule of thumb is to always assume your presbyopic patient wants the convenience of daily disposables until proven otherwise. Even if the patients insist on reusable lenses, send a strip of daily disposables home as a courtesy and to open their eyes to the convenience factor.

2. Make it comfortable
    Comfort is just another aspect of convenience. In my experience, the presbyopic patient places a higher value on comfort, perhaps because he has now experienced the moments of compromised comfort that the aging eye can bring.

    The first way to prioritize comfort is to be selective when choosing the contact lens material. Choose a highly wettable lens with a comfortable edge design and amble movement.

    The second key component of maximizing contact lens comfort is to adequately address the underlying ocular surface disease. Remember that a contact lens splits the tear film in half and will likely create increased evaporation. Therefore, even if a patient does not have dry eyes without contact lens wear, she may experience challenges as a wearer.

    It is always important to conduct a thorough ocular surface assessment or even dry eye evaluation before fitting a presbyopic patient in contact lenses. If signs are present in the absence of symptoms, it is often worthwhile to implement a proactive treatment to prevent discouragement and contact lens dropout.

    Something as simple as a pharmaceutical twice a day or something quicker such as in-office intense pulsed light (IPL) treatment or thermal meibomian gland expression can have a dramatic effect on patients’ contentment and longevity as contact lens wearers. Even if there is excellent underlying ocular stability, remind your presbyopic patient to limit wear time in order to maximize visual and physical comfort.

3. Make it valuable
    Presbyopes often treasure value more than price, so it is critical to create that sense of value.

    Especially after the children grow older, adults sometimes become more social and active. Perhaps this is also a factor of financial stability or life perspective. If I had to guess, at least 70 percent of my patient population is retired. However, just today in the exam room I heard patients talk about their afternoon plans of playing bridge, playing golf, bowling, going antiquing, attending church, having lunch outside on the water, and selling cannabidiol (CBD) oil. I kid you not!

    Seventy is the new 60, and 60 is the new 50. Because of that, there is a thirst for life that is sometimes unparallelled. The bottom line is that presbyopes value their quality of life, so be sure to celebrate those activities with them and ask if there are any they would enjoy more without their glasses.

4. Offer the freedom of functionality
    Often as a presbyope ages, her friends will undergo cataract surgery. Friends may brag about how they no longer need glasses and can see distance and near without help. Sadly, your patient was told her cataracts were not “ripe” enough for such surgery.

    This is the perfect opportunity to offer your patient a multifocal contact lens solution. Doing so will provide her with the flexibility to see distance and near and will give her a chance to experience multifocal optics before they become permanent.

    Fitting patients with multifocal contact lenses will bring value today but also for years to come. Young presbyopes still work, and seniors are more active than ever. Help them imagine being able to read price tags; see the sign at the end of the aisle; to see to drive but also be able to view their speedometer, phone, or watch without glasses. Remind your retired ladies that they can throw on any style of plano sunglasses they choose as contact lens wearers.

5. Provide reasonable expectations
    There may be a caveat to discuss with this age group. Often, younger patients are motivated by their appearance without glasses, which can be a more significant driving force leading to contact lens wear. Presbyopes can sometimes lack the determination to force contact lenses to work, perhaps because of their perspectives, or perhaps because the motivation to try contact lenses was not innate.

    This means they may be more impatient and quicker to give up if vision or comfort is compromised. It is important to set clear expectations of comfort level, vision quality, and an appropriate wear schedule. Although this is true with any contact lens patient, it is especially so for the presbyopic patient.

    I often tell patients wanting monovision that this modality is similar to wearing a tennis shoe and a high heel. Each eye is great at one thing but is not contributing to the work of the other. On the other hand, multifocal contact lenses offer blended vision in which the two eyes work together. Neither eye is perfect at distance or near, but together they often deliver better binocular vision than obtainable with monovision.

    Remind patients there will still be times when they have to wear readers, such as low-contrast reading environments. Despite those moments, wearing multifocal contact lenses will significantly increase their functionality without glasses at both distance and near.

Monovision is similar to wearing a tennis shoe and a high heel. Each eye is great at one thing but is not contributing to the work of the other.

Encourage patients

The bottom line: Don’t assume that your presbyopic patient is not interested, will not pay for daily disposables, or will not be able to adapt to multifocal lenses.

Encourage patients to live life to its fullest and let them see you as someone in their corner who is willing to help make that happen.

For your presbyopic patients who already wear contact lenses, consider proactive changes to the material, modality, and functionality of the lenses, as well as their ocular surface maintenance routine, in order to keep them in lenses for years to come.
PUT YOUR PATIENTS WITH DIABETIC RETINOPATHY (DR) ON THE PATH TOWARD MANAGING THEIR DISEASE AND SET THE COURSE FOR SUCCESS IN DR

Brought to you by REGENERON
DIABETIC RETINOPATHY: A GROWING PROBLEM THAT YOU CAN HELP MANAGE¹-⁴

Through early detection, monitoring, and timely referral, you play a pivotal role in managing your DR patients’ vision²-⁴

If you see or suspect DR:

Educate your patients about the severity of DR, especially when left untreated³,⁴
• Your early and frequent discussions about disease progression, treatment options, and referral will empower patients, which could help them avoid significant vision loss³,⁴

According to the AOA, you should refer patients with³:
• Severe nonproliferative DR (NPDR) within 2 to 4 weeks
• Proliferative DR (PDR) within 2 to 4 weeks
• High-risk PDR with or without macular edema within 24 to 48 hours

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

Monitor your patients with DR³,⁴

The AOA recommends frequent monitoring of patients³
• At least every 6 to 8 months in patients with moderate NPDR and more frequently for patients with greater disease severity³

Refer patients to a specialist who can treat DR³,⁴

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

AOA = American Optometric Association.

How to create an ocular surface disease treatment protocol

OSD treatments are rarely straightforward because of its complex, multifactorial nature

By Tracy Swartz, OD, MS, FAAO

You have seen the patient for her dry eye evaluation. You have biomicroscopy findings, ancillary testing, maybe an InflammaDry (Quidel) and osmolarity (TearLab Osmolarity Test) result to consider, in addition to her history. You may have imaging, a best-corrected visual acuity, and a questionnaire to help direct you.

But where do you go from there?

I am often asked for a treatment protocol. Because ocular surface disease is multifactorial, the treatment is rarely straightforward. Because ocular surface disease (OSD) can be challenging, several published protocols deserve attention. These include the Tear Film & Ocular Surface Society Dry Eye Workshop, second edition (DEWS II), the Cornea External Disease and Refractive Society (CEDARS) treatment algorithm, and the American Society of Cataract and Refractive Surgery (ASCRS) Preoperative treatment protocol.

