Practical Implementation of Dark Adaptation in Optometric Practice

Table of Contents

When dark adaptometry was first commercialized in 2014, early adopters were excited to share their clinical experience with their peers. Initial evidence of that experience was documented in a popular report published in *Review of Optometry* in 2017, titled "Practical Guidelines for the Treatment of AMD." Every year since then, MacuLogix® has invited AdaptDx® users to share their insights and discuss the standards of care that they've implemented in their own practices.

Now in its fifth year, this report goes beyond explaining why dark adaptation is so important in optometric practice. Having already established the reasons why functional testing is essential, this year's report outlines the practical strategies for how to make routine testing a reality in your own office.

You'll hear from 19 of your colleagues who will share their stories about how dark adaptation became standard of care in their practices. More importantly, this year you will get inside pearls on best practices on who to test and when, how to interpret tests, how to present tests and results to patients and more. As you'll see, a huge shift has taken place in how optometry cares for AMD patients and the AdaptDx is at the very center of that transformation. As the saying goes, "the train has left the building." All aboard.

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Meet the Contributors

Drue Bahajak
OD
Kirman Eye in Hummelstown, PA

Francis Bynum
OD
Northwest Tennessee Eye Clinic in Martin, TN

Greg Caldwell
OD, FAAO
Enhanced Eye Care in Duncansville, PA

Glenn Corbin
OD
Wyomissing Optometric Center in Wyomissing, PA

Damon Dierker
OD, FAAO
Eye Surgeons of Indiana in Indianapolis, IN

Timothy Earley
OD
Medina Vision Centre in Medina, OH

Steven Ferrucci
OD, FAAO
Sepulveda VA Ambulatory Care Center in North Hills, CA

Jeffry Gerson
OD, FAAO
Grin Eye Care in Leawood, KS

Gregory Jackson
PhD, FAAO
MacuLogix in Harrisburg, PA

Paul Karpecki
OD, FAAO
Gaddie Eye Centers in Lexington, KY

Gary Kirman
OD
Kirman Eye in Hummelstown, PA

Claudio Lagunas
OD
Lifetime Eye Associates in The Woodlands, TX

Amanda Legge
OD
Wyomissing Optometric Center in Wyomissing, PA

Nathan Lighthizer
OD, FAAO
Northeastern State University in Tahlequah, OK

Pamela Lowe
OD, FAAO
Professional Eye Care Center in Niles, IL

Jessica Marshall
OD
Marshall Eye Care Physicians in Holmdel, NJ

Joe Pizzimenti
OD, FAAO
University of the Incarnate Word in San Antonio, TX

Julie Rodman
OD, MSc, FAAO
Nova Southeastern University in Fort Lauderdale, FL

Tammy Tully
OD
Vision Source at Seaside Eye Associates in Myrtle Beach, SC

'What a Long, Strange Trip It's Been'

Gregory Jackson, PhD, FAAO, Co-founder and Chief Technology Officer, MacuLogix

A few months ago, I was reading an article that ran in *Review of Optometric Business* with a headline that read, "From 'Nice-to-Have' to 'Must-Have:' Why Everyone's Talking about Dark Adaptation." I suddenly found myself humming the Grateful Dead as I reminisced about what a long strange trip it's been watching dark adaptation take hold and enter mainstream optometry. What was it that happened between 1998 and 2021 that initiated the shift that's inspired adoption on this much larger scale?
The launch of the original AdaptDx® automated dark adaptometer in 2014 obviously helped, but there was so much more that transpired in the last seven years. If I had to pick the one thing that tipped the scales, I'd say the answer lies in the evolved approach to implementation. After years of collaboration with our earliest converts and optometry's thought leaders, it became evident that dark adaptation didn't yet easily fit into every practice workflow. This is how the AMD Excellence Program® was born and, as you will read in the following pages, optometrists all across the country are now changing the AMD standard of care in their practices. Here's a little background on how this journey unfolded.

'Sometimes the light's all shinin' on me'

As a graduate student at the University of Alabama at Birmingham, I had the privilege to work in Dr. Cynthia Owsley's laboratory, where I was assigned to study the impact of aging on night vision. My first project was to evaluate whether older adults had more difficulty seeing a dim spot of light in the dark compared with young adults. You know how that story ends: the average older adult has a reduced light sensitivity in the dark. But as a twenty-something year old with no appreciation of what aging feels like, I thought this was novel enough to be the focus of my dissertation, which looked at whether dark adaptation speed decreased as a function of age.

'Other times, I can barely see'

I started by collecting data on young patients. Everything was going well until I brought in a 72-year-old. The participant had excellent acuity, no visual complaints, and no history of any ocular or systemic disease that would affect his vision. I predicted that, in this case, the rod-cone break might be slightly longer than it was with the younger participants, but nothing prepared me for what was to come. As the minutes ticked by, I thought I had done something wrong. Thirty minutes passed, then 40—and still nothing happened. I thought about giving up and assumed my machine wasn't working. My finger hovered over the abort button. Then it happened. The patient hit his rod-cone break at 45 minutes. My test worked. Had I given up, I would have missed the discovery of a lifetime.

I sent the participant to two retinal specialists, both of whom said he had a normal retina and no sign of any disease that would compromise his night vision. Fundus photographs were sent to a special reading center in Wisconsin, but these too came back as normal. It wasn't until four years later that I discovered that this participant—and others like him—had developed clinical AMD. Eureka! I wondered: could impaired dark adaptation prove to be the earliest functional biomarker of AMD?

'Lately, it occurs to me'

It took us many years to fully understand what's now common knowledge—namely, that AMD is present before drusen are clinically visible,[1,2] and that patients who have impaired dark adaptation are twice as likely to develop clinically evident AMD and eight times as likely to advance beyond the earliest stage of AMD.[3] It also took several years—and a lot of grit—to develop, market and sell a device that was affordable and easy to use. We achieved that with the first-generation tabletop AdaptDx. But that wasn't enough. We had to make it more seamless in the practice flow. Hence, the AdaptDx Pro® headset was born. This made dark adaptation testing so much more practical because it creates a personal dark room anywhere and features an artificial intelligence-driven onboard technician. Her name is Theia™ and, trust me, technicians and patients love her!

Finally, we had the complete package, but there was still work that needed to be done. By and large, most doctors already have a very firm understanding of how the device works and what a difference it makes in patients' lives. But this wasn't enough to create the large-scale public health shift that was needed to elevate standard of care and save patients the unnecessary agony of avoidable vision loss. To do that, we needed to offer a blueprint of best practices. You'll learn all about that in this annual report, which is now in its fifth year.

As a company, MacuLogix® is so grateful for optometry's guidance throughout this journey. Without you, we would not have seen the forest through the trees and we would not have been able to develop this guide to practical implementation of dark adaptation. Thank you!

From Standout to Standard: Profiles of the Earliest Adopters of Dark Adaptation Testing in Optometric Practice

I TAKE COMFORT IN GREATER CERTAINTY

By Glenn S. Corbin, OD

A 2004 study showed that up to 78% of AMD patients had substantial, irreversible vision loss at first treatment.[1,2] That statistic could either terrify me as a doctor or give me an excuse to feel helpless. I chose neither. Instead, I resolved to make sure that my patients fall on the minority side of this statistic and I succeeded. I credit this to our practice's adoption of dark adaptation.

