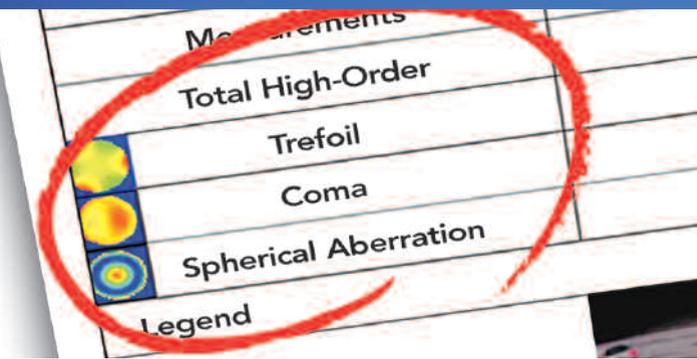
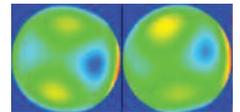


# Wavefront Dispensing



Experts discuss how this cutting-edge technology is reshaping premium lenses.



Highlights of a roundtable discussion held during SECO International 2006 in Atlanta.

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# Individualized High Definition Vision

Thanks to wavefront technology, O.D.s can create unique spectacle lenses for their patients. Here's how these O.D.s are using this technology in the lane.

**Paul M. Karpecki, O.D., F.A.A.O. (Moderator):** A new ophthalmic dispensing aberrometer generates prescriptions that are unique to each patient and provides crisp vision. This innovation is made possible by measuring light wave aberrations and developing new ophthalmic lenses that address imperfections in vision that were once imperceptible.

Today, we'll discuss how to introduce this technology to your practice. We'll identify the ideal candidates for this technology and discuss several applications, including refractions, which is one of the most significant. Let's begin with an overview.

## How the technology works

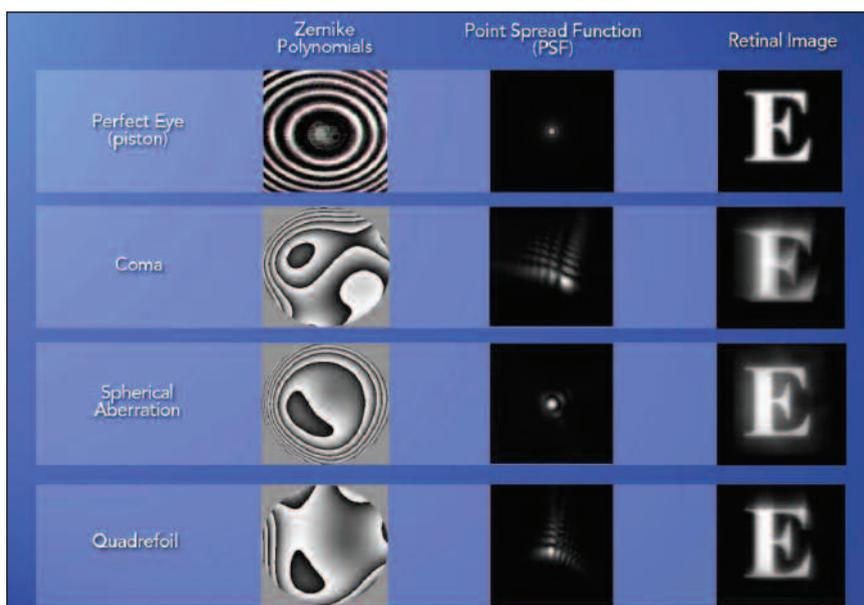
**Daniel E. Quon, O.D.:** To grasp how this new technology functions, we should remember we've always used ophthalmic lenses to correct lower-order aberrations (classified as first to second aberrations by order of com-

plexity), such as myopia, hyperopia and astigmatism. Higher-order aberrations, ranging from an order of third to sixth, include coma, spherical aberration and trefoil.

These higher-order aberrations — which can cause compromised night vision, glare, halos, blurring, diplopia and starbursts — are created by irregularities of the tear film, cornea, vitreous humor, aqueous humor and crystalline lens, including cataracts. We can discern higher-order aberrations by passing a wavefront of light through the eye and measuring the distortion of the reflected wavefront that returns from the retina and exits the cornea.

Of course, this technology has been used for several years now to achieve customized ablations in LASIK surgery. So what's new about wavefront technology that has us so excited? We now have a small, exam-lane-compatible instrument that enables us to use the same wavefront technology at a fraction of the cost to analyze distorted light pathways. Then, we can formulate findings to develop a highly specific correction that produces a unique ophthalmic lens for each eye.

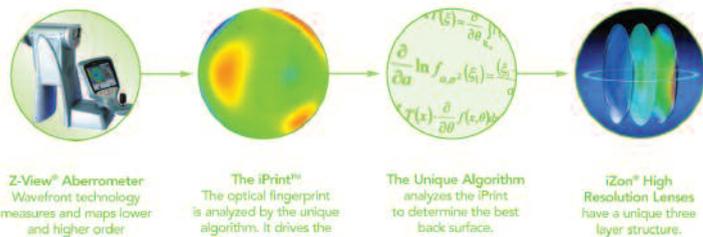
**Dr. Karpecki:** Two types of lenses have been designed with wavefront technology: the Varilux Physio 360° by Essilor of America and the iZon lens by Ophthonix. The Physio 360° uses wavefront technology to address aberrations that cause distortions of the lens, while the iZon lens addresses vision problems caused by higher-order aberrations of the eye. Today, we'll discuss primarily the iZon lenses, which are produced in a special offsite laboratory, using a patented process in which the unique iZonik™ photopolymer is sandwiched between two lens blanks. These lenses are created with prescriptions generated by the instrument Dr. Quon described, the Z-View



Point spread function and retinal image of a perfect eye compared with eyes that have higher-order aberrations, such as coma, spherical aberration and quadrefoil.