DEWS II protocol

The DEWS II protocol is a staged management algorithm in which treatment options are listed in order of disease severity. The recommendations for treatment of tear insufficiency and lid disease may include over-the-counter (OTC) preparations, topical immunomodulators, oral medications, topical steroids, complementary medicines, dietary changes, contact lenses, and surgical options.

This protocol is based upon subtyping and determination of disease severity. Using appropriate tests, first determine if the patient suffers more from aqueous deficient or evaporative dry eye, then consider the severity of the disease. Treatment is performed to restore homeostasis of the ocular surface.

Mild disease is managed using patient education, environmental modification, omega-3 supplementation, lubricants, and lid treatments. Moderate disease steps up the lubricants to preservative-free preparations, gels and ointments; more targeted lid treatments such as tea tree oil; in-office treatments such as LipiFlow (Johnson & Johnson Vision) and intense pulsed light (IPL) therapy; punctal occlusion; and prescription medications (Restasis [cyclosporin, Allergan], Xiidra [lifitegrast, Novartis], Cequa [cyclosporin, SunPharma]).

More severe disease not resolving with these techniques may require autologous serum, oral secretagogues to increase lacrimation, and use of contact

TAKE-HOME MESSAGE

Developing an ocular surface disease treatment plan is an involved process because it entails the consideration of overlapping diagnoses, including dry eye disease, ocular allergy, and blepharitis/meibomian gland dysfunction. Three published, preoperative treatment protocols are described here that can help ODs develop rewarding treatment plans on a case-by-case basis, once disease severity and surgical outcomes have been assessed.
lenses. When these fail, the last level of treatment recommendations include chronic steroids, amniotic membranes, surgical occlusion, and other surgeries.

Surgical approaches for severe dry eye not responding to treatment include a temporary or permanent tarsorrhaphy; conjunctivochalasis repair; corneal treatment of epithelium basement membrane dystrophy (EBMD); Botox (onabotulinumtoxinA injection, Allergan) for blepharospasm; lid surgery for dermatochalasis; blepharoptosis; conjunctival surgery for pterygium or pingueculae; Stevens-Johnson syndrome and pemphigoid; amniotic membrane grafts; and salivary gland transplantation.

**CEDARS algorithm**

The CEDARS treatment algorithm is slightly different in that it considers the type of evaporative disease. It features more diagnostic categories—aqueous deficiency is one category, but evaporative is broken into goblet cell or mucin deficiency, blepharitis, and exposure-related dry eye.

Once you determine the category, then treatment is directed by severity level. (See Table 2 for more specifics.)

**ASCRS algorithm**

The ASCRS Preoperative OSD Algorithm recommends assessment of ocular surface disease prior to performing ocular surgery. It starts at a “preoperative visit” in which preliminary testing may reveal a compromised ocular surface which can negatively affect surgical outcome (Figure 1).

This algorithm is obviously directed toward surgical interventions such as cataract or vision correction surgery, but it may be applicable to contact lens fitters, helping clinicians know when to trust their refractions, and aid technical staff in understanding their roles in OSD diagnosis and management.

Surgical evaluation typically begins with testing: topography, biometry, aberrometry, and autorefration. If these tests suggest a compromised ocular surface, a questionnaire regarding OSD symptoms is given, and osmolarity and MMP-9 levels are measured by the technician. If these are significant for OSD, the patient “fails.” Further diagnostic testing may be performed prior to the doctor’s evaluation.

When the patient sees the doctor, the examination is performed with categoric placement in mind: OSD is present and should be addressed prior to surgery, or no OSD and the patient may proceed with surgery.

For those in the OSD category, neurotrophic disease with significant clinical signs is separated from the usually less severe neuropathic, “more symptoms than clinical signs” type.

Once grouped, visual significance of the disease is considered. Those with more clinical signs and vision loss require treatment prior to surgery; those with no visual loss and minimal clinical signs with some symptoms may proceed with surgery.

Treatment is directed by subtyping: lid abnormalities, corneal abnormalities (EBMD, Salzmann’s nodules, pterygium), and conjunctival problems (allergic conjunctivitis, chalasis, pingueculae).

### Table 2: CEDARS treatment options for dysfunctional tear syndrome

<table>
<thead>
<tr>
<th>Treatment option</th>
<th>Aqueous tear deficiency</th>
<th>Goblet cell deficiency/mucin deficiency</th>
<th>Exposure-related Dysfunction tear syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First line</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tear supplements and lubricants (i.e., drops, gels, ointments, sprays, and lubricating inserts)</td>
<td>Tear supplements and lubricants (i.e., drops, gels, ointments, sprays, and lubricating inserts)</td>
<td>Tear supplements and lubricants (i.e., drops, gels, ointments, sprays, and lubricating inserts)</td>
<td>Taping of the eyelid</td>
</tr>
<tr>
<td>Nutritional supplements</td>
<td>Lid hygiene and lid scrubs (i.e., cleansers, warm compresses, and massage)</td>
<td>Topical cyclosporine</td>
<td>Moisture chamber eyewear</td>
</tr>
<tr>
<td>Topical cyclosporine</td>
<td>Nutritional supplements</td>
<td>Topical lifitegrast</td>
<td>Moisture chamber eyewear</td>
</tr>
<tr>
<td>Topical lifitegrast</td>
<td>Topical cyclosporine</td>
<td>Vitamin A ointment –retinoic acid (compounded)</td>
<td></td>
</tr>
<tr>
<td>Topical steroids</td>
<td>Topical lifitegrast</td>
<td>Moisture chamber eyewear</td>
<td></td>
</tr>
<tr>
<td>Topical secretagogues</td>
<td>Topical erythromycin/ bacitracin</td>
<td>Topical secretagogues</td>
<td></td>
</tr>
<tr>
<td>Moisture chamber</td>
<td>Topical azithromycin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second line*</td>
<td>Oral secretagogues</td>
<td>Oral doxycycline/ tetracycline</td>
<td>Scleral lenses</td>
</tr>
<tr>
<td>Topical hormones (compounded)</td>
<td></td>
<td></td>
<td>Topical clindamycin (compounded)</td>
</tr>
<tr>
<td>Autologous serum (compounded)</td>
<td>Topical metronidazole ointment or drops (compounded)</td>
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<tr>
<td>Albumin (compounded)</td>
<td>Topical doxycycline (compounded)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bandage contact lenses/scleral lenses</td>
<td>Topical n-acetylcysteine (compounded)</td>
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<tr>
<td>Topical dapsone (compounded)</td>
<td>Topical dehydroepiandrosterone (compounded)</td>
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<tr>
<td>Topical tacrolimus (compounded)</td>
<td>Topical dapsone (compounded)</td>
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<tr>
<td>Topical <strong>N</strong>-acetylcycteine</td>
<td>Topical <strong>N</strong>-acetylcycteine</td>
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</tbody>
</table>

