Practical Perspectives *on the* Diagnosis and Management of AMD

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In October 2017, several leading educators and private practice clinicians published the "Practical Guidelines for the Treatment of AMD" in *Review of Optometry.*

Since that time, these practical, evidence-based guidelines have been embraced by the optometric community and adopted by many eye care practitioners across a diversity of practice settings. These eye care professionals are committed to helping eliminate the progressive vision loss caused by age-related macular degeneration (AMD).

In this follow-up guide, practitioners review what they've learned since the Guidelines were first published; and based on extensive feedback, this committee will share practical advice for successful implementation of the Guidelines in your own practice.

A Supplement to
REVIEW® OF OPTOMETRY

Medical Optometry and AMD:
Easier Than We Thought and More Important Than We Knew

By Paul Karpecki, OD, FAAO

For years, optometric opinion leaders and consultants have encouraged a more medical approach to optometric practice, citing challenges from online vendors and a growing acceptance of virtual or automated vision screenings. Unfortunately however, more than 70% of the average optometrist's income still comes from goods and services related to glasses and contact lenses.[1]

According to a recent study conducted by The Management & Business Academy, only 17% of optometrists' revenue is currently derived from medical optometry.[2] On the flip side, the demand for medical eye care services is growing at a pace nearly three times the growth of comprehensive eye exams.[3] This begs the question: Who is performing these medical exams? All arrows point to a small group of highly successful ODs. Indeed, the top 5% of optometrists receive at least 50% of their income from medical services.[4]

AMD is more prevalent than glaucoma and diabetic retinopathy combined—and by the year 2050, it is estimated to double, according to research published in Archives of Ophthalmology.[7]

The need for medical eye care services shows no signs of slowing. In fact, given the aging of the baby boomer population, we can expect it to continue to grow well beyond the retirement of many of today's practicing ODs. Someone will need to care for these patients, and they shouldn't be funneled to MDs, unless signs of wet AMD are noted. Currently, 58,000 eye care professionals are licensed to perform comprehensive eye exams; only 18,000 of these are ophthalmologists, whereas 40,000 are optometrists.[5] Looking ahead, the ranks of ophthalmologists will remain relatively static over the next decade, while ODs will increase in number.[6]

The Path of Least Resistance

These numbers make a compelling case for branching out or rethinking your current practice structure. But, from a practical perspective, we all know this is easier said than done. Considerations ranging from office flow to investments in new technology can weigh heavily on ODs who may already feel stretched too thin. Furthermore, it's not easy becoming an expert in a new specialty. Let's face it: Glaucoma is complicated, and rarely is there a quick, easy fix for dry eye. Thankfully, both of these niches are growing, but they may not be a perfect fit for ODs who want to play it slow and safe. If this sounds like you, I would suggest AMD as the path of least resistance.

You may be thinking I'm out of my mind to suggest that—of all the specialties to choose from—retina is an uncomplicated pathway to medical optometry. But I assure you there is an immense need, a tremendous patient benefit, and a practical approach to creating an AMD Center of Excellence.

The Need Exists

AMD is a major health problem. Currently, clinical AMD is more prevalent than glaucoma and diabetic retinopathy combined—and by the year 2050, it is estimated to double, according to research published in *Archives of Ophthalmology.*[7]

Of course, most optometrists actively look for structural signs of AMD in their patients at every annual exam, but in my opinion—and according to new research—this approach is far from perfect. A recent study published in *JAMA Ophthalmology* revealed that both optometrists and ophthalmologists are missing AMD about 25 percent of the time, and nearly one-third of undiagnosed eyes in this study had large drusen, a known risk factor for wet AMD.[8] It's no wonder that as many as 78 percent of patients are first diagnosed with AMD after having already suffered irreversible vision loss in one eye, and nearly half of them are first diagnosed with an acuity of 20/200 or worse.[9,10]

Diagnosis Is Simple

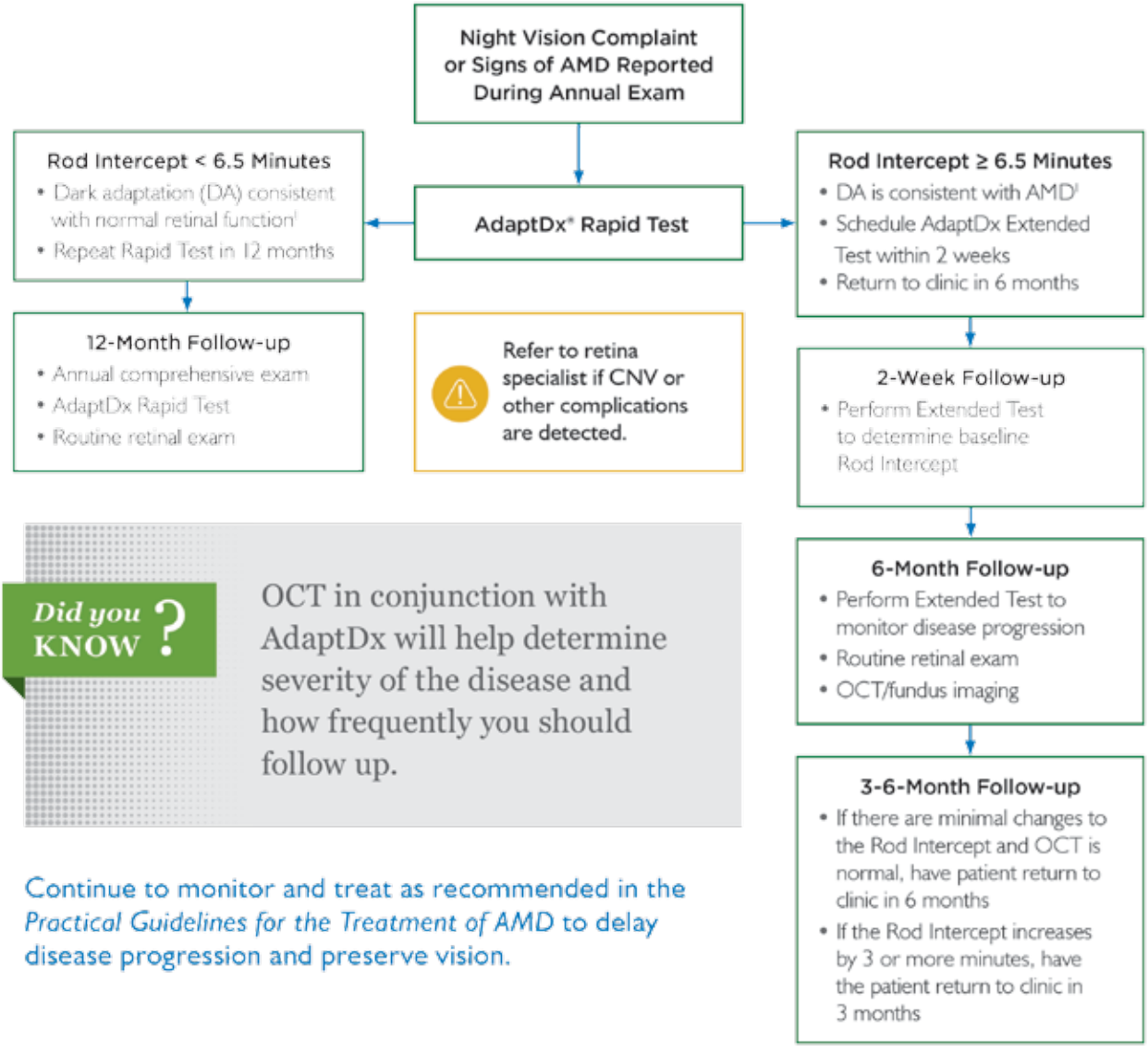
So how can we do a better job of catching AMD before patients lose vision? Furthermore, would it make a difference? The answer to both of these questions is yes.