## Wavefront Correction of the Eye with Spectacles

### ■ The Ophthonix vision correction system



The iZon lens is customized based upon the optical fingerprint, or iPrint, which is measured by the Z-View Aberrometer. The lenses are produced using a patented process in which the iZonik photopolymer is sandwiched between two lens blanks.

Aberrometer. We have a few other terms to discuss, such as iPrint and iZon PAL, which clinicians should become familiar with if they're thinking about using this technology in their practices.

**Stuart A. Gindoff, O.D., M.B.A., F.A.A.O.:** The iPrint is the data that's compiled from the Z-View Aberrometer measurements. The data is equivalent to obtaining a fingerprint of the eye; each eye is different. An iZon lens is the lens that's driven by the iPrint, and the iZon PAL lens is merely the progressive addition that Ophthonix puts into the iZon lens.

We now have a small, exam-lane compatible instrument that enables us to use the same wavefront technology at a fraction of the cost to analyze distorted light pathways.

— Daniel E. Quon, O.D.



### Higher-order aberrations

**Dr. Karpecki:** How important are higher-order aberrations? Overall, do they significantly affect vision?

**Pamela A. Lowe, O.D., F.A.A.O.:** Current literature in wavefront aberrometry states that higher-order aberrations account for about 17% to 20% of a patient's visual deficiency. So, higher-order aberrations are very impor-

tant, representing up to 20% of uncorrected refractive error. Conventional lenses don't address this. What's exciting about this technology is that it returns us to our optometric roots, improving considerably on a technique that is as old as our profession.

**Dr. Gindoff:** In our practice, where our surgeons perform LASIK and multifocal implants, some patients just aren't satisfied with their overall vision after these procedures, no matter what we do. With the Z-View Aberrometer, not only can we see what patients are talking about, but we can actually neutralize the problem, or at least help them get through the prolonged healing process.

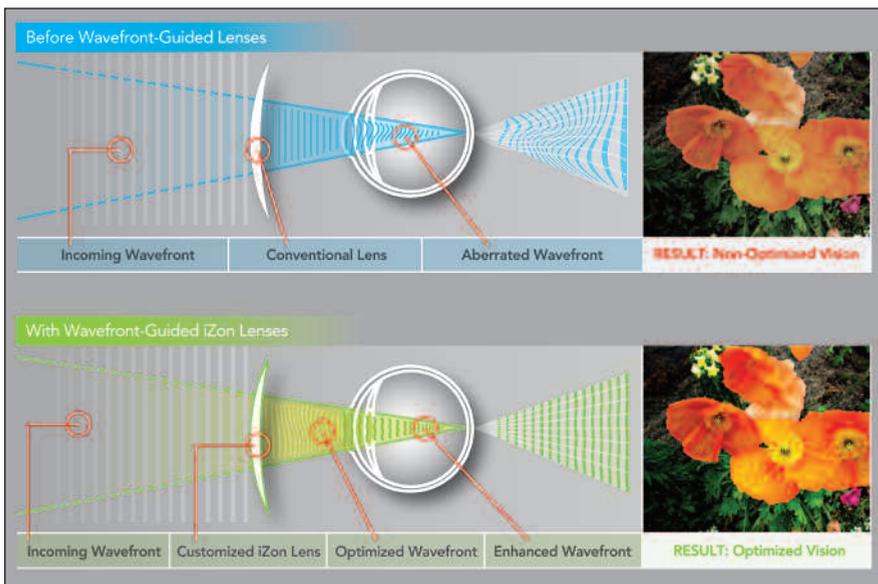
**Dr. Quon:** I use the iZon lenses for many patients who had LASIK before custom procedures were available. They're experiencing glare and seeing halos around headlights at night.

## THE CUSTOMIZED IZON LENS

Just as everyone's fingerprint is unique, so is each of your patient's eyes. In fact, their eyes have their own optical fingerprint. The iZon® High Resolution Lens is customized based upon the optical fingerprint, or iPrint™, which is measured by the Ophthonix Z-View® Aberrometer. The iZon brand is the only spectacle lens based upon the patient's iPrint.

The iPrint contains all second to sixth order aberrations of the eye, and the iZon Lens addresses the vision problems commonly associated with these aberrations. Halos around lights caused by spherical aberrations, starbursts from trefoil and comets from coma are examples of such vision problems. Ophthonix has found that 96% of myopic patients have pronounced levels of higher-order aberrations (HOA); 77% of emmetropic patients have pronounced levels of HOAs (Source: Ophthonix clinical investigations).

The iZon lens provides patients with generally sharp visual acuity, improved night-driving vision, better contrast acuity, greater depth perception and the ability to see colors with greater richness and intensity (Sources: iZon patient feedback questionnaire. Clinical investigations at the U.S. Navy Refractive Surgery Center in San Diego and the University of Illinois-Chicago, Ophthalmology & Vision Sciences).



A comparison of vision quality with and without wavefront-guided lenses. The wavefront-guided iZon lenses can address imperfections in vision that were once imperceptible.

**Jacqueline Campisi, O.D.:** I've practiced optometry for 16 years with a special interest in developmental vision and vision therapy. When a patient complains about light

## BETTER OUTCOMES

A 37-year-old patient presented with complaints about her correction even though her distance visual acuity was 20/20 OU (OD was 20/25+; OS was 20/20). Her residual refractive error was less than -0.50D. Nonetheless, she felt debilitated. For 5 years, she was unable to drive at night. She said that headlights of oncoming cars looked like one huge halo, and that her poor depth perception made lane changes extremely difficult. Conventional eyeglasses couldn't solve her problem. I prescribed iZon lenses for her, and she started driving at night immediately.