In 2014, our practice installed the first commercial dark adaptometer ever sold. The AdaptDx is a functional testing device that has been shown in clinical trials to identify patients with the earliest signs of AMD even when they have no other structural signs of AMD. It does this by revealing impaired dark adaptation function associated with AMD at least three years before it becomes clinically evident.[3]

The past seven years of using dark adaptation testing in my practice has completely changed my outlook on this potentially visually devastating disease. By proactively monitoring for both structural and functional changes in my AMD patients, I am able to catch CNV much earlier. As a result, I'm able to refer my patients with advanced AMD to my local retina specialists for treatment while they still have good BCVA in BOTH eyes. We have several cases of patients starting anti-VEGF treatment while maintaining 20/20 and 20/25 vision.

What's There and What Does It Mean?

You might ask, "why would we need an instrument to give us more information about what we routinely look for in a dilated exam?" The short answer is: we're not perfect. A 2017 study published in *JAMA Ophthalmology* revealed that optometrists and ophthalmologists failed to diagnose AMD about 25% of the time.[4]

Identification isn't the only challenge. Until the commercialization of automated dark adaptation testing, our ability to characterize small drusen was

limited. We might know they were there, but we didn't know whether they were harbingers of AMD. Several peer-reviewed studies have shown that dark adaptation function is impaired from the earliest stages of AMD, with increasing impairment as the disease progresses.[5,6] Much like glaucoma detection and management, having both structural and functional assessment of my AMD patients enabled me to vastly improve my ability to confidently diagnose disease and monitor progression.

Ignorance Is Not Bliss

Before bringing this technology into my practice, I would see patients with some small drusen but I would be unable to deliver a definitive diagnosis of AMD. But now, when my structural testing reveals something mildly suspicious but seemingly innocuous, I can turn to the AdaptDx Pro to confirm the diagnosis. Conversely, if dark adaptation is normal, I have greater confidence and worry less about the patient's prognosis over the next 12 months.

We've accepted uncertainty for so long many of us have gotten comfortable with it, when in truth, it's not acceptable. The answers are there and we now know how to obtain them. This is why I've long maintained that every optometrist should use dark adaptation testing in their practice.

Two doctors based in Central Pennsylvania with a passion for AMD care met with a small company on a mission to eliminate blindness caused by this disease and the rest is history. Seven years later, they reflect on their role in helping to create an elevated standard of care for practices everywhere.

THIS IS STANDARD OF CARE IN MY PRACTICE

By Gary Kirman, OD

In 2014, we bought the AdaptDx tabletop dark adaptometer. Using dark adaptation we were able to uncover existing disease that wasn't yet clinically present, and having a definitive diagnosis encouraged our patients to begin implementing lifestyle changes and taking vitamins in the hopes of preserving their vision. We were on the right track, but this was only the beginning. Over the past seven years, we've collected data on thousands of patient encounters and have used this data to make incremental adjustments to our protocol. Today, we've fully embraced the AMD Excellence Program, which our practice helped develop.

From Good to Great

The AdaptDx was a good fit for our practice right from the beginning. But because we have three optometrists simultaneously seeing patients, working with only one device had its limitations. We struggled with an ethical dilemma because we were unable to deliver the same care for every patient. We felt stuck because, without more space, we couldn't add more tabletop dark adaptometers, especially since these required a dark room. Fortunately, the portable AdaptDx Pro headset was introduced. Not only were we the first practice to get an AdaptDx Pro, we were the first to have three of them—one for each doctor on duty.

Numbers Tell the Story

Now that we're not all lining up to use the same tabletop device, we've doubled the amount of testing we perform and have significantly improved our capture rate. Just as you would expect since AMD is three to four times more prevalent than glaucoma, we are now finding and treating more AMD in our practice compared to glaucoma. In 2019, our doctors treated 2.2 times more AMD than glaucoma. When we look at the six-month data after we implemented the AdaptDx Pro, we found 3.3 times more AMD compared to glaucoma, which is much more reflective of the prevalence of these diseases.

The number of AMD patients captured using dark adaptation wasn't only correlated with how many tests we were able to perform. It was also impacted by the age limit we set. Initially, we tested patients age 60 and older, but we were curious to learn whether starting at 55 would make a difference. It did. After a year, we found that there was another 7% of patients that had abnormal dark adaptation at age 55. We're currently looking at what additional percent we may find between patients age 50 and age 55.

Numbers Change Lives

We've performed nearly 4000 dark adaptation tests in seven years. But this is so much more than data. These are people who count on me. I can't even fathom the impact that this has had on my patients' lives. We're not just spinning dials; our goal is to extend quality of life by preserving patients' vision for as long as we possibly can. I can't express in words, or in numbers, the profound degree to which dark adaptation has contributed to my ability to achieve this goal.

Everything We Know About AMD and Dark Adaptation

By Greg Caldwell, OD, FAAO

When automated dark adaptometry was first commercialized, many of us had more questions than answers with regard to using this information for detecting AMD and monitoring disease progression. But with more than seven years of practical in-office experience performing dark adaptation testing on thousands of patients, the tables have turned. This technology offers a safety net for providers and patients—not to mention the potential public health benefits that we are beginning to realize. Better still, optometry is leading the way. Our profession is at the epicenter of changing a paradigm that simply wasn't working. Focusing on end-stage disease is ineffective and expensive. It's not how healthcare providers approach other diseases and it's not how we should approach one that is a leading cause of irreversible blindness. In the following pages, you'll hear from several optometrists who practice in an array of settings. Each OD will share perspectives on how to raise the bar in AMD diagnosis and care.

ROUNDTABLE DISCUSSION

EARLY DIAGNOSIS IS ESSENTIAL

Q: What is the benefit of an early AMD diagnosis if there's not yet an FDA-approved drug to treat it?

Dr. Dierker: We are fixated on a stage of disease that optometrists can't do much about (i.e., advanced AMD) instead of taking a hard look at the statistics and asking what we could be doing to turn things around for our patients before things take a turn for the worse. The only way to do that is with early diagnosis.

Dr. Lighthizer: Presenting vision is critical. If a patient comes in and they're already 20/60 or 20/70, are they going to get back to 20/20 or 20/30? I'd rather catch the asymptomatic patient before their vision is drastically reduced and start working with them to slow progression through lifestyle modification and possibly nutraceutical intervention.

Dr. Bynum: As with most conditions, early detection of AMD is preferred because, when we can detect

disease early, we have an opportunity to make adjustments in the hopes of changing course. This option doesn't exist when you don't know a disease is present. Admittedly, there will always be factors we can't control, such as age or DNA, but there are many other things that are within human control, such as diet, smoking, and exercise habits. Just as a pre-diabetic patient is on track to develop diabetes, early and subclinical AMD patients are on track to develop drusen that can lead to substantial vision loss over time. Don't they deserve to know this? Particularly as patients live longer, there are more years to safeguard, which is why it's so essential to educate them about modifications that are within their control.