The most straightforward way I can think of to detect AMD is by testing dark adaptation time. Impaired dark adaptation identifies subclinical AMD at least three years

(Continued on page 4)

AdaptDx Testing Protocol

Adding dark adaptation testing to your patient evaluations to detect signs of age-related macular degeneration can be done seamlessly. Assessing your clinical workflow, our Practice Management Consultant can incorporate dark adaptation testing into your practice protocol.



Did you KNOW?

OCT in conjunction with AdaptDx will help determine severity of the disease and how frequently you should follow up.

Continue to monitor and treat as recommended in the *Practical Guidelines for the Treatment of AMD* to delay disease progression and preserve vision.

(Continued from page 2)

before it can be seen with imaging, OCT or clinical exam.[11] The test can be performed by a technician in just a few minutes and, unlike macular pigment optical density (MPOD) or genetic testing, impaired dark adaptation is a biomarker of disease as opposed to a less definitive indication of risk.

As the "Practical Guidelines for the Treatment of AMD" clearly demonstrate, there is plenty you can do to protect your patients from avoidable vision loss. Lifestyle changes, such as smoking cessation, diet and exercise modification, and systemic disease management can have an enormous impact for patients at all stages of AMD.

The AdaptDx is the only commercially available dark adaptometer. The AdaptDx measures a patient's Rod Intercept (RI) time. RI is the number of minutes it takes for the eye to adapt from bright light to darkness at a standard threshold stimulus level. The test delivers a simple output that requires no interpretation, providing clinicians a clear and objective measurement of retinal function, with 90% sensitivity and specificity.[12]

- An RI time less than 6.5 minutes indicates normal dark adaptation consistent with healthy photoreceptor function.
- An RI time greater than 6.5 minutes indicates impaired dark adaptation, most often due to AMD in patients over age 50, unless there is a pre-existing hereditary retinal degeneration or significant vitamin A deficiency, which is rare in the United States.

Management Is Straightforward

As you will learn in the following pages of this report, once you begin testing patients with the AdaptDx, you'll likely identify AMD in a much larger percentage of your patients than you are diagnosing currently. This begs the question: What can you do to help these patients? You can't inject them, and research on AREDS formulations seems to imply that certain supplements are only useful for intermediate-stage disease. This narrow way of thinking is precisely why so many patients are losing vision to AMD.

Early AMD matters. A colleague of mine, Arizona optometrist Marc Bloomenstein, recently spoke about the disservice we do to patients when we fail to manage early disease. He used pregnancy as an interesting analogy, and I immediately thought of AMD. Having AMD is like being pregnant—you either are pregnant or you're not pregnant. You're not "sort of pregnant" or "early pregnant." Even if you're in the first trimester, you need to take care of yourself, attend follow-up appointments, and exercise some extra caution. The same applies to AMD. This is not something we should be hiding. Imagine if doctors didn't tell patients they were pregnant until the second trimester. That's essentially what we're doing when we wait until intermediate-stage signs appear before telling patients they have AMD.

As the "Practical Guidelines for the Treatment of AMD" clearly demonstrate, there is plenty you can do to protect your patients from avoidable vision loss. Lifestyle changes, such as smoking cessation, diet and exercise modification, and systemic disease management can have an enormous impact for patients at all stages of AMD. Likewise, nutritional supplementation and retinal light protection play a key role in preserving vision. Perhaps most importantly, additional diagnostic testing and regular, careful follow-up can make a significant difference in a patient's future.

Armed with this knowledge, we should feel neither helpless nor hopeless when faced with an AMD diagnosis. On the contrary, we should feel empowered.

The truth is evidenced by the fact that we fail at this job 25% of the time when we rely on our own clinical observations.[13]

Why Not Do It Better?

Establishing an AMD Center of Excellence may sound daunting, but it can actually make our jobs far less difficult—even in the short term. Consider: Every time you perform a comprehensive exam and look at the back of the eye for AMD, you are being called upon to deliver a medical service that requires greater skill than most of us would like to admit. The truth is evidenced by the fact that we fail at this job 25% of the time when we rely on our own clinical observations.[13] Dark adaptation, on the other hand, removes the guesswork. It provides a clear answer that illuminates a well-defined path. It gives us confidence to diagnose, and it gives patients the power to make choices about their disease. ■

Recognizing Instruments of Change

By Leo Semes, OD, FAAO

They say old habits die hard, but when new technology has the ability to impact an entire generation of patients, optometrists have the opportunity to utilize instruments of change. Such was the case a generation ago in glaucoma, and we are witnessing this same change now with age-related macular degeneration (AMD).

Prior to automated perimetry, glaucoma diagnoses were based solely on structural changes of the eye observed using clinical observations and fundus photography, along with IOP. Furthermore, in most cases, disease wasn't detected until after irreversible damage to the optic nerve had occurred.

All of this changed with the advent of automated perimetry, which provided eye care professionals a means to support glaucoma diagnoses by assessing early functional changes. Indeed, automated perimetry had a dramatic influence on the diagnosis, monitoring and care of glaucoma patients and made automated perimetry the standard of care.