An 81-year-old patient had failed his eye test at the department of motor vehicles, despite the fact his visual acuity was 20/50, slightly worse than the 20/40 minimum requirement. He'd worn trifocals for 40 years and now had inoperable cataracts due to multiple systemic conditions.

Generally, I don't switch long-term trifocal wearers to progressives. But we discussed the iZon lenses, and he was willing to give them a try. Turns out, he passed his eye test and was able to switch from trifocals to the iZon progressives without any problems.

— Daniel E. Quon, O.D.

sensitivity, often I look for binocular vision disorders. This technology has really helped me better determine if a patient has Fuchs' dystrophy or perhaps binocular vision problems. If they do have convergence insufficiency and glare, I prescribe the iZon lenses with a little base-in prism, and I can feel confident these patients won't go anywhere else to get their next pair of eyeglasses.

### Personal experience

**Dr. Gindoff:** The best way to evaluate the iZon lenses is to try them yourself. I'm a contact lens wearer who has never felt comfortable in progressive addition lenses — until I tried the Physio 360° and got used to wearing them. Then I tried the iZon

lenses and, after 2 minutes of adjusting to the even more incredible vision clarity, I became a believer.

**Dr. Quon:** I had a positive experience wearing the Physio 360° lenses as well, mostly because of the great distance vision they provide. The iZon progressives made my vision seem almost three-dimensional. Within a day or two, I adjusted to the lenses and everything looked much clearer and normal spatially.

Also, as innovative optometrists, you have to think outside the box. I prescribe short corridor lenses for shorter people and, sometimes, depending on their working distance, I'll decrease their add by a quarter diopter. A taller person doesn't want a short corridor lens generally because objects in their inferior field of view will appear blurrier, especially when standing. By using this creative prescribing technique and the iZon PALs, I've found patients who couldn't wear progressive lenses before now can do so successfully.

**Dr. Campisi:** As a visual therapy specialist who's had to defend my practice in an ophthalmology-dominated community, I introduced the Optomap (Optos) retinal exam with its enhanced capabilities 3 years ago to set myself apart from other practices in southeastern Connecticut and Rhode Island. Now I've introduced the iZon, and it's having the same effect. Patients say, "I've never seen anything like it." And that's become my slogan to print on my cards and use on all my marketing materials. I've never seen anything like the iZon lenses.

**Dr. Karpecki:** All of this personal insight has been helpful. We'll continue to discuss other important issues, such as how to introduce this new technology to your practice — and your patients. **OM**

# Introducing Wavefront Dispensing to Your Practice

Learn these practical tips from those who have succeeded.

**Dr. Karpecki:** We've talked about the iZon lens technology, which significantly improves our ability to meet our patients' visual needs with spectacles. Now let's discuss how optometrists can introduce wavefront dispensing to their practices and patients.

## Building staff loyalty

**Dr. Quon:** One reason this new technology will be accepted is because technicians can use the instrument easily. My technicians perform a Z-View exam on all patients to expose them to the technology and to differentiate ourselves from other practices. The Z-View exam produces an iPrint containing all second to sixth order measurements that the technicians print out for me immediately so I can review them with patients. The staff is impressed when the Z-View shows any existing pathology, such as cataracts.

**Dr. Lowe:** We educated our staff about the iZon technology over a lunch meeting. Representatives from the company trained everyone in less than 90 minutes, although they'd spend more time if we needed it. Usually, employees complain that we're offloading work when we try something new. But they embrace newer technologies such as this because they become empowered, and they gain more respect with patients.

**Robert C. Layman, O.D.:** We've taken an all-encompassing, practice-wide approach to introducing the technology by prescribing iZon lenses for every staff member, including three emmetropes who were amazed by the improvement in their vision.

**Dr. Lowe:** We had a staff member whose correction was  $-4.00D$ , with  $1.50D$  of cylinder in each eye. She always wore contact lenses — even though they bothered her eyes — because her vision with them was so much better than when she wore spectacles. However, since she's been fitted with the iZon lenses, she won't take off her spectacles — even when she's exercising. When she perspires, her iZon lenses don't fog up like

her old AR-coated lenses. The irony of her situation illustrates the impact of this technology. Instead of the spectacles-wearer switching to contact lenses to benefit from superior vision, my employee made the opposite transition.

I dial the prescription into the phoropter so patients can see the cylinder and the sphere. But I explain that their iZon lenses address the vision problems caused by aberrations.

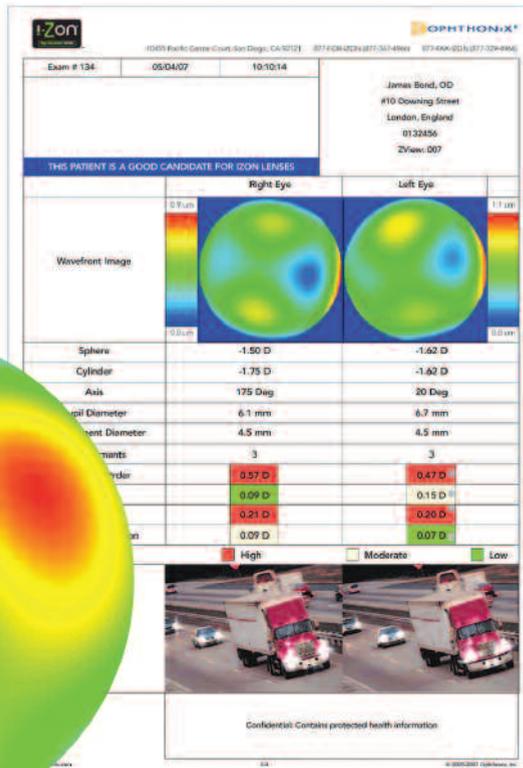
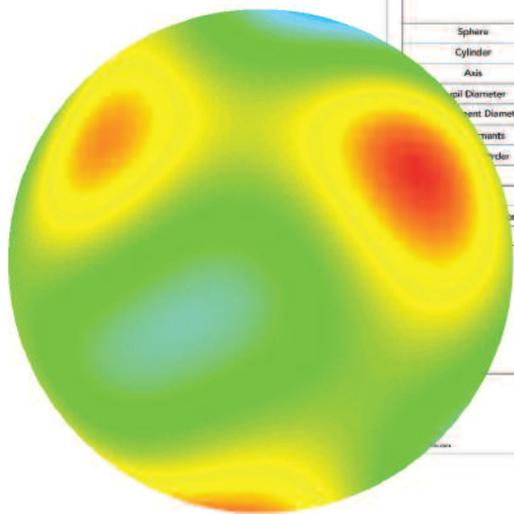
— Jacqueline Campisi, O.D.