Dr. Corbin: Imagine a cancer patient being told that they have to undergo chemotherapy or radiation treatment every month for the rest of their lives because the disease is already so advanced. Telling an AMD patient that they need injections or they'll go blind isn't much better. But this is how many patients are introduced to the realities of AMD. I consider this paradigm to be unacceptable.

Q: Are you concerned that patients would prefer to remain unaware of their condition?

Dr. Corbin: Telling patients they failed the dark adaptation test is far less difficult than explaining the significance of lots of small drusen. That's not only scary, it also exposes our uncertainty.

Dr. Dierker: Years back, a few of my colleagues expressed concern that patients don't want to know that they have a potentially blinding condition before it changes their life. However, at the time, I wasn't testing every patient age 50 and older. I was giving

patients the option and asking them if they wanted to be tested. Not only that, I was charging them $65 for the test. And even under those strict criteria, 50% to 60% of patients elected to have the test so they could be in the know and take control of their health. In short, this illustrated to me that my patients wanted to know.

Dr. Rodman: We shouldn't get too hung up on words like "early" and "subclinical." Keep in mind that when a patient has abnormal dark adaptation, structural damage has already caused functional abnormalities. Something is wrong—and it may or may not be AMD. It needs to be investigated and a plan must be developed. It's not overly ambitious to want to pick up AMD based on functional deficits we can detect before they become the structural deficits that manifest clinically. I can't think of any other condition where we would say, "don't tell the patient too soon."

Dr. Kirman: If you never did mammography, you wouldn't see much early-stage breast cancer. Likewise with colonoscopies. Until recently, we didn't see much early AMD. That's all changed.

Dr. Bynum: We need to start thinking about AMD the way we think about other diseases like diabetes and hypertension. Regardless of what ocular condition we're talking about, our primary job as optometrists is to preserve patients' functional vision for as long as possible. That is my passion. I want to alter outcomes and protect my patients. The only way to do that is to detect disease early.

Dr. Lighthizer: I often hear colleagues say that they can easily diagnose AMD exclusively on the basis of structural changes, and I don't doubt that. By the time a patient has extensive drusen, the diagnosis is obvious. But think about the bigger picture. With any disease, do we want it to get so bad that we easily can see it? With AMD, this approach is even more dangerous because, by the time we can see it, he or she already had clinically abnormal night vision for at least three years. Optometrists play the long game with patients' ocular health and, if we stay on top of it, AMD can be a long game rather than a short devastating loss. That's why I won't wait until I see extensive macular changes to start treating patients. I use dark adaptation testing so I can intervene at the earliest stage possible.

YOU CAN MONITOR AMD WITH CONFIDENCE

Q: Does dark adaptation remove all of the guesswork from AMD management?

Dr. Rodman: Not all of it, but interpretation is so simple with dark adaptation. It's not like trying to subjectively interpret a fundus photo or predict what a patient's drusen will look like in six months or a year. In my experience, dark adaptation provides clarity in the face of ambiguity.

Dr. Lighthizer: I agree. There's no perfect test in medicine—not in eye care or in any other specialty. I wish it were that simple, but until we can put our

AMD Basics

WHO is best positioned for detecting and monitoring early to intermediate AMD?
Optometrists as the primary eye care providers.

WHY are both structure and function necessary?
A combination of structural imaging and functional tests provides a more complete clinical evaluation of retinal health.

WHAT does impaired or delayed dark adaptation mean?
An RI of 6.5 or greater indicates impaired retinal function, signifying the need for a differential diagnosis to determine the cause. The RI also allows you to baseline and monitor AMD patients for disease progression when visual acuity and structural tests (photos, OCT) show equivocal changes.

WHEN should you to talk to patients about AMD?
Starting at age 50 or earlier if night vision complaints are present.

WHERE does dark adaptation fit in the continuum of care?
It starts with testing your patients beginning at age 50 as part of their comprehensive eye exam. For patients whose RI exceeds 6.5 minutes, you regularly monitor their retinal health during the year as clinical findings dictate.

HOW can you find all the AMD in your practice?
Test every patient aged 50 and older as well as any patient with symptoms, such as night vision complaints. Spoiler alert: If you start doing this now, you'll soon discover that you have more AMD patients than glaucoma patients.

patients in a machine that tells us exactly what's wrong and exactly what we should do about it, we have to put the pieces together. That used to be pretty challenging because we had a very incomplete picture. We didn't have the data we needed to make informed decisions. All of that has changed thanks to dark adaptation and OCT. There are other tools as well that allow us to further refine and define, but these two tests are where we start and, in most cases, finish.

Dr. Corbin: I look at four things: clinical findings, acuity, OCT, and dark adaptation. This gives me the whole picture, which is important because it's rare that each of the tests, individually, tell the same story—at least not until it's far too late.

Q: Does dark adaptation increase the number of patients you have to refer out to ophthalmology?

Dr. Lowe: Not at all. The additional information dark adaptation provides me makes my referrals timelier. I now have a way to predict who is progressing and how quickly they might progress.

Dr. Dierker: Unfortunately, retina specialty practices are bursting at the seams with patients who have manifested the sequela of undiagnosed or unmanaged disease.

Dr. Corbin: The burden on retinologists is tremendous. They are seeing advanced AMD in patients with many more years of life ahead of them. Unfortunately, they are too often getting the AMD referral after the patient has already lost vision they will never regain.

Dr. Legge: It's also important to consider how dark adaptation can strengthen optometry if we refer to our optometric colleagues for specialty testing. The opportunities for OD-to-OD referrals are much greater when you embrace dark adaptation testing. For example, optical-focused practices sometimes send patients to our practice for dark adaptation testing. On the other hand, if you are monitoring a case and feel like more advanced tests are needed, you can refer out to an optometric retinal specialty practice.

Dr. Lighthizer: That's an excellent point. Few of us have all the tests at our fingertips, but that doesn't mean we should stop looking for answers when they're this consequential. If you see a steady increase in dark adaptation time over several visits but the OCT still looks dry, OCT angiography can give you important information. If you don't have angiography, you can refer out to a colleague who does. This advanced test might pick up an early

choroidal neovascular membrane so you can detect the conversion to wet AMD that much sooner. This is definitely preferrable to waiting for the patient's visual acuity to dive or for CNV to catch you unaware.

TAKE A COMMON-SENSE APPROACH TO EARLY AMD TREATMENT

Q: How do you know that early AMD is worth treating?

Dr. Ferrucci: We don't know that it's NOT worth treating. Contrary to what you may have heard, the AREDS2 authors never stated that supplements are useless in patients with early disease because that was outside the scope of the study and could not possibly be extrapolated from the data based on the study's inclusion criteria. Patients with early disease were not included in AREDS2 to begin with. To directly quote the paper, "Enrollment was restricted to people between the ages of 50 and 85 years at high risk of progression to advanced AMD with either bilateral large drusen or large drusen in one eye and advanced AMD in the fellow eye."[1] That means both eyes had to be at the intermediate stage, or one eye at the intermediate stage and one eye at the advanced stage.

Dr. Karpecki: If early AMD weren't worth treating, companies wouldn't be spending millions of dollars trying to develop new drugs and devices for it. We may not have a magic bullet yet, but the preventative interventions that we do have are helpful and keep many patients from going blind.