**Procedures**

- Punctal plugs
- In-office thermal pulsation and/or lid massage
- Eyelid surgery (i.e., correction of lid malposition and tarsorrhaphy)
- Cautery occlusion
- Debridement of the lid margin
- Amniotic membrane transplantation
- Intense pulsed light
- Meibomian gland probing

The order of treatment in each category is left to the clinical judgment of the clinician and to the preferences of the patient.
OSD protocol

Continued from page 21

Following my examination, I consider the patient’s symptoms relative to the clinical picture as well as disease severity. I develop a treatment plan that addresses her primary symptom because I think that the patient is more likely to return for follow-up as well remain compliant with the recommended treatment if the primary symptom improves.

For example, if the initial complaint is primarily pain, I include topical nonsteroidal anti-inflammatory drugs (NSAIDs) in my plan. If it is primarily itching, I include a topical anti-allergy. If it is primarily redness or generally inflammatory, I include a steroid.

I present treatment plans with trade medications. In the OSD “game,” I think trade medications are less problematic than generics. If the patient is unable to afford the trade medications, I will switch to generic with a comment that this medication may not work as well as the one I preferred.

I live in the Tennessee Valley where there are more plant species than anywhere else in the U.S. Patients here often experience allergies. More than once, I have had a patient insist the problem is allergies, essentially demanding an anti-allergy medication. In many of these cases, I knew from my exam the problem was not allergy because I found EBMD, severe keratitis, conjunctival chalasis, pingueculitis, or Salzmann’s degeneration, for example.

When a patient presents with a strong belief that his problems are due to allergies, I may venture away from these protocol recommendations. If the patient voices concern over my treatment plan and strongly thinks that a particular treatment is the best option, I may try “his” treatment. I have the patient back quickly, usually in two to three weeks, to how “his” treatment is going. If symptoms improve, the patient appreciates my willingness to listen. If it does not work, I gently reiterate that I was not sure it would work and I would like to try “my” treatment to see if I can improve symptoms more quickly. Typically, the patient is much more compliant with my treatment plan and will improve.

REFERENCES

Figure 1. The ASCRS algorithm recommends ocular surface disease assessment prior to surgery.

Dr. Swartz serves as president for the Optometric Council for Refractive Technology (OCR2T) and consults for industry. She specializes in anterior segment disorders and being a mom to her three children.

tracysswartz@hotmail.com
The year 2020 is an important milestone for eyecare practitioners.

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Better manage nocturnal lagophthalmos for dry eye patients

Evaluating lid seal performance key to effectively treat patients with dry eye

By Amy Nau, OD, FAAO

Nocturnal lagophthalmos (NL) describes incomplete eyelid closure during sleep. The problem associated with NL manifests similarly to those from inadequate blinking during the day or prolonged screen use: namely, symptoms of dryness and irritation due to enhanced tear film evaporation, with ensuing ocular surface inflammation.

NL should be proactively investigated and addressed as, from my experience, it can greatly exacerbate other forms of dry eye (such as aqueous-deficient, Bell’s palsy, medication-induced, etc.). It is difficult to successfully treat any dry eye condition if NL is not effectively managed.

Common triggers for NL include:
- Cosmetic surgical procedures
- Botox (onabotulinumtoxinA injection, Allergan)
- Graves’ disease
- Floppy eyelid syndrome associated with sleep apnea and keratoconus
- High axial myopia
- Lid deformities
- Age-related lid laxity
- Senile ectropion
- Dermatochalasis

Diagnosing NL

NL is easily recognized when a patient presents with significant lid deformities. However, more subtle forms (such as lid seal deficiency occurring in patients with normal lid configurations) are frequently overlooked.

In clinical practice, a common scenario involves a patient complaining of ocular discomfort with no obvious cause. Many situations in which discomfort worsens in the morning (upon waking) and resolves slowly throughout the day do not lead to objective clinical findings, making a satisfactory diagnosis elusive.

Standard methods of examination often indicate that lids appear capable of full closure, even though signs and symptom severity peaks in the morning. Even to discerning clinicians, this has been an enigma. It wasn’t until 2015 that researchers realized that, even though lids may appear to be closed, if they are not properly “sealed,” air will reach the ocular surface, resulting in evaporative stress and associated symptoms upon awakening.

A simple method for detecting NL is the Korb-Blackie light test. In a darkened room, instructing her to gently close her eyes as if sleeping. Application of a transilluminator placed at the upper tar-

The importance of maintaining periocular humidity

In 1996, research determined that sustained increases to periocular humidity helps restore tear film lipid layer thickness and alleviate symptoms of dryness. It was also established that increasing lipid layer thickness was beneficial, suggesting the use of devices that elevate and maintain periocular humidity.

Contemporary treatment strategies

Historically, poor awareness of the problem and lack of a diagnostic test prevented identification and treatment of this condition. Typical recommendations for morning dryness include drops used before bedtime, on the assumption that inadequate lubrication is the primary challenge. This erroneous assumption was perpetuated by NIH definitions of dry eye, which until recently focused on aqueous deficiencies as the major cause of dry eye. In my experience, ointments can be effective, but they can also irritate a patient’s eyes, blur vision in the morning, fail to protect the eye from desiccating stress, or be contraindicated by medications or comorbidities.

When ointments do not work, fabric sleep masks which can keep the eyes closed may be recommended. In some patients, these are effective. For others, these simple masks are inadequate. Other interventions, such as use of surgical tape or Breathe Right nasal strips can be used to secure the lids together. Saran Wrap or Cling Wrap combined with fabric sleep masks can also work, with the goal of creating a periorbital high humidity microenvironment.

Moisture-chamber goggles designed specifically for the management of dry eye symptoms, including eyelseals or Omnyx goggles (Eye Eco), are another option. Finding a solution that produces the desired effect of absence of symptoms upon arising is critical.

Case study

A healthy Caucasian female, age 53, was referred by her primary-care physician due to ongoing problems with dry eye. She had a history of dry eye with blepharospasm, for which she received punctal plugs in all four lids, Restasis (cyclosporin, Allergan) twice daily, and Botox injections, which helped with the blepharospasm but sometimes made her symptoms worse, especially in the morning. She tested negative for Sjögren’s syndrome.