## Improving quality of life

**Dr. Layman:** Our message to consumers is that we introduce only new, patient-centered technology to our practice, which makes us the most advanced in terms of meeting visual needs. If the technology is not in our patients' best interest, we won't introduce it. Providing the best spectacle correction available, to me, is a quality-of-life issue. As practitioners, sometimes we don't realize how much our patients' lives are hindered because of easily corrected visual disabilities. For example, patients may be missing church meetings or social events because it's dark and rainy. If we can improve their quality of life with iZon lenses, we can change their lives dramatically and build incredible patient loyalty.

**Dr. Campisi:** These lenses also are ideal for computer vision syndrome, which is widely underdiag-



the refraction to show patients the difference between the two and to demonstrate the precision of the wavefront instrument. When I pull the refractor away, I point to the cylinder line on the refractor and say, “All of my career, I’ve been checking prescriptions in two axes — the white one goes this way and the other one goes 90° away from that.

“That was the best I could do because that was the only way we could grind lenses. Your iPrint is much more specific and accurate, and here’s why: See all these different irregular areas that need correction? These lenses, which are unique to each of your eyes, address the vision problems associated with these irregularities.”

Depending on the extent of my patients’ higher-order aberrations, I tell them we can achieve 10% to 15% better vision. The simpler I keep the message, the more effectively I can communicate it.

The iPrint measured by the Z-View Aberrometer. An iPrint is as unique to each patient as their fingerprints. Once an iPrint is obtained, it’s factored into the patient’s unique prescription.

nosed in children. I don’t know of any child who walks into my office who doesn’t use the computer for up to 12 hours a day — in the classroom, on their Gameboys and at home. Children are perfect candidates for these lenses because large pupils are associated with increased higher-order aberrations. If only these lenses were available in polycarbonate.

**Dr. Quon:** One of my patients is so meticulous that he has a different pair of eyeglasses just for computer use in addition to his general-purpose progressives. He said the iZon lenses were the first general-purpose progressives he could use without having to reach for occupational progressives. He was astonished.

### Doctor’s role

**Dr. Karpecki:** Before you achieve these results with patients, you need to make them aware of the new technology and explain how it works. How do you do this?

**Dr. Lowe:** Our staff begins the educational process by discussing the role of wavefront diagnostics in producing an optimal prescription.

**Dr. Layman:** I compare the wavefront findings with

the refraction to show patients the difference between the two and to demonstrate the precision of the wavefront instrument. When I pull the refractor away, I point to the cylinder line on the refractor and say, “All of my career, I’ve been checking prescriptions in two axes — the white one goes this way and the other one goes 90° away from that.

We’ve taken an all-encompassing, practice-wide approach to introducing the technology by prescribing iZon lenses for every staff member.

— Robert C. Layman, O.D.



**Dr. Campisi:** I dial the prescription into the phoropter so patients can see the cylinder and the sphere. But I explain that their iZon lenses address

the vision problems caused by aberrations, which are measured in 12,600 (6 mm pupil) points per eye. This will give them a customized lens based upon their unique iPrint. “If you think the quarter diopter change I just made is significant,” I explain, “wait until you see an optimized lens.”

Our staff begins the educational process by discussing the role of wavefront diagnostics in producing an optimal prescription.

— Pamela A. Lowe, O.D.



Plus, I tell them I’m seeking binocular balance. I show them three rows of letters on the eye chart. These are viewed through polarized lenses in the phoropter. Patients see the top row with the right eye and the bottom row with the left eye. When they report that the top row looks like the bottom row, but the contrast sensitivity is off, I hold up their results. Then I say, “You have more aberrations in that eye than the other one. That’s why the top row looks worse than the bottom row, even though the prescriptions are exactly what they should be.” Right away, they understand the effect of higher-order aberrations on their vision, and they’re in a perfect position to purchase the lenses.

### Getting the word out

**Dr. Campisi:** It’s also helpful to educate people in various industries in your community about the technology. My practice is near a large company, with many employees. A woman from that company became the first person in New England to wear iZon lenses. Our local TV news team interviewed her, and she talked about how the lenses gave her “surround vision.” We play that video repeatedly on our Eyemaginations software, which runs continuously in various locations in our office. You can watch this interview on my Web site at [drcampisi.optometry.net](http://drcampisi.optometry.net) when you click on the iZon logo on the home page.

As a result, we’ve grown by 50 new patients a month. We’re attracting people who live hours away from our practice because they want to know more

about the lenses from the news program.