When glaucoma's sea change occurred, I distinctly remember the impact it had on our profession, which is why I'm so thrilled to be witnessing another huge paradigm shift—this time in how we approach AMD.

Structure and Function of AMD

Much like glaucoma, functional changes are present in AMD prior to even the earliest clinical indicators. Also, like glaucoma care before automated perimetry became standard of care, AMD screening and disease classification was—until recently—based exclusively on structural changes. However, functional changes presenting as impaired dark adaptation, take place several years before clinically evident damage to the eye has occurred. As a result of not diagnosing AMD early and actively monitoring disease progression, up to 78% of wet AMD patients are seeking their first treatment after experiencing substantial, irreversible vision loss, including 37% who are legally blind in at least one eye.[14,15]

Finding AMD before it begins eroding visual performance is what we all aspire to achieve; yet it's exceedingly difficult to observe with clinical examination and advanced imaging technologies. But now—just as automated perimetry became our compass for glaucoma—we have another very simple and obvious tool to definitively recognize AMD before it's too late. We now know that impaired dark adaptation is the first detectable consequence of AMD and can be used to identify patients with subclinical disease.[11]

As more and more primary care doctors incorporate dark adaptation testing into their practices, we are likely to see a trend much like we did in glaucoma, with older patients having much higher rates of AMD than we currently anticipate.

Finding AMD before it destroys vision is what we all aspire to achieve; yet it's exceedingly difficult to observe with clinical examination and advanced imaging technologies.

Look Back, But Move Forward

Reduced reading speed in the case of early glaucoma[16] or difficulties in low-light conditions in the case of early AMD[17] are clear functional indicators of these vision-threatening conditions. However subtle or refractive they may seem, these symptoms are meaningful, and it is our responsibility to seriously consider that these masqueraders may, in fact, be signs of something quite serious. Identifying these risk factors by querying patients about low-luminance visual difficulties—such as trouble seeing or driving at night—should be part of our intake data.

Delayed dark adaptation is the first clinical biomarker for AMD and precedes visible presentation of drusen. As such, it is our responsibility to quantitatively assess dark adaptation function in patients presenting with night vision complaints and shift the disease paradigm as we did in glaucoma with the advent of automated perimetry.

Technology advances of this magnitude don't happen often, but when they do, it's incumbent upon primary care providers to take action. Doctors who have the tools needed for earlier detection have a tremendous opportunity to help their patients and advance their practices. Newer diagnostic protocols can have a significant impact on individual patients and society as a whole,[18] but change starts with us. We have the instruments of change, but progress will only be made by those who choose to employ them. ■

Prevalence of Subclinical AMD in Private Practice

By Jeffry Gerson, OD, FAAO

Caring for AMD patients has long been a passion of mine. Over many years, I've seen a significant evolution in the way we treat this disease. And now, more recently, there's been a dramatic shift in how—and when—we diagnose it.

We've been using the AdaptDx at Grin Eye Care in Kansas, for three years. Initially, I was excited about the technology because it would remove doubt in countless borderline cases. For example, if I had a 65-year-old female with 20/20 VA, no family history of AMD or smoking but some very subtle drusen, I would order an OCT. If that proved unremarkable, I would still be somewhat concerned about what could happen next and how soon. Now that I can perform dark adaptation (DA) on this patient, I don't live with this uncertainty anymore. I know whether she has AMD, and I therefore know what to do next. Having this confidence is what drew me to AdaptDx, but it's not the only benefit that's come from it. As I've discovered, a surprisingly large group of patients that I previously would not have worried about have been definitively diagnosed with AMD thanks to this additional technology.

Driven by Concern

I was starting to notice that more and more of my patients had AMD, which made me wonder if there were some cases that I was missing altogether, as many of us do—even in eyes with large drusen. Twenty-five percent of undiagnosed eyes in a large cross-sectional study had AMD on further examination of fundus photography.[19] Of these patients found with photographic evidence of AMD, 30% had large drusen! Furthermore, the optometrists and ophthalmologists who performed the exams were made aware that the fundus photos would be evaluated by trained raters who would determine the presence of AMD according to the Clinical Age-Related Maculopathy Staging (CARMS) system. In other words, even under the best of circumstances, when the doctor knew his or her work would be doublechecked, AMD was diagnosed by the raters with alarming frequency. None of us want our own patients to become part of these statistics, which is why testing dark adaptation function has become so useful in a growing number of practices.

Ask Your Patients

Are you having trouble seeing or driving at night? This simple question can uncover a reason to screen for AMD with dark adaptation testing (CPT 92284) using ICD-10 code H53.62 for acquired night blindness.

My Research

We decided to look at a series of 100 consecutive patients over age 60 with no clinical findings of AMD based on dilated fundus exam and OCT.

Rod-mediated DA was assessed in one eye after a photobleach using the AdaptDx. DA speed was characterized by the Rod Intercept time, with abnormal DA defined as RI ≥6.5 minutes. Demographic characteristics, best-corrected visual acuity, and OCT were also assessed.

At the end of the study, 61 participants had normal DA, and 39 participants had impaired DA (consistent with AMD). In other words, almost 40% of my seemingly healthy patients over age 60 had AMD.

The Implications

As this study revealed, the prevalence of subclinical AMD in a typical private practice setting is likely much higher than most of us assume. Earlier community-based studies revealed abnormal DA in 24% of subjects,[20] whereas 39% were found to have abnormal DA in this sample.

But is subclinical AMD a big deal? Yes. It absolutely is. AMD is a progressive, chronic disease. Patients with impaired dark adaptation are two times as likely to develop clinically evident AMD and eight times as likely to advance beyond the earliest stage of AMD within three years.[21]

The goal of AMD management (as detailed in the Practical Guidelines for the Treatment of AMD) is to prevent progression to advanced AMD [geographic atrophy (GA) or choroidal neovascularization (CNV)], and to immediately detect and manage CNV if it does occur. Achieving these goals is paramount, as it allows our patients to enjoy additional years of high-quality central vision. Incorporating DA testing into routine patient workups helps us meet this goal by allowing for earlier intervention in the disease continuum and preventing unnecessary vision loss. ■

Test Your DA Knowledge

Here are answers to frequently asked questions about age-related macular degeneration, dark adaptation and AdaptDx testing. If you don't see the answer you need below, visit: www.maculogix.com.