The patient reported that she could no longer read due to dryness and that she used a screen for about four hours daily.

Her evaluation included the Standardized Patient Evaluation of Eye Dryness (SPEED) questionnaire, and her score of 26 out of a possible 28 confirmed significant discomfort. The patient had moderate meibomian gland dysfunction, with meibography showing approximately 20 percent atrophy of the upper and lower glands, and 50 percent anterior migration of the Line of Marx on the lower lid margins bilaterally.

A meibomian gland evaluator (TearScience) showed severe lower lid obstruction with three glands open on the right lid and two glands open on the left lid. The upper lid on the right eye had 13 glands open and the upper lid on the left eye had four glands open.

Fluorescein staining showed Grade 1 inferior superficial punctate keratitis (SPK) OD and Grade 2 inferior SPK OS. She exhibited conjunctival chalasis bilaterally. Her osmolality was 308 OD and 318 OS.

The Korb-Blackie light test was performed with a Finoff transilluminator against the upper eye lid immediately superior to the tarsal plate. The patient exhibited severely compromised lid seal bilaterally, which was worse on the left side. Neither eye fully closed with attempted forced closure.

A diagnosis of NL resulting in desiccating stress led to prescribing ointments before bedtime. The patient was also placed on therapy for meibomian...
Even though lids may appear to be closed, if they are not properly ‘sealed,’ air will reach the ocular surface, resulting in evaporative stress and associated symptoms upon awakening.

Gland dysfunction including compresses (Tranquileyes, Eye Eco), lid margin scrubs with hypochlorous acid, (Avenova) non-preserved lipid-based tears (Retaine MGD), blinking exercises, and Azasite (azithromycin, Akorn) drops for one week, along with reduced screen time and omega-3 supplement (PRN).

At the one-month follow-up visit, the patient reported symptom improvement and LipiFlow (Johnson & Johnson Vision) was performed. Gland function improved substantially at the three-month time point, with no corneal staining, normal osmolarity and a SPEED score of 12.

However, the patient still exhibited significant symptoms of dryness in the morning and continued to have cosmetic Botox. At this point, we added a moisture-preserving sleep mask (EyeSeals 4.0, Eye Ecol to her prescribed regimen. After sufficient protection was achieved, rapid improvement followed with her SPEED score decreasing to 7.

Conclusion
As eyecare practitioners better understand the nature and importance of NL, they must ensure lid seal is evaluated in all patients with dry eye. Reduction in symptoms necessitates complete enclosure of the periorbital area to promote a high-humidity microenvironment.

REFERENCES

Eylea shows positive Phase III results

TARRYTOWN, NY—Regeneron Pharmaceuticals, Inc. announced positive two-year results from the Phase 3 PANORAMA trial evaluating Eylea (aflibercept) Injection 2 mg. in patients with moderately severe to severe non-proliferative diabetic retinopathy (NPDR).

The two-year pre-specified exploratory data demonstrate that untreated moderately severe and severe NPDR can lead to vision-threatening events, which includes vision-threatening complications (VTs; proliferative diabetic retinopathy or anterior segment neovascularization) and center-involved diabetic macular edema (CI-DME).

According to the company, more than half (58 percent) of patients in the untreated sham arm developed a VTC or CI-DME within two years of entering the trial, while Eylea treatment was shown to reduce the likelihood of these vision-threatening events by at least 75 percent (nominal p < 0.0001).

The two-year results also showed a greater benefit for Eylea patients treated at regular intervals compared to patients who received Eylea treatment less frequently. Per the protocol, the group of trial patients who received Eylea every 8 weeks in the first year were switched to receive it when their doctor deemed they needed it (PRN) in the second year (8-week/PRN group).

The proportion of patients with a > 2-step improvement from baseline in Diabetic Retinopathy Severity Scale (DRSS) scores decreased in the second year (80 percent improvement at 52 weeks and 50 percent at 100 weeks). By comparison, in patients who continued to receive Eylea every 16 weeks (16-week group), the > 2-step DRSS scores remained consistent (65 percent at 52 weeks vs. 62 percent at 100 weeks).

During the trial, adverse events were consistent with the known profile of Eylea. Serious ocular adverse events in the study eye occurred in 2 percent and 0 percent of the Eylea 8-week/PRN and 16-week groups, respectively, and 2 percent of patients in the sham group. Ocular inflammation occurred in 2 percent and 1 percent of patients in the Eylea treatment groups, respectively, and 1 percent of patients in the sham group. Anti-platelet trialists’ collaboration (APTC)-defined arterial thromboembolic treatment emergent events occurred in 3 percent and 6 percent of patients in the treatment groups, respectively, and 5 percent of patients in the sham group.

IN BRIEF

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Optometry’s role in MS

Continued from page 1

the optometric exam chair and has been shown to aid in earlier diagnosis using OCT, in some cases without other physical evidence of optic neuritis. OCT and other examination tools can also be used throughout the careful management of this vision-threatening condition; as time and therapeutic interventions allow for regression of inflammation, the eyecare professional can watch for the return of visual function. And while neurologists are often well-read on the capabilities of OCT in MS management, they may not have the access or experience in image interpretation of ODs.

MS classification
MS is the most common disability in young adults, and its prevalence is increasing, particularly in some Asian countries. It is considered an autoimmune disease leading to central nervous system demyelination and subsequent symptoms of muscle weakness, fatigue, pain, and impaired coordination. The severity, duration and rate of progression for a given patient vary and depend on which of the four types of MS is present:

- Relapsing-remitting is the most common, occurring in 85 percent of MS patients.
- Secondary-progressive (which often progresses from relapsing-remitting) manifests with symptoms worsening over time, with or without relapses and remissions.
- Primary-progressive is uncommon, occurring in 10 percent of patients, and symptoms slowly worsen over time without relapse/remission.
- Progressive-relapsing is the most rare, occurring in only 5 percent of patients, and includes continuous progression with acute relapses and no remissions, often without recovery.

Treatment for MS patients (see Table 1) is aimed at decreasing/eliminating disease activity and delaying/preventing progression.

MS and CME
As it turns out, treatment option fingolimod (Gilenya, Novartis) is associated with cystoid macular edema (CME), and therefore patients prescribed this treatment are recommended to have baseline OCT and close follow-up. Fingolimod leads to CME in 0.5 percent of patients taking the lowest dose, with an incidence of up to 20 percent in those more susceptible to compromise in the blood–retina barrier, such as patients with a history of uveitis or diabetes. The condition can occur unilaterally, or bilaterally, and may be asymptomatic. An OCT and dilated fundus exam are recommended initially and again every four weeks for the first four months of treatment.