**Dr. Lowe:** A local colleague of mine also participated in a television report in Chicago. He was interviewed while performing a wavefront analysis on a patient. Within a few days, we received 20 phone calls. From those inquiries, 10 people made appointments as new patients. With high definition TV in vogue, and with everyone wanting to see things more clearly, people are responding to this technology.

**Dr. Layman:** We also market iZon lenses in our community. On [izonlens.com](http://izonlens.com), we’re listed as one of the many practices that offer the technology. All consumers have to do in my area is type in their ZIP code, and the name, address and directions to my practice pop up. In addition, we publish information about iZon lenses in our promotional materials for new patients. I also convinced a local newspaper to write an article about my practice offering the new technology.

**Dr. Karpecki:** Are there other ways that you can position this technology to benefit your practice?

**Dr. Campisi:** We are so confident patients will react positively to the lenses that we dispense them in a colorful room. When patients put the lenses on, people in the waiting room can hear their exclamations. It’s gotten to the point where I excuse myself from an exam, saying, “Oh, someone’s picking up their iZons. I have to go to the dispensing room and hear their first reaction.” The patients who are waiting for me in the exam room hear the excitement and naturally want to know what these lenses are all about. It’s amazing.

## A DRAW FOR PATIENTS

Many of us have bought the GDx nerve fiber layer analyzer or the optical coherence tomographer (OCT), believing that these instruments were worth having in our practices. But this equipment doesn’t drive patients to our door. I’ve never had anyone show up in my office saying, “I’ve got to have a GDx scan today!” However, I’ve had patients come in saying, “Gee, I’ve heard about this wavefront technology, and I really want to know more about it.”

The iZon technology is more intriguing to patients. Instead of driving them away because of price, it has them lining up at your office waiting to take their turn.

— Jacqueline Campisi, O.D.

## Increasing profitability

**Dr. Karpecki:** What are the financial implications of introducing iZon lenses to your practice?

Patient's often ask, "How much do [iZon lenses] cost?" Instead of answering them directly, I always explain that ... they'll spend \$100 more for single-vision lenses.

— *Jacqueline Campisi, O.D.*



**Dr. Quon:** Using this technology is one way to offset the lower margins from third-party insurance programs. With the iZon technology, we're not required to use third-party, insurance-contracted laboratories and lenses, nor are we restricted to accepting only the insurance company's dispensing service fees as the only profit in providing eyeglasses. We can make a greater profit offering iZon lenses than the standard lenses allowed by vision insurance companies.

**Dr. Lowe:** We don't have to worry about selling any add-ons because this technology sells itself. And, of course, it boosts profitability. My staff is thrilled when a patient chooses iZon lenses because they are thin and lightweight and already have an excellent AR coating and edge design to enhance any frame.

**Dr. Campisi:** Patients often ask, "How much do the lenses cost?" Instead of answering them directly, I always explain that, because of the technology, they'll spend about \$100 more for single-vision lenses and about \$200 more for progressive addition lenses. Then I show this breakdown by comparing the 1.6 index with AR coating, UV and scratch resistance coats to the iZon product, which includes these along with a hydrophobic coating and the iPrint. Once you explain that they won't be charged extra for all of these add-ons, they really appreciate the iZon value.

**Dr. Layman:** In our office, opticians describe the iZon as the "fully-loaded lens" that offers every feature that can optimize vision quality. If price-conscious patients don't choose iZon lenses, they're

more likely to choose what has been traditionally a premium lens to maintain their high visual standards. And this ultimately helps boost profitability.

**Dr. Campisi:** Patients who choose premium lenses also help you increase frame sales. Patients are more inclined to put high-end lenses into high-end frames.

## Bottom line

**Dr. Gindoff:** I think that our opticians would say the same holds true in our practice. Consequently, the per-unit sales probably are much higher than they once were for price-conscious patients.

**Dr. Karpecki:** So it sounds like this allows you to improve your practice's profile, in terms of the type of clientele and patients you attract.

**Dr. Layman:** That's true. I would imagine that everyone here who has the new technology has seen an increase in per-patient revenue.

**Dr. Karpecki:** And with the increase in revenue comes so many other benefits, such as an increase in word-of-mouth referrals, higher patient retention and improved patient flow.

When deciding whether to adopt this technology, a doctor must consider the bottom line. I saw one presentation that suggested the average doctor completes 20 refractions per day. If you add one more refraction, and your per-patient revenue from that encounter increases because of the sale of iZon lenses and a new set of frames, you'd net an additional \$129,000 in revenue per year.

With the increase in revenue comes so many other benefits, such as an increase in word-of-mouth referrals, higher patient retention and improved patient flow.

— *Paul M. Karpecki, O.D.*



So you won't just retain patients. You'll improve public perception of your practice and increase efficiency while differentiating yourself. And you'll earn a lot more on the balance sheet. **OM**

# Identifying Candidates for Wavefront Lenses

Patient selection is key when offering this technology. Read on to learn about the best approaches to take.

**Dr. Karpecki:** We've discussed how wavefront technology is used to make premium ophthalmic lenses and how to introduce the technology to your practice. Now let's discuss patient selection. What percentage of people who visit your practices benefit from this technology, and what do you tell them about it?

## Fitting the criteria

**Dr. Lowe:** We've had the iZon technology for about 6 months. We use the Z-View Aberrometer algorithm to identify good candidates. So far, we've found that the technology is ideal for about 50% of our patients.

**Dr. Gindoff:** I certainly don't prescribe the iZon lens for every patient. I carefully consider whether he or she will benefit from this lens technology. A major drive of our practice is to meet or exceed the expectations of patients who want to see without eyeglasses — whether we accomplish this with LASIK or some other type of refractive surgery, such as premium lenses. So we really think hard about these options before writing a prescription for iZon lenses.