What is the connection between AMD and dark adaptation?

Research has shown that impaired dark adaptation is the first biomarker of AMD and indicates subclinical AMD at least three years before structural changes are visible with imaging or clinical exam.

What is subclinical AMD?

Subclinical AMD is the earliest stage of the disease. Even though no structural changes can be observed at this point, AMD has already impaired the function of the macula, specifically the dark adaptation function.

Who Should Take the AdaptDx Test?

The AdaptDx test is indicated for patients with symptoms or risk factors. It is also used to monitor disease progression.

- ***Patients with issues seeing or driving at night:*** Since night vision difficulty is the first symptom of AMD, all patients who have issues seeing or driving at night should be tested for dark adaptation impairment. Acquired night blindness (ICD-10 H53.62) is a billable reason for performing a dark adaptation test (CPT 92284). Simply add the following question to your intake form: "Have you experienced problems seeing or driving at night?"
- ***Patients who are at risk of AMD:*** Patients over 50 who are at high risk of developing AMD should be tested on an annual basis, even if they do not experience night vision problems. Risk factors include age, family history, smoking, obesity and overall cardiovascular health (heart disease, high blood pressure or high cholesterol).
- ***Patients with AMD to monitor disease progression:*** Patients with diagnosed AMD should take the AdaptDx Extended Test every six months or more to monitor disease progression. There are several ICD-10 codes that can be used to justify an extended dark adaptation test.

What is the value in detecting AMD at a subclinical stage?

AMD has an extended subclinical phase lasting five years or more. During this time there is little or no loss of vision, but it is followed by a precipitous loss of vision if a patient transitions to an advanced stage of the disease. Detecting AMD at a subclinical stage will allow eye care physicians to help patients take proactive measures that can slow progression of the disease.

How accurate is dark adaptation testing using the AdaptDx?

AdaptDx is 90.6% sensitive in identifying AMD cases and 90.5% specific in identifying normal cases. The overall accuracy of 90.6% makes AdaptDx more accurate than a visual field test.

How is AdaptDx different from other AMD testing tools?

Other devices and tests look at structure of the macula (OCT, fundus photography, etc.) or risk factors of AMD (contrast sensitivity, macular pigment optical density, genetics, etc.). AdaptDx is the only device that measures the function of the macula and provides objective and easy-to-interpret results.

What is the difference between AdaptDx and the MPOD?

MPOD (macular pigment optical density) devices measure a risk factor for AMD, not a physiological indicator of the disease. The AdaptDx dark adaptometer measures a biomarker of the disease with 90% specificity and sensitivity. Impaired dark adaptation results from an AdaptDx test signal that AMD is already present. Research has shown that there is no correlation between low MPOD levels and impaired dark adaptation.

Unlike MPOD devices, AdaptDx testing is reimbursable under CPT code 92284 at a national average of $64.08. ■

Practical Application:

How One Optometrist is Using Dark Adaptation in Clinic

By Amanda Legge, OD

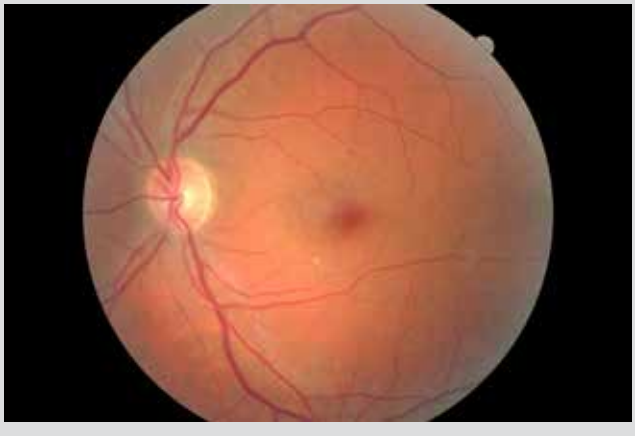
The clinical finding of any drusen, regardless of size and number, is considered a risk factor for macular degeneration. This should be likened to the concept of suspected glaucoma. Increased optic nerve cupping during a clinical examination warrants further testing (OCT and visual fields at a minimum) to determine if a patient has true glaucoma. If baseline testing is normal, a patient is typically monitored annually, but those tests are repeated periodically to catch the earliest progression to true glaucomatous disease.

Similarly, drusen are a risk factor for macular degeneration. Therefore when drusen are identified during clinical examination, further workup is indicated to determine if a patient has true macular degeneration. The workup should include both a study of structure, namely OCT or photography, and a study of function, namely dark adaptation.

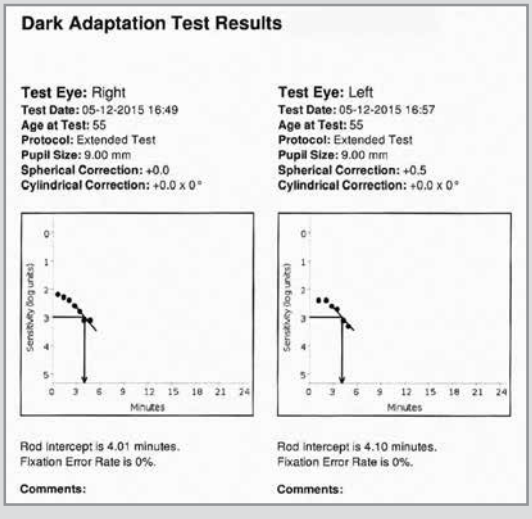
Dark adaptation does not test the number or severity of drusen present, but rather is an indirect measure of the amount of impedance to RPE transport of vitamin A and nutrients by a cholesterol barrier that is present in true AMD.

Patient #1: Clinically Evident Mild Drusen With Normal Dark Adaptation

A 55-year-old white male with a chief complaint of stable floaters for several years presented as a new patient.