Diagnosis and early intervention
As optic neuritis is the presenting sign of MS in up to 30 percent of patients, the eye exam can lead to the initial systemic diagnosis. As such, this discussion of diagnosis and early intervention will focus on the findings by the eyecare provider. Earlier treatment of MS and subsequent optic neuritis may not only improve visual prognosis but also may be consistent with a higher quality of life and lower rates of systemic disability over time. The first year of systemic disease course has been found to be when most permanent damage occurs, highlighting the importance of an accurate diagnosis along with an appropriate and timely comanagement plan.

Optic neuritis is a general term describing inflammation of the optic nerve anywhere along its long path. The condition must be analyzed not just by its own characteristics gathered in the eye exam but also by accompanying systemic signs and symptoms. Most clinically isolated optic neuritis cases are eventually diagnosed with MS; however, other etiologies to initially consider must include diabetes. The condition can occur unilaterally, or bilaterally, and may be asymptomatic. An OCT and dilated fundus exam are recommended initially and again every four weeks for the first four months of treatment.

Take-home message
Optic neuritis is the presenting sign of MS in up to 30 percent of patients, so optometrists can play a vital role in initial diagnosis and effective treatment. High-resolution OCT aids both the diagnosis and management of optic neuritis. Although high-dose IV steroids are still the most widely accepted form of treatment for optic neuritis, numerous other avenues are showing promise.

Table 1: Treatment options for MS patients

<table>
<thead>
<tr>
<th>First line</th>
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<tbody>
<tr>
<td>Interferon beta – injection</td>
<td>Fingolimod – oral</td>
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<tr>
<td>Glatiramer acetate – injection</td>
<td>Natalizumab – injection</td>
</tr>
<tr>
<td>Teriflunomide – oral</td>
<td>Mitoxantrone – injection</td>
</tr>
<tr>
<td>Dimethyl fumarate – oral</td>
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</table>

Figures 1 and 2. A 34-year-old, otherwise healthy, female patient presenting with “severe decline in vision in the right eye” that began 1 week ago. Sectoral pallor of the discs likely indicate old episodes of optic neuritis, while the severely reduced acuity, afferent pupillary defect (APD), red cap desaturation, and reduced visual field in the right eye are consistent with a subsequent acute optic neuritis OD. No edema is noted for either optic nerve; however, visual and pupil function are consistent with retrobulbar optic neuritis OD. This patient was referred for MRI with FLAIR, which confirmed the diagnosis of MS. She was comanaged with her neurologist who treated the optic neuritis with IV steroids. One month later, VA was 20/30, VF was mostly clear, and the APD was resolved. VA 20/400 OD, 20/20 OS. APD OD Red cap with 70% desaturation OD.
infection, inflammation and vascular insult.\textsuperscript{5-11}

Optic neuritis in MS can present with many faces, ranging from a severe to mild reduction in visual function and an optic nerve appearance that may or may not be indicative of pathology. The inflammation caused by demyelination typically occurs proximal to the optic nerve head within the retrobulbar portion of the nerve (hence the term retrobulbar optic neuritis).

While visual acuity may range from normal to moderately or severely reduced, visual function is more sensitively measured by threshold visual field and contrast sensitivity. Visual field loss is most commonly central, consistent with damage to the anterior visual pathway.

Varying degrees of optic disc swelling and/or pallor may be present, with acute neuritis more likely associated with edema, and chronic, longstanding, and recurring neuritis more likely to be associated with pallor. In a recurrence, patients may demonstrate new edema, adjacent to older pallor, assuming the remaining tissue is viable enough to swell.

The old saying about retrobulbar optic neuritis, “The patient sees nothing, and the doctor sees nothing,” does not always hold true because the doctor and patient alike will often see more than “nothing.” In addition, most patients with acute optic neuritis will report eye pain, often more noticeable during eye movements.\textsuperscript{2,3}

In both acute and chronic neuritis, an afferent pupillary defect is common. Visual evoked potential will likely show reduced amplitude and increased latency.\textsuperscript{4}

**OCT in diagnosis and management**

High-resolution OCT is useful in both the diagnosis and the management of optic neuritis, as regression is sought after following treatment. Furthermore, OCT has been suggested to be predictive of disability secondary to MS, and indicative of quality of life, particularly in early MS without previous history of optic neuritis.\textsuperscript{5,6}

Recalling that the inner retinal layers are in fact an extension of the central nervous system, ODs can deduce with reason that these tissues are vulnerable to damage in MS and other neurologic diseases.

Episodes of acute optic neuritis will lead to swelling (manifesting as thickening on OCT), while longstanding optic neuritis or recurrences will lead to atrophy and therefore thinning. It is also common to see inner retinal thinning in MS patients who have no reported history of optic neuritis, possibly suggestive of a subclinical episode, retrograde degeneration, or retinal ganglion cell damage independent of optic neuritis.\textsuperscript{7,8}

While there may be a tendency to focus on the optic nerve, the inner retinal layers around the optic nerve as well as in the macula must be evaluated. In contrast to the inner retina around the disc, which contains mostly retinal nerve fiber layer (RNFL) axons, one-third of the total macular volume is made up by ganglion cell layer (GCL) neurons. Given that the GCL is particularly susceptible to impact in MS, the macula will often bear the brunt. This correlates well with the typical central visual field defect (Figures 4 and 5).

Acute optic neuritis, on the other hand, is consistent with inner retinal thickening noted in the central ganglion cell complex (GCC) as well as in the peripapillary RNFL. However, unless the affected patient is experiencing optic neuritis for the first time in his life, it may not present as “abnormally” thick according to the instrument’s normative database. This is due to existing atrophy and therefore thinning from a previous episode, which also means less cellular function and nerve fibers which do not as actively swell (Figure 6).

Optic neuritis which progresses to atrophy is differentiated from other conditions which can cause RNFL/GCC thinning (e.g., glaucoma) due to its dramatically fast rate of progression. It has been shown that, in less than three to six months, 10 µm to 40 µm of RNFL loss can occur.\textsuperscript{9,10}

**Important differential**

Neuromyelitis optica (NMO), previously thought to be a variant of MS, is also a demyelinating disease that can lead to optic neuritis. While NMO and disorders within its spectrum are much rarer compared to MS, only accounting for one to two percent of demyelinating disease in the US, they have an equally negative outcome. NMO has a five-year mortality rate of 20 percent, and patients with progressed disease are often blind or partially sighted, unable to walk, and suffer from respiratory failure.\textsuperscript{11}

NMO manifests as acute transverse myelitis with...
Multiple sclerosis

Continued from page 27

a prediction for optic neuritis which may or may not manifest recurrent attacks. When optic neuritis presents, considering NMO with caution is important because the treatment is often very different than for patients with MS.