Dr. Gerson: I agree. In the absence of longitudinal studies demonstrating outcomes after 20-plus years of preventative treatment, we have to rely on our medical knowledge to make conclusions derived from proven facts regarding the pathophysiology of AMD. The underlying process that drives the damage is no different in early-stage versus late-stage disease. The only difference is how far down the continuum the patient is. You don't wait for a patient to have a

heart attack before you start working on lowering cholesterol, and you don't wait to treat a patient with pre-perimetric glaucoma. The same logic applies to early AMD.

Dr. Pizzimenti: It's also important to note that closer monitoring is, in and of itself, a form of treatment.

Q: What gives you confidence that you're doing right by your patients when you recommend treatments for early AMD?

Dr. Pizzimenti: We often treat high-risk patients who have small drusen, even when we have no way of confirming they have AMD, so if dark adaptation confirms the diagnosis, I would not hesitate to treat.

Dr. Gerson: We all live by the motto: Do no harm, so I ask myself, "what approach is most likely to help me achieve that end?" Monitoring patients more consistently and prescribing supplements isn't going to make anyone go blind. I can't say the same for the alternative. Beyond that, research shows that carotenoid-based supplements improve vision, whether someone has AMD or not. So, if all we do is help a patient see better, is that worth it? That's why I got into optometry in the first place, and it's the most obvious of all the clinical decisions I make.

Dr. Ferrucci: Evidence strongly suggests that patients with AMD should be prescribed some form of nutritional supplement.[2-4]

Q: Are you concerned about the cost of supplements and other early AMD interventions?

Dr. Gerson: Blindness is far more expensive. Beyond that, we also need to look at the bigger picture. If a 60- or 70-year-old patient is not currently taking any vitamins, the benefits of an ocular supplement are going to do more than help out with AMD. On the other hand, most of my patients are haphazardly self-selecting supplements. In many cases, prescribing a specific formulation saves them money and ends up being less to swallow—literally.

HOW TO TREAT EARLY AMD

By Julie Rodman, OD, MSc, FAAO

From a pathophysiological standpoint AMD is AMD—regardless of stage or how long the disease has progressed. As such, the following treatments should be offered to patients— even at the earliest stages of AMD:

Prescribe smoking cessation programs. Smoking is the largest modifiable risk factor for the progression of both CNV and GA,[5] yet in one study, 90% of patients with AMD were not advised to stop smoking.[6] Although most patients have been counseled on the ill effects of smoking, most don't realize that it affects their eyes and potentially their vision.

Prescribe nutritional supplementation. Although there is extensive debate about which supplements are most appropriate, evidence strongly suggests prescribing them because, on average, treated patients have better outcomes than untreated patients.[2-4]

Discuss lifestyle modifications with respect to diet and exercise. Following a healthy diet, exercising regularly and maintaining overall health are sound goals for all patients. These lifestyle choices may act synergistically to prevent or delay onset or progression of AMD. One study found that women who followed a healthy diet, engaged in physical exercise, and avoided smoking had substantially lower risk of early AMD compared with women who did not follow these healthy lifestyles.[7,8]

Systemic disease management. Several systemic conditions carry an increased risk of the development of AMD based on epidemiological studies—and it is our job to educate patients on how overall health can impact eye health. Cardiovascular disease, diabetes, hypercholesteremia, and obesity have all been associated with increased risk of AMD and/or progression of AMD.[9-12] Body mass index and abdominal obesity are independent risk factors for progression to advanced AMD.[9]

Prescribe retinal light protection. Epidemiological evidence suggests that chronic sunlight exposure increases the risk of incident AMD and its progression.[13] Based on increased study in this area, you may also want to consider recommending HEVL-blocking eyeglass lenses.

Vigilant Monitoring. Moving from a 12-month follow-up interval to a six-month (or even shorter in some cases) follow-up interval may be useful for monitoring disease progression.[14] More frequent visits provide the clinician increased opportunity to both reinforce patient education and detect CNV before visual acuity loss.

TALK TO PATIENTS ABOUT AMD

Q: How do your patients react when you tell them you want to test them for AMD?

Dr. Caldwell: Not in the negative way that you might fear. Most patients have heard of AMD, and they want to avoid or delay vision loss. They're eager to know as soon as possible so they can take charge of their health, especially if they have a close family member who lost vision. And when you show them the AdaptDx Pro, they think it's cool. Better still, if the test is normal, they celebrate.

Dr. Lowe: Even in practices where patients are asked to pay out of pocket for a rapid test, patients want answers.

Dr. Ferrucci: I don't think there is anything to worry about in terms of how patients will react to our request to perform dark adaptation. Perhaps what some optometrists may be concerned about is the perception of their peers or of ophthalmologists. However, in my opinion, that is outdated thinking. If I went to my primary care doctor and he told me I had very early signs of heart disease that didn't yet require medication, but it would make sense to start eating healthy, stop smoking, and lose some weight, I would be grateful for the heads up. I don't understand why anyone, in this day and age, would argue that an early diagnosis is not beneficial.

Dr. Pizzimenti: There's definitely a school of thought that in order to have true AMD, you have to have visible funduscopic change. But even if you're afraid to put the AMD label on a patient, delayed dark adaptation indicates a retinal disease process is underway. Think about that in terms of the practical realities of life. Patients don't always follow up on time. Pandemics happen. If a patient has no idea that they have subclinical AMD—or pre-AMD or borderline AMD or whatever you feel comfortable calling it—you may not see that patient for two years. Conversely, a patient's risk-benefit ratio looks a lot different when they're as concerned as you are about the potential consequences of gaps in care.

Q: Are patients nervous about the testing itself?

Dr. Lowe: Patients who have a family history of AMD are usually very nervous long before they're tested. When you have an aunt or a parent who lost vision, you experience it deeply and you imagine what it would feel like. This nebulous uncertainty can be misery. Conversely, knowing puts the patient in a position of power. If everything looks normal, the patient can breathe a sigh of relief. And if it isn't normal and we've caught it early in most cases, having a plan is much better than having unsubstantiated fear looming over you.

Dr. Bynum: Once they put the headset on and hear Theia, my patients are impressed with our advanced technology. Even my patients in their 70s and 80s are used to talking to Siri and Alexa, so they are very comfortable having a similar personality as part of their medical testing.

Q: How do patients react if they fail the test?

Dr. Rodman: When a patient fails, we lead with, "This is your lucky day because we found a disease that used to be so hard to detect at this early stage, and now we can stay ahead of it, which is a luxury people didn't used to have."

Dr. Caldwell: This is where it's important to empower patients and give them recommendations on how they can help themselves. Diet and lifestyle are important, but most patients opt for a supplement over more kale.

Dr. Ferrucci: If the disease is in a very early stage, it also helps to explain that the short-term chance of vision loss is relatively small. However, we all hope to live long, healthy lives. If that happens, as mortality rates would suggest is likely, we need to be thinking far beyond the next few years. Patients don't lament having a discussion about how to improve their quality of life over the next 10 years, 20 years or 30 years. They appreciate the optimism and want to be living independently when they're 90 years old. That's much harder to do if you're 90 and blind.