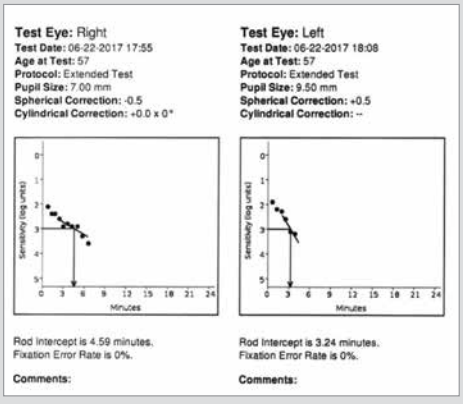


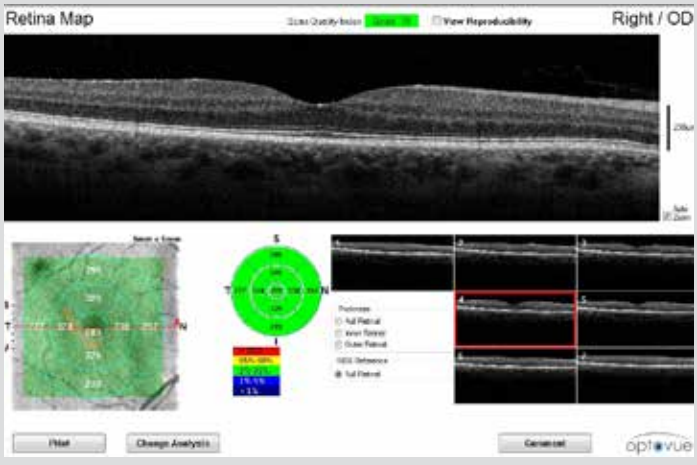
Patient #1, Visit 1, Interpretation and Report
Baseline Rod Intercept: 4.01 minutes OD, within normal limits. 4.10 minutes OS, within normal limits. Good reliability OU. Initiate supplementation. Monitor yearly.

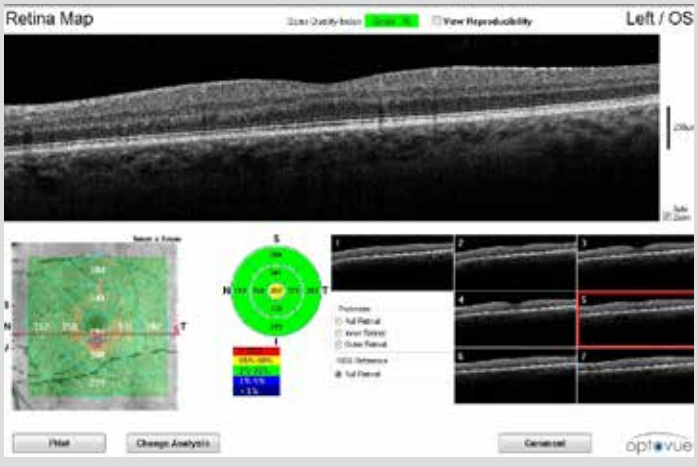


Patient #1, Visit 2, Interpretation and Report

Rod Intercept: 4.59 minutes OD, within normal limits with slight worsening compared to previous. 3.24 minutes OS, within normal limits and improved compared to previous. Change compared to previous is not statistically significant. Good reliability. Continue supplementation. Continue to monitor yearly.







He had no known ocular history and reported that his vision was stable. His systemic history was remarkable only for perennial allergies that were controlled with Zyrtec and Flonase. He had no family history of macular degeneration.

It is important to confirm the reliability and consistency of the dark adaptation, similar to repeat visual field testing in glaucoma.

Best-corrected visual acuities were 20/20-1 OD and OS. He had mild nuclear sclerotic cataracts OU and scattered pinpoint drusen throughout the macuale in both eyes. In the left eye, he also had a small placoid druse inferior to the fovea.

Because of the clinically evident drusen, even though small and scattered, dark adaptometry testing was ordered to determine if this finding was isolated drusen without disease or a sign of early AMD. Drusen of any number or size should immediately be considered as a risk factor for AMD and need further investigation.

The patient's Rod Intercept was normal and symmetric between his eyes. His baseline Rod Intercept was 4.01 minutes OD and 4.10 minutes OS with good reliability OU. Because the patient's dark adaptation was normal, the patient was not diagnosed with macular degeneration and did not need intensive monitoring at this time. Rather, he was educated on the presence of isolated drusen and the importance of annual dilated eye exams to monitor for changes in the future. He did not have true AMD at the present time, so AREDS2 therapy was not recommended; however a discussion was initiated about supplementation, and the patient elected to begin lutein 10mg/zeaxanthin 2mg vitamins for preventative care.

Although at this examination the patient's dark adapta-

tion was normal, the presence of drusen was still considered a risk factor for macular degeneration. As such, a study of structure and a study of function were ordered once per year to monitor for progression to macular disease, in addition to dilated funduscopy.

The patient did return annually after baseline testing with no complaints. He was compliant with the lutein/zeaxanthin supplements daily. At all subsequent annual visits, he had a dilated fundus examination and a study of structure (OCT or photography) and a repeat dark adaptation as a study of function. His findings remained stable during this time period.

At a subsequent visit, the patient's right eye had a change from 4.01 minutes baseline to 4.59 minutes. This was not statistically significant so it was considered unchanged. Statistically significant change is considered 3 minutes from baseline. The left eye had a change from 4.10 minutes to 3.24 minutes. Just as visual field testing can wax and wane, dark adaptation can do the same. A change of less than 1.5 minutes is not concerning, and a change of less than 3 minutes is not statistically significant.

The patient was recommended to continue his supplementation (lutein 10mg/zeaxanthin 2mg) for prevention of AMD and to continue annual dilated examinations. If changes were to occur over time, close monitoring and more frequent dilated examinations and testing would be appropriate.

Patient #2: Clinically Evident Mild Drusen With Abnormal Dark Adaptation

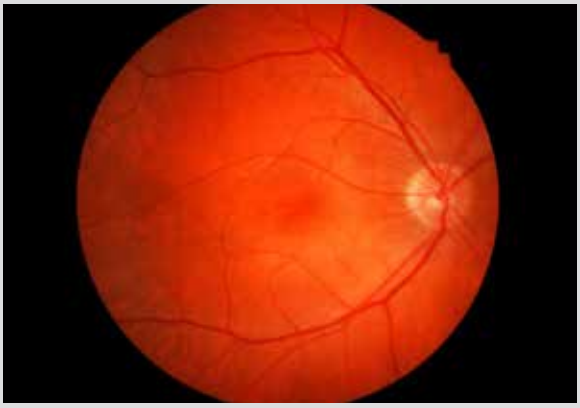
A 67-year-old white male with no complaints presented for a routine exam. He was an established patient and reported that his vision was stable. His ocular history was remarkable for pseudophakia OU. He had no systemic history and did not take medications. He did not have a family history of macular degeneration.