While optic neuritis secondary to MS generally responds to steroids (discussed in more detail below), optic neuritis from NMO may require immunomodulators to prevent progression.14 When NMO is suspected, lab testing for the anti-aquaporin-4 (AQP4) or anti-myelin oligodendrocyte glycoprotein (MOG) antibodies are diagnostic.2,13

Imaging and other testing

Without a known diagnosis of MS or other cause of optic neuritis, MRI with fluid-attenuated inversion recovery (FLAIR) is preferred for detecting white matter lesions in demyelinating disease. Fat suppression can enhance the anterior optic nerve. Imaging and other testing

Treatment of acute optic neuritis

While the Optic Neuritis Treatment Trial remains the flagship study in the treatment of acute optic neuritis, clinical approaches based on its conclusions are not without debate.9-11,14,15 In the randomized study, a three-day course of intravenous (IV) methylprednisolone (250 mg q6 hours, followed by two weeks of daily oral prednisone at 1 mg/kg/day), was compared to both a 14-day course of oral prednisone at 1 mg/kg/day, and a 14-day course of placebo.

Initial results showed that IV steroids reduced recovery time for visual function and were also consistent with better acuity six months after the initial episode. Furthermore, results suggested that patients treated with IV prednisone were less at risk for an additional demyelinating event (e.g., optic neuritis recurrence) in the first two years following treatment compared to the other groups. Following the same patients years later showed similar long-term results for visual function and recovery, measured by visual acuity, visual field, contrast sensitivity, and color vision.9-11

While high-dose IV steroids are still the most widely accepted form of treatment for optic neuritis, a variety of clinical approaches are used among neurologists and eyecare providers due to their questioned efficacy, practicality and long-term benefit.17

Treatment strategies are often influenced by the professional opinion and approach of the neurologist and/or eyecare provider and the particular needs of the individual patient. Given the controversy and inconvenience with IV steroids, alternative options are a popular topic of discussion and study.

Morrow and colleagues found that oral prednisone in a dose equivalent to the typical IV dose showed no significant differences in acuity, contrast sensitivity, or visual evoked potential (VEP) at both one and six months, for example.18 In addition, promising therapies focusing on immunosuppression, neuroprotection and remyelination are in Phase 2 and 3 trials, offering more targeted alternatives for the future.14

Conclusions

Diagnosing and managing patients with MS and other demyelinating disease creates a collaborative opportunity for optometrists with neurology and other healthcare providers. OCT instrumentation and interpretation is a standard aspect of care for MS patients and is optometry's strong suit.

Furthermore, given the correlation between the severity of optic neuritis and its response to treatment with systemic disease activity, a strong relationship between communication and coordination of care will greatly benefit MS patients.

REFERENCES

The effect of contoured prism lenses on chronic headaches: A case study

Reduced symptoms and medication use after a 90-day follow-up

By Yamam Almouradi, OD

Ground-in prism and lens decentration are routinely utilized by optometrists and ophthalmologists to relieve symptoms of trigeminal dysphoria.

This case study follows a symptomatic adult Caucasian male over 90 days to determine the effects of contoured prism technology on debilitating chronic daily headaches, using a validated Headache Impact Test (HIT-6).

Qualitative data analysis reveals that full-time wear of neuro lenses, prescription spectacle lenses that add contoured prism to bring eyes into alignment, significantly improved patient HIT-6 score by 3.5 lifestyle changes. Notably, headaches that were frustrating and tiring enough to prevent activities of the patient’s daily living on a highly frequent basis were alleviated by Day 90.

There was subjective improvement of patient intake frequency of Advil (ibuprofen) and Excedrin (acetylsalicylic acid) as the patient was able to decrease intake from “daily” to “on rare occasion.” The case study patient was able to discontinue butalbital-acetaminophen-caffeine (50:325:40 mg) and amitriptyline previously prescribed by his neurologist.

Although a broader study is warranted, this case study suggests that adult patients suffering from chronic headaches significantly benefit from the addition of neuro lenses, with contoured prism technology, to their medical regimen.

Background

Historically, vision care professionals have utilized ground-in prism as well as lens decentration in their prescribed refractive error correction to relieve patients of various symptoms of asthenopia.

Neurologically, the use of prisms or lens decentration to achieve a prismatic effect is derived from the overstimulation of the fifth cranial nerve, which has been linked in previous studies to trigeminal dysphoria, among which chronic daily headaches (CDH) play a major role.

This case study investigates the efficacy of full-time contoured prism wear on symptom frequency and severity of chronic headaches in adult patients. The author hypothesizes that, if a positive correlation between full-time contoured prism wear and decreased chronic headache symptoms is achieved, then prescribing contoured prism lenses would provide an effective solution to improvement or complete resolution of chronic headaches not caused by systemic or ocular disease.

Consequently, the author hopes to provide an effective prescribing or referral tool for optometrists and other healthcare professionals, respectively, for patients with chronic headaches.

Methods

One of the most symptomatic subjects in the Digital Vision Syndrome study was followed after the termination of the 30-day trial, for a total of 90 days, in order to determine the efficacy of full-time contoured prism use on chronic headache severity.

JP is a 49-year-old Caucasian male with a 20-year history of severe chronic headaches that have interfered with his activities of daily living. He was prescribed several medications throughout these years in order to help him cope because the intensity and high frequency of his headaches were preventing him from work, academia, and social activities. JP was instructed to complete a HIT-6, which is a tool that measures the impact headaches have on a person’s ability to accomplish his or her activities of daily living (Figure 1).

HIT-6 was developed by an international team of headache experts from neurology and primary-care medicine; it is a reliable and valid tool for discriminating symptom impact on chronic headache patients.

The six questions from the Headache Impact Test (HIT-6). To answer the questions, the patient chooses from never, rarely, sometimes, very often, always.

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<th>COLUMN 4</th>
<th>COLUMN 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6 points each)</td>
<td>(8 points each)</td>
<td>(10 points each)</td>
<td>(11 points each)</td>
<td>(13 points each)</td>
</tr>
</tbody>
</table>

To score, add points for answers in each column. Please share your HIT-6 results with your doctor.