Q: Have new patients sought you out because they heard you adopted dark adaptation?

Dr. Lowe: All the time! There's a 60-year-old woman at my parish who has AMD and, since we've established our AMD Center of Excellence, word has gotten out about our dark adaptation testing. A few months ago, this woman showed up at our practice with her 30-year-old daughter, requesting to be tested with the AdaptDx Pro. Obviously, that's very young, but she's a mom of two girls as well, and she's worried for her whole family. They said, "Pam, we know you'll be on top of this, so we're switching to you."

Dr. Gerson: Having cutting-edge technology to complement high-quality patient care is always a differentiator for any eye care practice. Once my patients experience the headset and the responsive feedback from Theia, they start referring their friends and family to our practice as well.

Dr. Lagunas: Our AMD practice is growing exponentially as a result of dark adaptation testing. It began even before we started using it on every patient over age 50. Now that we've fully embraced the AMD Excellence Program, our growth is off the charts.

Why Structure and Function Together Are Necessary

By Paul Karpecki, OD and Pamela Lowe, OD

In our practices, we evaluate both the structure and function of the retina to help diagnose AMD and monitor disease progression, just as we do with the optic nerve in glaucoma. Even with contact lens fittings both structure and function matter. How well the lens is riding on the eye is important but it's meaningless if the patient can't see.

With regard to retinal care, we start with dark adaptation speed and, if there is a detected impairment, we follow with structural testing and imaging, using OCT. Based on this comprehensive information, we determine how to monitor and treat the patient. If a patient's dark adaptation function is normal, we have a useful baseline. This takes the guesswork out of the equation. But early diagnosis isn't the only benefit to dark adaptation testing. The monitoring benefits are just as great.

Don't Brush Off Risk Factors or Symptoms

As the name of the disease implies, age is the number one non-modifiable risk factor for AMD. So much so, that 1 in 8 people over the age of 60 have AMD.[1] Based on a variety of modifiable risk factors, such as obesity and smoking, AMD is showing up more frequently in even younger patients. Therefore, many optometrists have started testing dark adaptation speed in all patients age 50 and older as a way to cast the widest net. When we catch the disease early, we have a much better chance of changing course and monitoring the patient more closely to avoid vision loss.

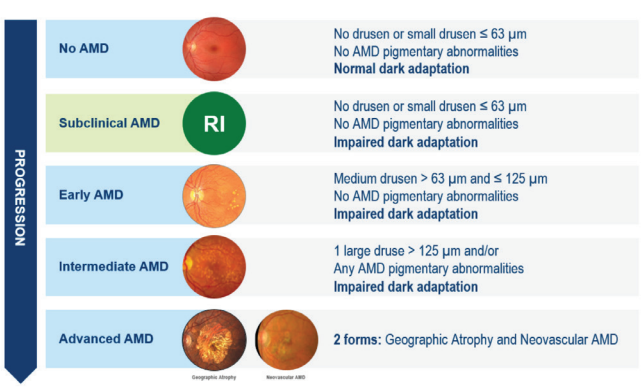
Additionally, many of our older patients are frustrated with their nighttime vision—often to the point that they're relegated to daylight driving. Importantly, cataracts aren't always the culprit and we're not doing the best we can by our patients if we blame almost every night vision complaint on normal aging. So, what do we do when these night vision sufferers' OCTs show no signs of disease? This is one area where dark adaptation testing with the AdaptDx Pro provides immense clarity because structure alone is giving us an incomplete picture—one that doesn't corroborate the patient's experience. Is the standard of care to send this patient home with the assurance that this is a normal part of aging to which we can't attach a diagnosis? We would argue that it's our responsibility to take these symptoms seriously and get to the bottom of them. AMD doesn't have to be a diagnosis made after a patient suffers irreversible vision loss. And, frankly, the patient is often relieved to have a diagnosis that explains the symptom they've struggled with instead of being told they're "getting old."

Monitor with Confidence

Beyond the initial diagnosis, functional testing complements the structural testing in an even more profound way. How many times have our AMD patients gone wet all of a sudden, seemingly without warning? Patients with excellent vision would present out of the blue at 20/100 and we'd look back at the OCTs and the photos and scratch our heads because there wasn't' much to see—certainly not enough to explain the huge drop. This was a common occurrence before dark adaptation. Now that we have experience with functional testing, we know that the warning signs were there all along—they just weren't an output of the structural tests. Now we have the benefit of the Rod Intercept® time, which often increases before visual acuity changes or the structural test abnormalities alert us to progression. As a result, we can now monitor these at-risk cases very closely and refer for injections as soon as conversion occurs, when the patient's vision is still very good.

Before dark adaptation testing, we had to rely on much less sensitive testing and our gut a lot more than we do now. It's a relief to have so much more confidence with such a high-stakes condition. In this regard, the AdaptDx technology has really made AMD care so much easier in our practices.

All stages of AMD are manifestation of the same underlying pathology



The Clinical Significance of Rod Intercept in the Management of AMD

By Timothy Earley, OD

As a primary care profession, optometry has long been keenly aware of the importance of monitoring trends in our patients and how they inform our management and treatment plans. For decades, optometrists have closely followed our patients' intraocular pressure (IOP) and the pattern standard deviation (PSD) in visual field assessments in our management of glaucoma. Corneal thickness is closely followed in patients with form fruste or frank keratoconus with serial pachymetry readings. Closely following trends over time in a patient's refraction allows the optometrist to pick up changes in eyeglass prescriptions that could indicate cataracts, macular edema, or diabetes-induced blood sugar changes. Needless to say, a great deal of our professional decision-making is centered around the analysis and interpretation of serial measurements obtained by diagnostic testing.

I believe that it is of utmost importance that optometry begins to look closely at functional testing that allows us to monitor changes in patients diagnosed with or at-risk for age-related macular degeneration (AMD). For many years, optometrists have followed the progression of AMD by describing changes in clinical signs that are able to be imaged. RPE changes, drusen, focal atrophy, and macular scars are observable with slit lamp examination through a condensing lens. Fundus photography and a dilated fundus examination have been the primary means of assessing the health of the macula for many years. More recently, the use of OCT to evaluate the outer retinal layers has become more mainstream. These high-quality images allow observation of subtle clinical signs never before seen with standard imaging. However, neither of these devices, as useful as they may be, are able to analyze the functioning of the macular photoreceptors. They allow us to take a high-resolution look at the structure of the macular tissue, but they do not allow us any insight into its functioning.