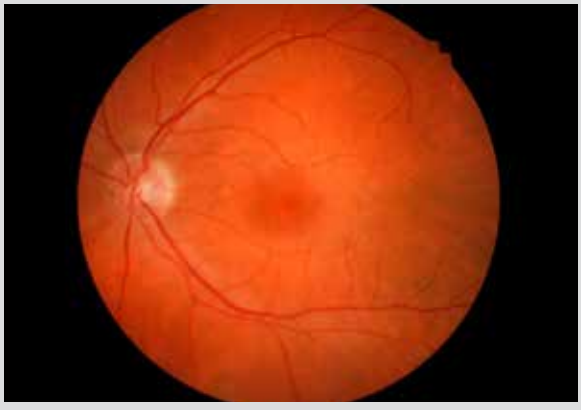
Best-corrected visual acuities were 20/20 OD and 20/20-1 OS. PC IOLs were well-centered and clear. He had small, hard drusen in both eyes, but more obvious OS versus OD. He also had a PVD in both eyes without retinal consequence.

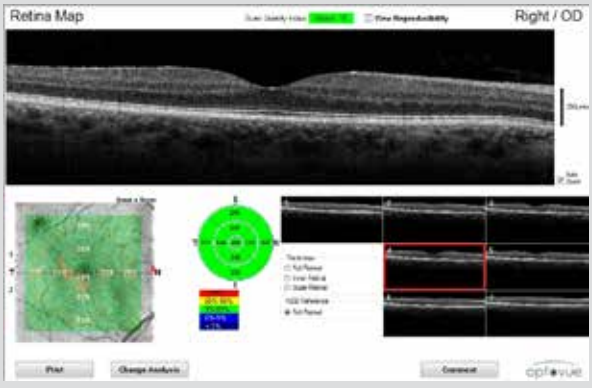
Because of the clinically evident drusen, even though small and scattered, dark adaptometry testing was ordered to determine if this finding was isolated drusen or a sign of early AMD.

The patient's dark adaptation was significantly abnormal. His Rod Intercept OD was 18.20 minutes and OS was 11.69 minutes. Macula OCT was also ordered.

His dark adaptation was reliable—it had the expected plotted curve with low fixation error rate—and results were significantly abnormal OD compared to OS. Dark adaptation does not test the number or severity of drusen present, but rather is an indirect measure of the amount of impedance to RPE transport of vitamin A and nutrients by a cholesterol barrier that is present in true AMD. Although his drusen looked clinically rather mild, the patient



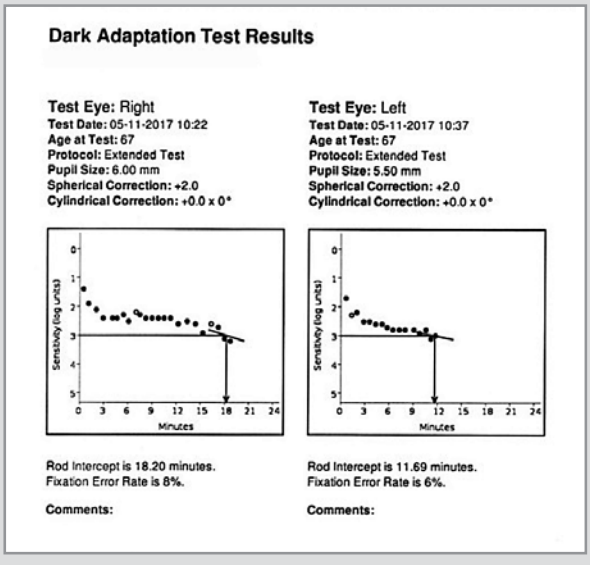


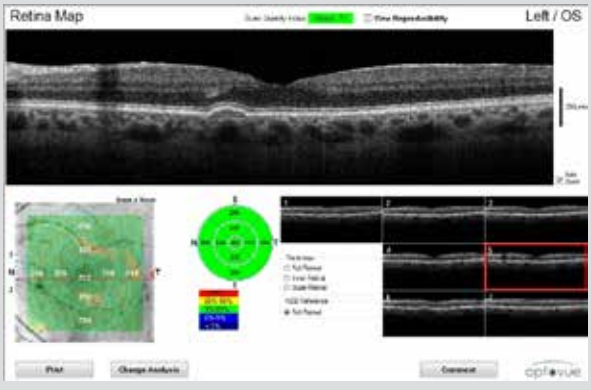


had a functional deficit in dark adaptation that was due to early cholesterol deposition that was not clinically visible. Therefore, this patient was diagnosed with AMD and is managed as such.

We recommended that the patient begin AREDS2 therapy, and that he be well-educated on AMD etiology and the importance of close monitoring for progression to wet AMD. He was also instructed on Amsler Grid at home screening, which he was asked to perform once per week monocularly.

Patient #2, Visit 1, Interpretation and Report
Baseline Rod Intercept: 18.20 minutes OD, abnormal. 11.69 minutes OS, abnormal. Good reliability. Initiate AREDS2 therapy and monitor more carefully at six-month intervals.





When drusen are identified during clinical examination, further workup is indicated to determine if a patient has true macular degeneration. The workup should include both a study of structure, namely OCT or photography, and a study of function, namely dark adaptation.

It is important to confirm the reliability and consistency of the dark adaptation, similar to repeat visual field testing in glaucoma. The patient was scheduled to return in six months for another dilated examination and repeated dark adaptation testing. If all is stable then, he will be monitored at six-month intervals unless progression is seen over time.

Patient #3: Clinically Evident Soft and Hard Drusen with Impaired Dark Adaptation

An established patient, a 79-year-old white female, presented with no visual complaints. She had an ocular history of noted small, soft drusen OD, and small, hard drusen OS. She was also pseudophakic OU. Her systemic history was remarkable for hypertension and high cholesterol controlled with medication, and she was post chemotherapy and mastectomy for breast cancer in 1993 that was in remission. She had a family history of macular degeneration in her maternal grandmother.

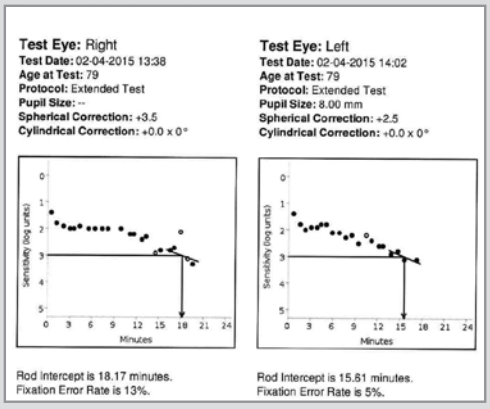
Best-corrected visual acuities were 20/20 OD and 20/25+2 OS. Anterior segment examination was remarkable for mild senile ptosis, with well-centered and clear PC IOL OU. Her dilated examination revealed many small, hard and soft drusen centrally OD, and cluster of small, hard drusen in the temporal macula OS.