**Dr. Quon:** There is a learning curve when you begin prescribing iZon lenses. You have to choose candidates carefully and manage some of their excessive expectations. I've encountered a couple of patients who expected ultra-high definition vision beyond what was possible.

I tell patients subjectively that they'll experience a 10% to 20% increase in resolution, contrast and color perception and improvement in night vision. In many cases, patients will experience an improvement in visual acuity of about 1 to 3 more letters on the Snellen Acuity Chart compared with conventional lenses. The key to success is targeting patients who will be satisfied with this level of improvement. In my practice, we try not to overpromote the lens.

## Marginal vision

**Dr. Gindoff:** Patients who have marginal vision, such as those with mild macular degeneration, can

benefit from the iZon lens because it provides optimal visual acuity. However, I will rarely prescribe the lens for a patient who's developing a cataract that will be surgically removed in, say, a year or sooner. And I see a great number of cataract patients.

**Dr. Campisi:** My philosophy is the same as Dr. Gindoff's. I refit patients in low cylinder contact lenses if their vision will improve even slightly. Why wouldn't you want to improve their spectacle Rx the same way? We want to avoid the risk of over-marketing or over-prescribing iZon lenses. However, you can minimize this by keeping your explanations of the technology realistic. I believe using the terms low-definition and high-definition television give patients an idea of what to expect. It's like seeing with a low-cylinder toric as opposed to a spherical contact lens correction — the vision is crisper. Why should patients settle for less in their eyeglasses?

I don't give patients improvement percentages or discuss obscure aberration numbers. I've had only two patients return disappointed during the 2 years I've offered this technology. The patients' disappointment was a result of a mistake we'd made, but when we fixed the problem, the patients were satisfied with the results.

## Scanning all patients

**Dr. Lowe:** We scan every patient with the Z-View Aberrometer, whether or not they're candidates for the lenses. The scan establishes a baseline for higher-order aberrations to which we can refer later even if the patients aren't candidates right away. It also plants the seed in their minds about the technology.

**Dr. Campisi:** We use the Z-View Aberrometer on all patients and make sure they walk away with a print-out so they can tell their friends and relatives. That's one of the reasons why we attract so many new patients each month.

**Dr. Karpecki:** That's so effective. An advanced eye diagnostics printout goes home with the patient. It

becomes refrigerator art and serves as a marketing tool.

**Dr. Lowe:** We put the map up on a screen in the exam room. It makes quite an impression. If patients are appropriate for this correction, you don't need to say much to convince them.

**Dr. Karpecki:** Do you ask certain questions or look for specific conditions to identify candidates?

**Dr. Lowe:** I'm prepresbyopic, but I wear the lenses to see more clearly, reduce eye strain and, who knows, maybe they'll keep me out of progressives longer. I use this logic with patients who are about my age, and they respond to it well.

**Dr. Campisi:** I'm an emmetrope, but I've always had a problem driving at night because of glare. I never could understand why until I saw my iPrint scan. I have laminated my scan, and now I show it to all patients who also might have trouble driving at night. I say, "Look, I'm worse than you are, and I don't wear eyeglasses." They understand right away what I can do for them.

This technique has helped me identify about 20 patients a month who would benefit from the iZon lenses — just by showing the scan and talking about the glare while driving at night.

## Occupations and hobbies

**Dr. Karpecki:** Do certain occupations or hobbies make patients better candidates for wavefront lenses than others?

**Dr. Layman:** We see a lot of truck drivers who tell us these lenses help them see better than ever on the road. Sales people also are ideal candidates because they're always looking for addresses and directions. In

addition, patients who can't achieve sharp, 20/20 vision due to any ocular pathology do well. Heavy computer users typically benefit, too.

**Dr. Gindoff:** As a pilot, I can tell you that flying, especially at night, is much easier when wearing these lenses. I don't just recommend these lenses for pilots; this is one instance in which I always prescribe them.

**Dr. Campisi:** We can all identify ideal settings to find potential patients. Small airports, limousine and taxi services, state trooper barracks and ambulance driving syndicates are all good places to locate ideal candidates. All it takes is one patient to brag about how much the lenses help him or her to see and that will lead to several word-of-mouth referrals.

**Dr. Quon:** I have many patients who drive at night and are uncomfortable with their depth perception, visual acuity, the glare and halos around headlights. Generally, I recommend the iZon lens to compensate for these problems. I find that engineers also are interested in this technology. I've had quite a few engineers from Boeing visit my practice after researching the iZon technology on the Internet.

**Dr. Gindoff:** As I mentioned before, these lenses play a role in improving vision after refractive surgery. However, you must be careful how you communicate this to patients to avoid giving them the impression their surgery was a failure. We tell patients they may see glare and rings around lights for a while after the surgery. "If you're bothered by this," I explain, "and you find you can't drive at night, I have a way to solve your problem."

People who benefit the most from these lenses are refractive keratotomy (RK) patients and those who underwent LASIK before wavefront-guided technology was introduced to customize surgery. Their refraction is next to nothing, but they still have difficulty seeing at night. Once they put on the iZon lenses, immediately they're very happy. I've seen tears in my patients' eyes once they've gotten their eyeglasses. No joke.

**Dr. Campisi:** I agree with this approach. However, keep in mind that no controlled clinical trials have been conducted in post-LASIK patients, although there are cases where iZon lenses prove successful in the post-refractive surgery population. In the short time I've used this technology, I've prescribed the iZon lenses to two patients who've had previous refractive surgery. And they were most impressed by the change in their visual acuity. Multifocal implants and intraocular lenses also may produce glare, so these patients may be potential candidates.