Take-home Message

A case study of a patient who suffered from chronic daily headaches is presented in which use of contoured prism technology reduced the patient’s symptoms and use of medication. More studies are warranted to investigate these results further.

See Contoured prism lenses on page 30

FIGURE 1

This questionnaire was designed to help you describe and communicate the way you feel and what you cannot do because of headaches.

To complete, please check one answer for each question.

1. When you have headaches, how often is the pain severe?
   - Never
   - Rarely
   - Sometimes
   - Very Often
   - Always

2. How often do headaches limit your ability to do usual daily activities including household work, work, school, or social activities?
   - Never
   - Rarely
   - Sometimes
   - Very Often
   - Always

3. When you have a headache, how often do you wish you could lie down?
   - Never
   - Rarely
   - Sometimes
   - Very Often
   - Always

4. In the past 4 weeks, how often have you felt too tired to do work or daily activities because of your headaches?
   - Never
   - Rarely
   - Sometimes
   - Very Often
   - Always

5. In the past 4 weeks, how often have you felt fed up or irritated because of your headache?
   - Never
   - Rarely
   - Sometimes
   - Very Often
   - Always

6. In the past 4 weeks, how often did headaches limit your ability to concentrate on work or daily activities?
   - Never
   - Rarely
   - Sometimes
   - Very Often
   - Always

Total Score

Higher scores indicate greater impact on your life.
Contoured prism lenses

Continued from page 29

The scoring of HIT-6 assigns point values to symptom frequency, which increase proportionally to symptom severity. A change of six points in a patient’s score over time is indicative of one lifestyle change. HIT-6 was chosen instead of Migraine Disability Assessment (MIDAS) due to its higher accuracy in quantifying the intensity of pain rather than the frequency of headaches, the latter of which is the main focus of MIDAS.

In order to gain insight on headache frequency improvement over the 90-day trial, JP was asked to keep a daily log of his headache frequency, intensity, and usage of analgesic medications. He was consistent with his daily log and compliant with the full-time wear regimen of his lenses during the 90-day trial.

Results

During baseline testing, JP’s HIT-6 score showed that he was experiencing disabling pain and symptoms that were interfering with his activities of daily living. His HIT-6 score improved steadily over the 90-day trial period, resulting in three-and-a-half lifestyle changes (Figure 2).

Although all six specific headache symptoms in the HIT-6 questionnaire showed great improvement over time, Questions 4 and 5 displayed complete symptom alleviation on Day 90. Question 4 assessed patient headache severity leading to overall fatigue that prevented daily activities, and Question 5 inquired about patient frustration or irritability secondary to headaches (Figure 3).

By Day 90, JP was successfully able to discontinue his two prescribed pain medications. Additionally, he was able to notably decrease his intake of Advil and Excedrin from a daily frequency to rare occasions.

Conclusion

As with any case study, specific details might vary among patients, which in turn makes it difficult to generalize data points. Contoured prism technology offers a customized prism that progresses down the lens to achieve increasing degrees of convergence relief as the patient shifts his or her focus from distance to a near target. This case study reveals that full-time contour prism could in fact be used as a successful tool to alleviate debilitating headaches and notably decrease, if not completely eliminate, the need for daily pain medication in adults suffering from chronic headaches.

The author recommends future studies to investigate contoured prism efficacy on chronic headaches and other trigeminal dysphoria symptoms experienced by younger adult patients as well as children. Future larger-scale studies are also warranted on adults with chronic headaches in order to achieve repeatable results.

REFERENCES


Multiple Sclerosis

Continued from page 28


Dr. Almeaoudi is a graduate of the Southern California College of Optometry. She is a member of the American Optometric Association and the California Optometric Association. Her interests include pediatrics, vision therapy, and acquired brain injury rehabilitation. In her free time, Dr. Almeaoudi enjoys event planning, volunteering in optometry service events for the underserved, and directing Sight & Sketches, a grassroots Southern California optometric and humanitarian relief project she co-founded. She also speaks Arabic.

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Technology

FIGURE 3 Headache Impact Test (HIT-6) Individual Question Score over Time

FIGURE 2 HIT-6 score over time (days)

Time (Days)

HIT-6 score over time (days). A comparison of JP’s HIT-6 score over time, starting with baseline (day 0) and ending at day 90. Data points reveal overall improvement in symptom severity, with 3.5 lifestyle changes by day 90.

Key

1: Never
2: Rarely
3: Sometimes
4: Very Often

Question 1
Question 2
Question 3
Question 4
Question 5
Question 6

HIT-6 score over time (days). HIT-6 symptom frequency over time of individual test points (questions 1-6), starting at baseline (day 0) and ending at day 90. Results indicate that JP experienced complete symptom alleviation for questions 4 and 5, and a decrease in the frequency of all symptoms by day 90.

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The magazine in your hands is only the beginning. Breaking news, topic centers, event coverage and engaging partner content make optometrytimes.com an ideal resource for the smart clinician.
A common reason that children are referred for an eye exam is a complaint of headaches. In fact, a survey found that 17 percent of 4- to 18-year-olds reported frequent, severe headaches and/or migraine in the previous year. Specifically, the prevalence of headaches was 4 percent of 4- to 5-year-olds and increased to 25 percent of 12- to 18-year-olds. Often, pediatricians are tasked with determining if headaches are primary (tension, migraine) or secondary (organic, vascular, infectious, ocular, etc.). Before referring to pediatric neurology, rule out common causes of secondary headaches. This is where optometry comes in: ODs have a great opportunity to show colleagues their knowledge.

**Headache history**

A comprehensive history is one of the most important components of headache evaluation. Discovering the temporal pattern of the headache is essential.

**The ocular exam**

Just like any other examination, a headache evaluation begins with the basics: visual acuity, pupils, and extracocular motility testing. The following findings during assessments of these systems would be causes for alarm and would warrant further investigation:

- Visual acuity that is reduced with no apparent refractive, ambylopic, or pathologic cause
- Presence of anisocoria (non-physiologic) or an afferent pupillary defect
- Restriction of movement on extraocular motility testing
- Presence of a strabismus should trigger the examiner to check for small vertical deviation
- Presence of anisocoria (non-physiologic) or an afferent pupillary defect
- Restriction of movement on extraocular motility testing

A comprehensive evaluation of a headache patient should include an assessment of ocular health and visual field (automated if the patient is able). Visual field is an important tool to evaluate the integrity of the visual pathway. Neurologic visual field loss (such as homonymous hemianopsia, bitemporal hemianopsia) would indicate a likely organic cause of headache. Increased intracranial pressure (ICP) and anterior or posterior segment inflammation should be ruled out as a cause of pain that may be interpreted as headache by a child. The most ominous ocular finding to rule out is papilledema, which indicates increased intracranial pressure.