In the autumn of 2018, I was fortunate to have the ability to add dark adaptometry testing to my primary care practice. Macular assessment by dark adaptometry allows me to evaluate the function of the rod photoreceptors in my patients. As we all know, the rods outnumber the cones in our macula by 9:1, and it has been well documented that rod photoreceptors are damaged earlier and more severely in AMD.[1,2] Evaluating

rod-mediated dark adaptation is now straightforward and easy to perform in the office: A bright light is presented to a defined area of the macula just superior to fixation. The bright light "bleaches" the specified macular tissue and creates an after image. In a healthy macula, the photoreceptors "bleached" by the light will recover from the bleaching event and return to normal sensitivity within 6.5 minutes. This normal sensitivity is representative of the rod's ability to regenerate rhodopsin, which relies on the metabolic exchange of vitamin A from the choriocapillaris to the photoreceptors. Lipid deposits within Bruch's membrane and between Bruch's membrane and the RPE which can precede the appearance of clinically evident drusen, act as a barrier to the transport of vitamin A, slowing down the regeneration of rhodopsin resulting in delayed dark adaptation.[3,4]

Here is where the measurement of rod-mediated dark adaptation, as characterized by the Rod Intercept (RI®), has clinical utility. As well as being shown to be the earliest biomarker of AMD, a prolonged RI has been found to be over 90% specific and sensitive for clinically evident AMD. In patients with an RI greater than 6.5, further testing and evaluation is scheduled.

> ***"Having a quantifiable measure (RI) and a highly specific and sensitive diagnostic tool have completely changed our approach to AMD management."***

Having a quantifiable measure (RI) and a highly specific and sensitive diagnostic tool have completely changed our approach to AMD management. In our practice, we've seen many patients with little to no clinically evident disease (RPE changes or drusen), yet they have very delayed dark adaptation times.

Our goal with all of these pre-clinical and early cases is to stabilize, or possibly reduce RI. In fact, we have seen dozens of patients whose RI times have improved 12-18 months after beginning a high-quality carotenoid supplement.

Why do we do this? It's simple:

Early diagnosis and early intervention are extremely important. We aim to slow the progression of this potentially blinding disease in every patient who walks through our door.

ROUNDTABLE DISCUSSION

Q: How do you use RI at the diagnostic stage?

Dr. Lowe: At the first testing, I simply need to know whether the patient is taking longer than 6.5 minutes to dark adapt. If that's the case, we need to dig deeper and collect more information to make a differential diagnosis.

Dr. Karpecki: In the early stages of AMD, we often don't see much clinically, so we question what we do see. The RI helps us make sense of concerning, but seemingly minor clinical findings. It tells us when we need to be more vigilant and investigate further to uncover the meaning of structural findings that otherwise wouldn't give us definitive, actionable information.

Q: How do you use RI as a monitoring tool?

Dr. Lowe: Patients like numbers. My glaucoma patients all know their IOP, and my AMD patients all know their RI. As we continue to manage patients in the practice, whether they passed or failed the test, I need to see how those numbers move throughout the years, particularly when the patient has early AMD. This test allows me to be on top of things and alerts me if a patient is at risk to converting to advanced AMD.

Dr. Karpecki: Once a patient has been diagnosed with AMD, we interpret RI as a trend line more than as an absolute at one particular date and time. If we see the number rising, we'll see the patient more frequently and may start talking about at-home monitoring as well. Alternatively, if the number is holding steady, I can share this excellent news with the patient and let them know how pleased I am that our strategy is working.

Q: How do you use RI to guide treatment decisions?

Dr. Karpecki: The RI is a big help with treatment. For example, if the number is going up, I share that with the patient and it helps me convey the importance of smoking cessation, high energy visible light (HEVL) blocking spectacles and sunglasses. It also lets me know if I need to be more aggressive with supplements and follow-up visits.

Dr. Lowe: The Rod Intercept is a big help in terms of adherence to therapy because, if someone does have a shift and I express surprise, they will often admit that they haven't been taking their supplements or following my other recommendations. However, their resolve to try harder in the future increases when they see that number go up.

Dark Adaptation: Now a Cornerstone of Optometric Education

By Drue Bahajak, OD, Pennsylvania College of Optometry at Salus University, 2016

The AdaptDx was first released in 2014—just one year before my rotations began, so I was fortunate that the device was used in both of the practices where I did my rotations. For me, dark adaptation is just the normal thing to do. In fact, I currently work at a location with not just one but four dark adaptometers. Because of this, I often wonder how my own path compares to this next generation of students. Here's what faculty from three top schools have to say about dark adaptation in their programs today.

ROUNDTABLE DISCUSSION

EARLY DIAGNOSIS IS ESSENTIAL

Q: Is dark adaptation an established part of the curriculum at your university?

Dr. Lighthizer: We've had the AdaptDx at our university for three years and it's become a cornerstone of our AMD education in the classroom and in the clinic.

Dr. Pizzimenti: We've also had AdaptDx in our university eye clinic for three years. To ensure that our future optometrists know how to diagnose and monitor AMD at the highest standard of care, we include both structural and functional instruction. Rod-mediated dark adaptometry is an essential part of that standard.

Dr. Rodman: We're working hard to make sure that our graduates are well versed in dark adaptation, but this wasn't always the case. I recognize the contrast when I speak at CE meetings because my own generation of colleagues didn't get this education the way today's students are.

Dr. Lighthizer: It can be a bit amusing when students occasionally don't appreciate the history of how, in the not-too-distant past, the patients that we now treat and monitor more closely would have been managed much differently. For example, we might have written off complaints about difficulty seeing at night, chalking it up to a natural part of the aging process. Now we know better. These complaints require attention because they could be an early symptom of macular degeneration. Unlike most of their professors, today's students graduate already knowing this.

Dr. Pizzimenti: This just goes to show you how important education is after you graduate. We all need to take lifelong learning seriously and stay on top of evolving standards of care.

Dr. Rodman: I agree. We can't rely on tomorrow's optometrists to adopt modern protocols simply because the option wasn't available to us when we graduated.

Dr. Lighthizer: Dark adaptometry is definitely a best practice. This technology has worked its way into the curriculum in much the same way that OCT did several years back. It began in the classroom and grew from there. Students are taught to rely on certain technologies and then they find it inconceivable to practice without them. That was true of OCT and I see the same thing happening with dark adaptation—especially now that there's a convenient, portable headset option. When the AdaptDx Pro was introduced, dark adaptation went from being a nice-to-have to being a must-have for many doctors.

Dr. Pizzimenti: It comes down to awareness. There was a time when many optometrists were unaware that this technology existed and that it was so easy to use, interpret and act upon. Now that we're past that hump, the expectations shift.

Dr. Rodman: There's also a tremendous amount of enthusiasm alongside this growing awareness. Every time I lecture on dark adaptation, I get a slew of emails asking to visit my clinic. I think what shocks my colleagues the most is that the learning curve is so miniscule, which makes this technology a lot easier to embrace compared to some of the other big breakthroughs that we've incorporated in the past. The inclusion of Theia, the on-board AI technician helps remove human error and inconsistency in the testing itself.

Dr. Lighthizer: it's true: we're so much better off today than we were 20 years ago thanks to the technology that we have. Information is power and the more information that we can have, the better it is for our patients.

How to Make AMD Excellence the Norm in Your Practice

By Jeffry Gerson, OD

As is the case with the introduction of any new technology, the early adopters of the AdaptDx had unique implementation strategies, opportunities, and challenges. In many practices, this involved testing only the highest-risk patients who have night vision complaints. Indeed, this strategy resulted in countless diagnoses that otherwise might have been missed. But as we began to take inventory of all the patients with abnormal results, many of us began to wonder if we were casting a wide enough net. How many more patients were we missing? Our own clinical experience, coupled with what our colleagues were also echoing left little doubt that we should make dark adaptation testing part of the standard patient workup based on the leading risk-factor for the disease, age. This might sound like a radical shift in how you practice optometry and, in theory, it is because it means AMD won't live in the shadows of your practice anymore. But just because it wasn't front-and-center before doesn't mean it wasn't always there.