**Dr. Layman:** We had a post-LASIK patient who was

## WORKING WITH A LASER CENTER

I attract new candidates for the iZon lenses by promoting them to a laser center in my area. The center's manager asked me about the lenses, so I invited him to come by for a quick refraction and to order a pair of the lenses. He accepted my offer, and he just couldn't believe the results.

Now, he's sending me patients who don't qualify for a LASIK touch-up or enhancement but are concerned about glare and halos around lights at night. That's been a great boost for my practice. One patient I had who used to see two headlights as one is now driving at night for the first time in 5 years.

— Daniel E. Quon, O.D.

## IMPROVED NIGHTTIME DRIVING

Nearly eight out of 10 consumers, age 18 and older, report that nighttime vision is a challenge (Source: Nationwide survey conducted by Ophthonix). And this is often a complaint practitioners hear from patients on whom they've performed refractions. The most frequently reported causes of this challenge include poorer vision during low-light conditions, along with glare, halos and starbursts from street lights, car headlights and reflections from rearview mirrors.

The iZon High Resolution Lens can be a good solution for patients who experience difficulty with nighttime vision. In addition to providing generally sharp vision, iZon Lens wearers also are very positive about their vision for both daytime and nighttime driving (Source: iZon patient feedback questionnaires).

The benefits of the iZon Lens for nighttime driving have been demonstrated in a controlled clinical trial, using an FDA validated simulator. In this study (Source: Clinical study conducted by US Navy Refractive Surgery Center, San Diego, Calif.), 27 subjects were evaluated in night driving conditions wearing both the iZon Lenses and conventional lenses. Both lenses were made of matching materials and coatings, and were mounted in identical frames. The single difference between the lenses was that the iZon Lens was based upon a patient's individual optical fingerprint, or iPrint. (The iPrint contains all second to sixth order aberrations.)

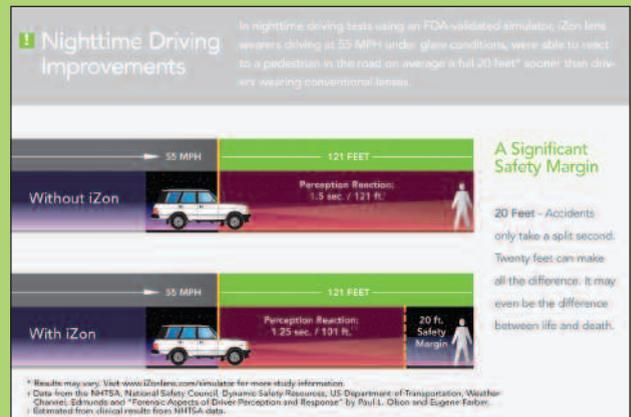
overwhelmed by his visual acuity after we prescribed these lenses. He said, "These are the most fantastic eyeglasses I've ever had in my life." And he'd come in just for reading glasses. It's fascinating that such low prescriptions provide so much benefit.

**Dr. Lowe:** In our practice, we had a post-LASIK patient who had to wear Polaroid sunglasses to drive at night — but not anymore thanks to these lenses. And she couldn't be happier. The closer to plano, the greater the wow factor in patients who are symptomatic due to uncorrected higher-order aberrations.

### Managing dissatisfied patients

**Dr. Layman:** Identifying the right patients is essential, of course. But what if your patient has a poor visual outcome?

**Dr. Gindoff:** When I began using the technology, I prescribed directly from the iZon printouts. Some



A clinical study showed that iZon lenses provided wearers with the ability to react more than 20 feet sooner at 55 miles per hour than when wearing conventional lenses.

The night driving simulation included 12 tests, where the subject had to detect and then identify potential hazards. The tests included glare and nonglare conditions. In all 12 tests, the iZon Lens held an advantage for improving reaction time, with 10 of the tests being statistically significant. For example, in one of the tests, involving a pedestrian near the highway under glare conditions, the iZon lens provided an improved reaction time of 0.25 seconds or a 20-foot shorter stopping distance when traveling at 55 mph. This is better than one full car length, which could be the difference between life and death.

patients complained of less optimal vision. But we got around that by scanning each eye five times instead of three times. Ophthonix recommends three readings with the Z-View Aberrometer and only recommends modifications of some sphere with select patients. In my experience, the more scans you make, the more data the computer can analyze and the better off the patient will be. If the technician can't get five scans, I won't use the data and we'll refract normally. If I have five clean scans, I'm fairly comfortable that we can use the data to prescribe directly from the Z-View Aberrometer. This doesn't mean that the doctor's judgment is ignored in the prescribing phase (i.e. a patient's been wearing -0.75 cylinder and now the Z-View measures -1.75 cylinder). Some "doctoring" still occurs to determine if I want to prescribe all or some of that cylinder power. Many times, I'll modify the sphere finding for the very same reason. But what's

important to understand is that this data is accurate if you get five clean scans.

### Progressive lens wearers

**Dr. Karpecki:** How do you approach wavefront progressives? Do you recommend them for early presbyopes? Late presbyopes? Are there any issues associated with converting existing progressive addition lens (PAL) wearers?

**Dr. Lowe:** We've fit almost everyone who's been wearing PALs into one of the new wavefront PALs, and we've had very few issues. We've had some comments about the corridor. Patients say their vision is great in the iZon, but they feel more restricted than they were in the Physio 360°. They need a little more time to adapt. In addition, with experience, we've improved our readings, making sure everything is in alignment. So now we have more success. However, we have the greatest success with first-time PAL wearers because it's easier for them to adapt.

**Dr. Quon:** Presently, I position the iZon progressive as the premium progressive. I firmly believe in the lens because I wear it. I have several top-of-the-line progressives, including many wavefront-guided and free-form designs. Most of these new progressives are excellent products, but when compared to the iZon progressives, the iZons provide me with a wider intermediate distance, larger reading area, clearer distance vision and greater visual comfort.