While it is important to rule out ocular signs of emergent headaches, in my experience the exam is much more likely to find that a secondary headache with ocular etiology is caused by something easily diagnosed and treated within an optometric office.

Foremost, refractive error must be evaluated. Myopia and astigmatism are typically easy to detect, but hyperopia can be a little trickier. In some children, even small amounts of hyperopia can cause headaches. This hyperopia may be latent and not be apparent until the patient is cyclopleged (1% cyclopentolate recommended). In a headache patient, prescribing even low amounts of hyperopia is warranted to rule out that their refractive error may be the headache trigger.

A thorough evaluation of the ocular vision and accommodative systems can be fruitful in a child with headaches. A full assessment of these systems with normal values is summarized in Table 1.

First, assess ocular alignment. A significant phoria (with poor vergence ranges) can be the cause of headache. Note these common binocular conditions that are frequently associated with headaches:

- Convergence insufficiency: Esophoria greater at near
- Convergence excess: Esophoria greater at near
- Divergence excess: Exophoria greater at distance

Ensure you are vigilant with your cover test. The presence of a strabismus should trigger the examiner to perform comitancy testing—evaluating the deviation in multiple positions of gaze. An inconstant strabismus indicates a muscle (mechanical) or nerve (neurologic) problem. A forced duction test can be used to differentiate between these two causes. The presence of a cranial nerve palsy can often be seen during extraocular motility testing, so watch carefully. Typically, a patient with a new-onset strabismus would complain of diplopia, but children often do not complain of this unless specifically asked.
The vergence system should be assessed to evaluate capacity and flexibility. Normal vergence ranges are noted Table 1. But, it is important to always be mindful of Sheard’s criterion as well—the compensating vergence range (BO for eso, BI for eso) should be twice the blur value (or break value if no blur is present). Vergence facility is commonly overlooked, but an inability to change from a convergence to a divergence posture poses difficulty and can be symptomatic. Inadequate fusional vergence, with or without significant phoria, can cause headaches.

The accommodative system evaluation should include assessment of magnitude, flexibility, and accuracy. This will help to diagnose common accommodative conditions associated with headache:
- Accommodative insufficiency: Reduced accommodative amplitude, difficulty with minus lenses
- Accommodative spasm: Over-accommodation; lead on monocular estimated method (MEM), difficulty with plus lenses
- Accommodative infacility: Reduced accommodative facility with difficulty on plus and minus lenses
- Accommodative fatigue: Inability to sustain accommodation; lag on MEM that increases with time, amplitude of accommodation that recedes with repetition

**Optometric treatments**

Refractive, binocular vision, and accommodative problems can be managed within optometric practice. Many of these conditions can be treated or initially managed with glasses alone. Do not forget the power of lenses.

Many accommodative disorders (accommodative insufficiency, fatigue, and sometimes even spasm) can be treated with glasses as well. Giving the child a bit of time in glasses to decrease the accommodative demand at near can make a significant difference. Additionally, high accommodative convergence/ accommodation (AC/A) conditions also respond to added lenses—convergence excess with extra plus at near and divergence excess with extra minus at distance.

Binocular vision and accommodative conditions are also successfully managed with vision therapy (VT). It is the gold-standard treatment for conditions like convergence insufficiency* and is used effectively to remediate many binocular vision, accommodative, or ocular motor deficiencies. Many patients who have completed a VT program will report a decrease in their symptoms, including headache. VT can be used in conjunction with lenses to manage these patients to improve their symptoms. Lenses can be used as a temporary solution to relieve symptoms immediately, while vision therapy is a longer-term solution to many of these visual conditions.

**When to image?**

The American Academy of Neurology and the Child Neurology Society published recommendations regarding neuroimaging as part of evaluation of headache in children and adolescents in 2002. Its recommendations are as follows:
- On a routine basis, neuroimaging is not indicated in children with recurrent headaches and a normal neurologic exam
- Neuroimaging can be considered in children with an abnormal neurologic exam, the coexistence of seizures, or both
- Neuroimaging can be considered in children who have historical data to suggest recent onset of severe headaches, change in type of headache, or associated factors suggestive of neurologic dysfunction

Another study looked at children who presented to the emergency department with the complaint of headaches and what signs or symptoms were most associated with them having a brain neoplasm versus clean neuroimaging. The findings show that the following were significant: neurologic signs (10.3x greater chance of neoplasm present), seizure (10.8x) and vomiting (6.6x). So, it is important to remember that neurologic signs and symptoms play a significant role in the decision to image a pediatric headache patient.

Although neurologists conduct a cursory evaluation of visual acuity, pupils, visual field, extraocular motilities, and gross funduscopy exam, this is optometrists’ specialty area. ODs are poised to evaluate the visual system and provide input on ocular neurologic signs that they may see. It is important to remember these neurologic findings should be communicated to the neurologist in order to facilitate neuroimaging. Or, if you are able, imaging can be ordered yourself due to:
- Acutely reduced visual acuity with no apparent cause
- New-onset anisocoria or the presence of an afferent pupillary defect
- Cranial nerve palsy
- Neurologic visual field loss
- Papilledema

**Non-ocular headache management**

Sometimes it is not obvious whether the headache is due to the patient’s eyes. Perhaps the findings are borderline, and you are not convinced. In this case, a headache log can be useful to monitor headache characteristics such as frequency, duration, and what activities might trigger their onset.

For example, headaches that occur after reading are often visual, while headaches that wake a person from sleep are not. These logs are available as free apps (such as Migraine Buddy or iHeadache) that are easily accessible and make tracking seamless.

As healthcare providers, ODs can also counsel patients on lifestyle changes that can promote a healthier and more headache-free life. Suggest these SMART lifestyle changes:
- Sleep: Get sufficient and appropriate sleep
- Meals: Ensure regular intake of healthy foods and good fluid intake
- Activity: Engage in regular and appropriate activity, neither excessive nor deficient
- Relaxation: Consider methods of stress management and relaxation
- Trigger avoidance: Recognize and avoid or manage situations that provoke headache

ODs are part of the team working toward getting to the root of the headache. Your findings will prove useful to the patient’s medical doctor. While it may help cross a differential off the list, it also could be the information the provider was waiting for to show medical necessity for neuroimaging.

**REFERENCES**


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*Dr. McDaniel is the author of Howard and the Amazing Eye Exam, a free downloadable ebook helping parents and children understand what happens during an eye exam.*
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