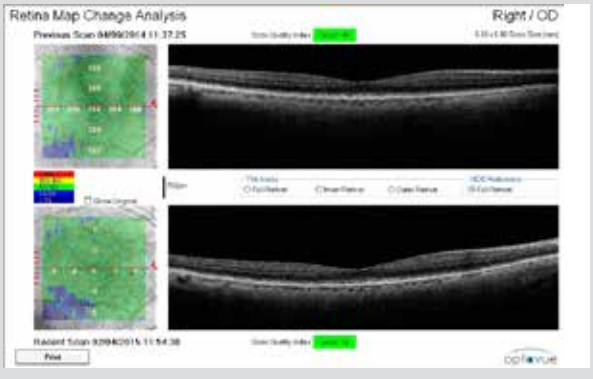
The patient's OCT showed small drusen under the RPE in both eyes, but her macular contour was normal overall. Inferiorly, there was a mild amount of total retinal atrophy OS>OD that was worsening over a one-year period per the OCT change analysis.

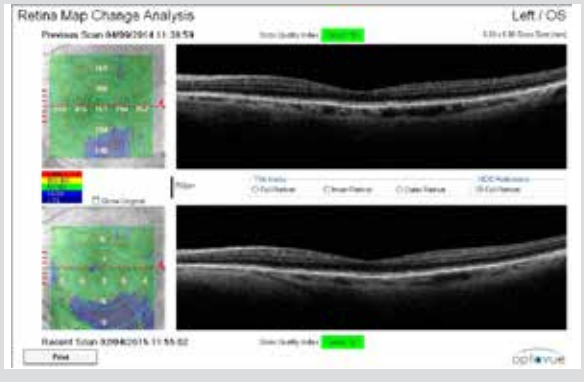
The patient's dark adaptation was reliable, having the expected plotted curve with low fixation error rate. Rod Intercept time was significantly delayed in both eyes, but worse in the right eye, which matched the more advanced fundus appearance of OD compared to OS. Similar to visual field testing in glaucoma, fixation error rates of less than 30% are acceptable for a reliable test, with lower

Patient #3, Visit 1, Interpretation and Report

Due to the finding of drusen during her clinical examination, dark adaptometry was ordered as well as OCT imaging. Baseline Rod Intercept: 18.17 minutes OD, abnormal. 15.61 minutes OS, abnormal. Good reliability OU.







values being even more accurate. Therefore both tests were reliable and significantly abnormal OD>OS.

The patient was graded as having bilateral nonexudative macular degeneration (H35.3131) due to her small-to-medium-sized drusen OD>OS and abnormal dark adaptation OD>OS.

The patient was educated about the etiology and management protocol for macular degeneration, including lifestyle changes, AREDS2 therapy, Amsler Grid at-home screening, and routine monitoring with dilation and fundus examination. She was recommended to begin AREDS2 therapy. She is being monitored every five months for progression to wet AMD to initiate treatment as early as possible if conversion from dry to wet AMD occurs. Because her dark adaptation was abnormal and she had noted soft drusen, close monitoring was recommended, as the patient was at higher risk for progression to wet AMD. If the funduscopic appearance or Rod Intercept in dark adaptometry worsens over time, she will be monitored even more closely, in three-to-four-month intervals. ■

Your AMD Center of Excellence

By Pamela Lowe, OD, FAAO

AMD is one of optometry's biggest opportunities to impact patients' lives positively, as well as build stronger, more profitable practices. Yet, positioning your practice as an AMD Center of Excellence can seem simultaneously exciting and daunting. With the right mindset and planning, practices committed to the early detection and management of AMD can implement three key strategies for success.

1. Assess Your Patient Population

Not only is AMD three times more prevalent than glaucoma, it is the leading cause of vision loss among Americans over age 60. Today, 11 million people in the United States have a form of AMD, and by the year 2050, it is estimated to double, according to *Archives of Ophthalmology*.

There are several known risk factors for AMD:

- Age (1 in 8 over age 60; 1 in 3 over age 75)
- Gender (females have twice the incidence of males)
- Concurrent diabetes
- Concurrent cardiovascular disease
- Family history
- Race (specifically Caucasian)
- Light-colored eyes

Now, consider your patient base and community. Unless you specialize in pediatrics or only see young, healthy patients, there is a good chance you are seeing many patients each day with one or more of these risk factors. To get a better sense of how many of your patients are at risk for AMD, run a report on your EHR system or simply keep a tally from your schedule for a few days.

2. Invest in Dark Adaptation

We all know the importance of imaging tools to find drusen, so I won't go into detail on fundus photography or OCT. These technologies have been in the mainstream for years, and most optometrists are already using them to enhance their clinical examinations.

More recently, study after study has proven that impaired dark adaptation is an actual biomarker—not a risk factor—for AMD. In fact, impaired dark adaptation can help us detect subclinical AMD at least three years before drusen are clinically evident. In addition to the risk factors above, this research confirms that night vision complaints are one of the earliest symptoms of AMD. How many of your older patients have told you it is getting harder to see or drive at night? If they don't share this information freely, most will admit it after being asked.

So, adding this functional test for AMD is comparable to using perimetry to detect glaucoma. Would you even consider diagnosing glaucoma without a visual field?

Unlike comparing the features and benefits of a variety of automated perimeters, there is really only one commercially available automated dark adaptometer—the AdaptDx from MacuLogix. The good news is it has been on the market for several years and works as promised. It's easy for the technician and patient, and it provides the doctor with a simple output to diagnose AMD with 90% sensitivity and specificity. I've owned an AdaptDx for over two years, so I can vouch for it personally.