With the original tabletop dark adaptometer, testing all patients aged 50 or older in a busy practice just wasn't practical. Then, the head-mounted AdaptDx Pro guided by Theia came along and completely changed the game. The idea of a portable darkroom that can be brought to the patient combined with a built-in technician that significantly reduces the amount of technician oversight needed created new—and realistic—workflow opportunities. Now we had the tool needed to address AMD head on, making it a whole lot easier to diagnose, monitor and manage this potentially devastating, prevalent stealer of sight. As the saying goes, the more regularly you do something, the easier it becomes. Many of us have found this to be particularly true of dark adaptation testing. Here's a snapshot of how our colleagues have implemented new AMD protocols and have worked with MacuLogix to incorporate these best practices into their AMD Excellence Program to make it easier to implement from day one.

CONSISTENCY IS KEY

By Tammy Tully, OD

AMD can be scary, but it doesn't have to be when you have a plan. If we didn't have dark adaptation testing and we didn't know that many of our patients have early AMD, we could stick our heads in the sand and ignore what we couldn't see. That's one option, but it's not one I'm particularly comfortable with and it's inconsistent with our practice philosophy. So now we're faced with a new source of uncertainty: namely, how do we manage all these AMD patients? Rather than question every decision we make day in and day out, we developed an easy-to-follow protocol that guides next steps.

We screen every patient over age 50 with an AdaptDx Pro Rapid Test and if their dark adaptation is impaired, we bring them back for an Extended Test and an OCT. Next, based on the results of the Extended Test, we monitor them based on the level of dark adaptation impairment (higher RI score).

1. Slightly impaired dark adaptation speed and no major structural concerns. See this patient annually.
2. RI is getting slower and OCT is showing signs of drusen. See this patient every six months.
3. Slow RI with visible drusen on OCT. See this patient quarterly or even more frequently.

With the additional metric of the RI, we are able to continue to evaluate structural and functional findings and move the patient up or down based on the complementary information these tests provide. This RI score helps me decide how soon I need to see the patient back, using structure and function together the same way I do for a glaucoma patient. I follow the same protocol for every patient over age 50 so I never worry or second guess myself. I have a complete picture with all of the relevant data to make my clinical decision for each case. Interpretation of the RI score couldn't be more straightforward. And I am confident it's working because even though we've had patients convert to CNV, our elevated standard of care with more frequent

monitoring gave us the opportunity to ensure that they were promptly referred for injections while their vision was still 20/20. That goes to show you how much of an impact optometry can make if only we would all embrace this common-sense paradigm.

THE HURDLES ARE EASILY OVERCOME

By Claudio Lagunas, OD

We've been using dark adaptation testing for years, beginning with the tabletop unit and then, later, with the AdaptDx Pro. Honestly, I thought we were doing great. Patients were happy and we were catching a lot of AMD that we didn't know we had in our practice. But testing based on night vision complaints alone was just the beginning. When the AMD Excellence Program was first introduced and our MacuLogix Practice Management Consultant showed us how to efficiently test every patient over age 50, it seemed like a logical next step for our practice and for the overall public health challenge posed by AMD. However, I quickly learned that even though I thought we were doing pretty well, testing more patients made it abundantly clear that we still needed to improve our protocols. That was our first hurdle.

In the first six weeks, we tested 152 patients (the test was included in their pre-test at no cost)—when we had been averaging about 17 tests per month previously—and 42% of them had impaired dark adaptation speeds. For those patients, we schedule a follow-up medical visit within two weeks. These follow-up visits include a reimbursable AdaptDx Pro Extended Test (CPT 92284 at ~$60) and an OCT.

The next hurdle we had to overcome was an ethical one. Now that we knew how much more AMD there was in our practice, we felt strongly that we had to give this our full attention, with no excuses for delaying the Rapid Test as part of a routine exam for each and every patient aged 50 and older. And in the early days, we learned a valuable lesson the hard way. We had a situation where a couple came in at the same time and they each saw a different optometrist. The wife failed the Rapid Test and when we brought her back, she failed the Extended Test and needed an OCT as well. During the second visit she asked why her husband hadn't been tested and, of course, we had no good answer other than that we didn't have enough units available to test them both that day. We all want to give every patient the same quality of care, and sometimes that's hard. This realization led us to acquire an additional headset, which turned out to be a very easy decision since we already had a clear understanding of the ROI.

There were two other hurdles that I expected to be monumental but which turned out to be surprisingly insignificant. The first was the staff and the second was the scheduling.

1. How would the technicians react to the directive to test every patient over age 50? In this regard, you have to be clear about why dark adaptation testing is so important. We wanted our staff to be a part of this initiative and to understand why, as primary eyecare providers, we need to champion finding all of the AMD in our practice. When we communicated that clearly, they understood and wanted to be part of it as well.
2. With respect to scheduling, you have to be considerate of your staff. It's the responsibility of the practice owners and managers to adjust to the new patient flow. When we did this, we encountered no resistance. In fact, the only pressure we got from the staff was the push to add another "Theia" to the team. Having Theia onboard as an extension of our technician team to administer the test, enables our technicians to be more productive while the patient is being tested by Theia.

HOW WE MADE THE AMD EXCELLENCE PROGRAM POPULAR AND FUN

By Jessica Marshall, OD

As we all know, our patients don't always understand how their eye health is connected to their overall health and wellness. So, I've added a community education component to the AMD Excellence Program at my practice. As an optometrist, I've always advocated for better nutrition, so I decided to host cooking classes in the evenings. My goal is to teach my patients, their friends, and other members of the community how to cook healthy foods that have been shown to promote eye health. I start with an entertaining 20-minute lecture on diet and the eyes and then we launch into cooking—and eating, of course!

I also plan to start a walking club at a local park. The more resources I can provide my patients to show them how much these small steps can contribute to improving their overall health and preserving their vision, the better. My goal is to demonstrate that prevention doesn't have to be miserable. It can be fun.

PILOT TESTING IN A SATELLITE OFFICE

By Amanda Legge, OD

We have three office locations, each of which is at a different stage in terms of how evolved the dark adaptation protocol is at this point. In our largest office, we have 11 exam rooms, up to four doctors working at a time, and only one AdaptDx tabletop which is constantly in use—primarily for the purpose of clarifying suspected AMD based on visual complaints and structural findings and for monitoring these patients over time. For example, if a patient presents with pinpoint drusen, we perform dark adaptation testing to help determine whether this is normal age-related drusen versus macular degeneration. This protocol worked well for years, but we always suspected that we could be doing more. The AdaptDx Pro set that aspiration in motion.

When the AdaptDx Pro was introduced, we used it as an opportunity to see how much more we could improve our AMD care. To do this, we piloted the AMD Excellence Program in a smaller satellite office before rolling it out in the larger practice, which we now look forward to accomplishing based on how well the program is working . When we fully implemented the AMD Excellence Program to test all patients over age 50 at the first satellite office, we found that we had about a 30% fail rate among new and established patients who had never before undergone dark adaptation testing. The established patients had no note of drusen prior to testing. For the new patients, the dark adaptation screening was performed first, so some of these patients already had early or intermediate AMD with noted drusen during clinical examination.

In either case, this is significantly higher than the data in our medical records would have suggested. Clearly, we were missing AMD. When we consider those numbers and how many patients' lives will be impacted when we roll this out on a larger scale it's staggering. Thanks

ROUNDTABLE DISCUSSION

Q: Is AMD more prevalent than we thought?

Many practices that commit to testing all patients over age 50 find more patients with impaired dark adaptation than they anticipated. What does this mean? Here are five perspectives from your peers:

Dr. Marshall: When a patient has impaired dark adaptation, it prompts me to do further testing to determine the cause and appropriate treatment plan. While impaired dark adaptation is most likely due to AMD, it can be associated with a variety of conditions, such as retinitis pigmentosa, Stargardt disease, vitamin A deficiency, plaquenil toxicity or macular edema. It's our job to use all of our tools, technology and knowledge to make the appropriate diagnosis.

Dr. Lagunas: It's important to consider the definition of what AMD is in cited average numbers. Hopefully, we already know when most of our patients have intermediate or advanced disease, and that's what is generally reported in the data. With dark adaptation, we're looking at a whole new segment of subclinical AMD and possibly catching some early AMD we may have otherwise missed.

Dr. Rodman: Consider that the Beckman scale classifies a patient as having "no AMD" based exclusively on the presence or absence of clinical findings. If a patient does not have clinical findings and the OCT looks great yet the patient has a dark adaptation delay, I'd say that patient has subclinical AMD, which would not be counted as such in the inclusion criteria of most prevalence investigations.

Dr. Tully: I agree with Dr. Rodman. We can't point to these historical studies and expect them to reflect something we didn't even know we could measure in a practical way a decade ago. There will be new longitudinal studies, but for obvious reasons, these take time. Until then, we have to use common sense.

Dr. Gerson: We've known since 2014 that false positives are not a huge concern with this technology.[1] To calculate the diagnostic sensitivity and specificity for the Rapid Test, dark adaptation was measured by using the AdaptDx dark adaptometer in two groups: subjects with normal retinal health and subjects with clinical AMD. Subjects were assigned to their group by clinical examination and grading of fundus photographs. Sensitivity was defined as the percentage of AMD subjects who exhibited a Rod Intercept > 6.5 minutes. Specificity was defined as the percentage of normal subjects who exhibited a Rod Intercept ≤ 6.5 minutes. Diagnostic test sensitivity was calculated to be 90.6% ($P < 0.001$). The 95% CI for diagnostic sensitivity had a lower bound of 85.1% and an upper bound of 100%. Diagnostic test specificity was calculated to be 90.5% ($P=0.0271$). The 95% CI for diagnostic specificity had a lower bound of 72.9% and an upper bound of 100%.

to the portability of the AdaptDx Pro and the onboard technician, shifting protocols on a larger scale doesn't sound as impractical as it once did. Given the results of our pilot, we have much more confidence that this will be successful in all of our practices and, more importantly, it will impact the lives of many more patients. When we are able to provide a superior level of care to our patients, they are more appreciative and loyal to our practice.

TRANSITIONING FROM RESEARCH TO ROUTINE

By Julie Rodman, OD

Increasingly, dark adaptation is being used as an endpoint in clinical trials, making it important for universities like ours to remain current. To that end, we've had a tabletop AdaptDx for several years at Nova Southeastern University and, until recently, we used it primarily for research purposes. In the past several years, however, there's been a significant shift in how dark adaptation is perceived and utilized in the United States. As more and more practices make dark adaptation a standard test for detecting and monitoring AMD, the more I begin to look at best practices for integration in our university setting. Having AdaptDx technology makes all the difference in this regard. Now that we are actively using the AdaptDx clinically, we are looking at how to streamline in order to run a Rapid Test on every patient over age 50.

It's interesting because, in many ways, universities lead the way insofar as we're entrenched in cutting-edge research. But sometimes, we aren't the first to fully adopt

WHAT TO EXPECT FROM MACULOGIX'S AMD EXCELLENCE PROGRAM

1. DEVICE TRAINING

As the core training session for all AdaptDx Pro customers, this virtual, hands-on education focuses on getting your team comfortable using the device. You will gain confidence with the technology and learn how to work with Theia to guide patients through the test.

The skills covered include:

- Charging and cleaning the device
- Navigating the user interface
- Instructing patients to appropriately don the headset
- Starting the test for the patient
- Understanding and recording test results

At the end of the session, a practice management consultant (PMC) will observe team members setting up the device for testing and provide coaching tips.

2. PRACTICE IMPLEMENTATION & PROGRAM LAUNCH

This step of the process will align your entire team thorough the following:

- **Practice Implementation —** This includes a working session with key team members. The PMC spends time getting to know your practice and will help you set goals for your AMD program. Together, you'll outline processes, workflows, and smart scheduling to set your practice up for future success in identifying and managing AMD.
- **Program Launch —** Your entire team will be included in the last part of this session to ensure sure that everyone knows and understands their role in making your AMD program a success—from the identification of patients to scheduling, patient education, and follow-up.

3. WEEKLY CHECK-INS

Your MacuLogix PMC will schedule weekly calls with your practice's AMD leader to catch up on progress, understand roadblocks, modify processes, and answer questions. The PMC will also check in to see how your team is performing against your goals.

4. ONGOING SUPPORT

To help you maximize your success and maintain your efforts to capture and monitor AMD, you'll have access to the following:

- **PMC Support —** Reach out to the PMC team for ongoing guidance and education as needed.
- **AMD Academy® —** 24/7 access to online training videos, clinical resources, patient education materials and professional marketing support.
- **AMD Enrichment Sessions —** Register for any or all of the MacuLogix AMD Enrichment Sessions on the AMD Academy to further your team's knowledge in support of your goals with personalized, live training sessions.
- **Peer-to-peer Learning Opportunities —** These learning forums provide an opportunity to talk to other optometrists—both experienced AMD clinicians and those new to AMD. There will be time to ask questions and learn how others are achieving success.

new standards due to legalities that we contend with. Billing is the first example that comes to mind since these decisions aren't made by a single practice owner but rather by several departments and committees university-wide. That said, having seen the success of colleagues who are changing the public health paradigm in AMD, we are committed to joining the ranks of those who perform dark adaptation testing based on the number one AMD risk factor: age. Based on everything I've heard and read, this is the model that makes practice integration easier as well as maximizes the clinical benefits, and so it's what I am working to adopt as soon as possible.

It's my hope that the implementation of the AMD Excellence Program at our clinic will provide a novel perspective and add to our understanding of early AMD in non-Caucasian patients. Our patient base is largely African-American and they are often under-represented in AMD research. The opportunity to evaluate our population in a more comprehensive way can contribute immensely to what we know about the role of demographics at different stages in disease development. As they say, "once a researcher, always a researcher."

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I Take Comfort In Greater Certainty

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