Here are a few ways I use the AdaptDx in my practice and how we bill (See "AdaptDx is Reimbursable") or charge for it:

- ***Testing patients with issues seeing or driving at night.*** Since a night vision problem is the first symptom of AMD, I ask every patient if they are having trouble seeing or driving at night or reading in dim light. If they say yes, I schedule an AdaptDx Rapid or Extended Test, depending on other risk factors. Acquired night blindness (ICD-10 H53.62) is a billable reason for performing a dark adaptation test (CPT 92284).
- ***Testing patients who are at a higher risk for AMD.*** If a patient does not present with a night vision complaint but is over 50 and has several risk factors for AMD, I will discuss the screening test and associated out-of-pocket costs. This allows them to decide if they want to be tested based on a risk profile, rather than medical necessity.
- ***Monitoring disease progression of patients with AMD.*** My patients with diagnosed AMD come back every six months for an AdaptDx Extended Test to monitor disease progression. I also employ visual field and electrodiagnostic testing when appropriate AND always discuss nutrition, and the appropriate nutraceuticals after genetic testing. If I notice a major change in drusen or dark adaptation time, I will start seeing them every three months to monitor for CNV. There are several ICD-10 codes, including H53.61 for abnormal dark adaptation curve or H35.36X for drusen,that can be used to justify an extended dark adaptation test (CPT 92284).

(Continued on page 14)

How Your Practice Benefits From Improving Care

By Gary Kirman, OD

As the second private practice clinician to own an AdaptDx, I have more than four years of experience with the device. First and foremost, the AdaptDx has dramatically improved my ability to care for my patients. I am passionate about saving sight and this device has truly changed the way I diagnose, manage, and treat my patients with AMD. In my experience, earlier detection and treatment of AMD has led to patients maintaining their day vision, improving their night vision, and improving their retinal condition. These were not common outcomes in our practice prior to the implementation of routine AdaptDx testing for all patients 55 and older.

As for the performance side of running a successful business, focusing on AMD care at its earliest stages, before visual acuity is impacted, has also had a positive impact on the bottom line. As you implement AdaptDx testing in your office, you'll notice that other ancillary tests that you perform will increase in frequency. For example, AdaptDx becomes the driver for OCT, fundus photographs, central perimetry, MPOD, and more. Plus, once you've diagnosed a patient with subclinical or early AMD, you will want to start managing the disease proactively. This requires more frequent visits, including functional and structural testing. As a result, the patient who used to provide practice revenue of $80-$150 per year may now provide $600 or more in revenue per year. If you dispense vitamins to your patients for AMD treatment, these sales will almost certainly increase.

For example, in our practice, we were dispensing $23,000 annually in 2013. But at the end of 2017, we were dispensing $64,000 annually. This is because we can now diagnose AMD earlier, with greater confidence, and help the patient understand that their night vision complaint is an actual symptom of the disease. Spectacle prescription dispensing is also impacted positively when you ensure that AMD patients are wearing adequate UV and blue light protection.

In summary, the AdaptDx significantly improves both patient visual outcomes and practice performance. With it, you are are helping your patients maintain their independence while helping to improve your bottom line. ■

(Continued from page 13)

3. Educate and Promote

As the doctor, education starts with us. We need to constantly stay informed of the latest studies, technologies and treatments. We need to then share that information with our optometric staff and encourage them to become knowledgeable about identifying AMD risk factors and symptoms. We should also take the time to educate front-desk and optical staff, as they play a key role in reinforcing the message and discussing the benefits of nutraceuticals and blue light and UV protection. Together, doctors and staff can educate the patients, working as a team to diagnose and manage disease for better outcomes. Ultimately, an informed patient will take more ownership in his or her wellness.

As you commit to placing a more proactive focus on AMD care, make sure your community knows it. Add information about the disease and the technology you use to diagnose it to your website. Place educational brochures and posters in your waiting area, and encourage patients to ask about AMD. Discuss AMD risk factors and symptoms with every patient over 50 during examinations. And incorporate AMD messaging into your advertising and promotions. Just like specializing in diseases like dry eye and glaucoma, positioning your practice as an AMD Center of Excellence can set you apart.

Yes, Optometry Can

From the podium to the publications, there is a very heavy focus on interventions for later-stage AMD treatments. But ophthalmologists don't need to fight this disease alone. For too long, our profession has viewed AMD as a disease that can't be addressed in optometric settings. Early diagnosis and careful follow-up, testing and intervention can spare patients from needing invasive treatments for many years.

AMD is a devastating disease, but it has been complicated by diagnostic uncertainty for far too long. This is one of optometry's biggest opportunities to impact patients' lives positively, and build stronger, more profitable practices. Are you ready to join me in the battle to reduce blindness caused by AMD? ■

The Reality of Delivering A Life-changing Diagnosis

By Laurie Sorrenson, OD, FAAO

Let's be real: delivering bad news is no fun. However, bad news is subjective. As doctors, we know that catching disease early leads to better outcomes. But, from the patient's point of view, finding out that you need to battle a serious condition for the rest of your life is a hard pill to swallow—no matter how much we try to sugarcoat it.

Diseases like AMD require patients to take personal responsibility if they wish to avoid consequences, including vision loss. That being said, we have the power to shape our patients' perceptions of their diagnoses. When we tell a patient she has AMD or subclinical AMD, that patient can walk away from the conversation feeling either hopeless or empowered. Everyone benefits when the patient recognizes the good in an early AMD diagnosis. After all, when a patient remains in the dark, no choice is available to her and the disease wields all the power.

Based on my own experiences with delivering this diagnosis to many patients, I've learned there are some simple steps that will help the patient fully understand the news and feel empowered to take action.

- ***Be prepared.*** Have an organized message and plan before you walk into the room.
- ***Be positive.*** If a patient does not pass the AdaptDx test but has no drusen or other clinical signs, my first sentence always is "Bad news, you didn't pass the test. Good news, you didn't pass the test. We have caught this very early; you show no other clinical signs except delayed dark adaption. There is a lot we can do to make sure we maintain your vision for the rest of your life."
- ***Establish a plan and provide information.*** Have the sight-saving plan, including supplements and information on exercise, BMI, and UV and blue light protection, ready to discuss with the patient when you walk into the room. Sit next to the patient and go over it line by line.

No one wants to be a powerless victim of a chronic disease. From this perspective, knowing that you have AMD before it has a chance to diminish your quality of life is actually some of the best news ever. But it is up to us, as doctors, to help our patients perceive it in this way. ■

AdaptDx is Reimbursable

- *CPT Code 92284 for dark adaptation*
- *$64.08 average national reimbursement*
- *No limit to number of tests per year*
- *Monocular testing qualifies for full reimbursement*
- *Multiple ICD-10 codes for screening and monitoring (including H53.62 for Acquired Night Blindness)*

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