Initially, you'll experience what I call a little bit of visual overload when you wear them the first day. But you'll quickly adapt to the clarity of vision. Other than that, I think the iZon progressive is excellent.

### Will patients pay?

**Dr. Campisi:** Many of our colleagues say they avoid this technology for fear of not being able to sell a premium lens to patients — even ideal candidates. But I don't believe prescribing this lens is about selling a product. It's about using a technology to help patients see better and improve their quality of life.

I've done the price comparisons with other premium products, and my message to our colleagues is this: If you have patients who will buy any premium lens, you have patients who will want a wavefront lens, such as the iZon.

**Dr. Quon:** If a patient wants the best lens available, price generally isn't an issue. When you offer iZon lenses, you encourage patient loyalty and internal product purchasing within your practice. As we all know, many people take their prescriptions out the door with them. But they can't fill an iZon prescription everywhere. As far as I know, iZon lenses are available only through

independent practitioners. This supports independent optometry and differentiates your practice from the "big box" optical stores.

**Dr. Karpecki:** What about customization? So many products in the consumer marketplace are customized. Isn't this technology consistent with this trend?

**Dr. Campisi:** Because I'm the first doctor in New

People who benefit the most from these lenses are refractive keratotomy (RK) patients and those who underwent LASIK before wavefront-guided technology was introduced.

— Stuart A. Gindoff, O.D.



England to introduce this technology, I hear my colleagues' concerns that their patients might not want to wait a couple of extra weeks for their eyeglasses.

I explain to them that I drive a luxury car, and that they probably do, too, and didn't mind waiting an extra 2 or 3 weeks for the heated steering wheel, which many people in New England appreciate.

My patients understand the word "custom." There's a 2 to 3 week wait for custom toric multifocal contacts or out-of-range eyeglass/contact lens orders. The women often come in with expensive handbags, and they drive nice cars. I tell them up front: "This lens is a custom item. I'm sure you've waited for every high-end item you've ever ordered. This is no different." And they're fine with that.

**Dr. Karpecki:** Setting the right expectations is important.

### From the top down

**Dr. Quon:** In optometry, we've always used the phrase, "top-down" selling. You start with Cartier, Swarovski and so forth, and everything else looks a lot less expensive by comparison. The same principle applies to the iZon. You present the top-of-the-line lens to patients, and it's up to them to decide if they want the Mercedes or the Chevrolet. In the end, you have to leave the decision to patients. **OM**

# Applying Aberrometry

From dispensing customized lenses to detecting eye disease, here's how these O.D.s are using aberrometry to maximize patient care.

**Dr. Karpecki:** We've provided an overview of wavefront lens dispensing and discussed how to select the best candidates. I'd like to know more about how you apply aberrometry in practice to perform refractions and detect disease.

## Reliable data

**Dr. Gindoff:** In our practice, where we manage refractive surgery cases, many of our technicians perform refractions. In the past, knowing who performed the refraction was as important as understanding the data.

With the Z-View Aberrometer, I obtain standardized, repeatable data I can depend on without worrying about which technician performed the presurgical refraction. We've all had problems with instrument-induced myopia associated with some of the other autorefractors that developed over time. But this particular technology doesn't seem as susceptible to that problem.



The Z-View Aberrometer collects and processes data from the eye's higher-order aberrations for individualized prescriptions.

**Dr. Campisi:** I'm the technician in my office. I perform all of the Z-View scans. I like using the Z-View Aberrometer because it helps me identify cortical spokes, Fuchs' dystrophy and unusual shadows that I wouldn't normally see during refraction. On one occasion, I detected keratoconus before taking autokeratometry or topography readings — even before using the slit lamp. The cone actually cast a shadow and was picked up on the iPrint.

When the aberrometer doesn't produce a usable scan, I know to look for pathology or binocular vision disorder. It's so gratifying when patients realize that I've identified their problems within a few seconds of starting their exam.

**Dr. Gindoff:** In my practice, we deal with many post-op cataract cases, so it's not uncommon for technicians to tell me they think they've identified a posterior capsule opacification on the Z-View Aberrometer. I check to confirm their suspicions, and they're usually right.

**Dr. Quon:** My technicians use the Z-View for pretesting, allowing them to identify problems for me in advance. Cataracts, keratoconus and some corneal problems show up as irregularities on the Z-View video display. My job becomes easier when I'm told ahead of time that I may need to examine a patient more closely for ocular health issues. At the same time, the technicians become more involved with patient care and the diagnostic process.

## Detecting other pathologies

**Dr. Karpecki:** Although the Z-View Aberrometer isn't designed or approved for detecting pathologies other than higher-order aberrations, have any of you detected other pathologies besides Fuchs' dystrophy, keratoconus and cataracts?

**Dr. Campisi:** Yes, I have detected epithelial basement dystrophy. We were unable to obtain a scan from a patient, who was self-referred from the [izonlens.com](http://izonlens.com) Web site, due to his EBMD. His ophthalmologist advised me to dilate his pupils to create a larger scan area. The Z-view couldn't produce a wave scan since the dystrophy was too advanced. I could see the maps and dots in retro-illumination right on the aberrometer screen. Even though he didn't qualify for iZon lenses, we improved his vision with gas permeable contact lenses. This was another example of how we attracted a new patient by having state-of-the-art technology. Also, it's created a nice referral source with the patient's corneal specialist.

This MD saw the value in seeking an iZon consult from me before surgical interventions, such as Descemet's stripping endothelial keratoplasty.

Attracting more patients who are seeking correction for corneal irregularities and glare has changed my practice emphasis from primary care to comanagement with corneal specialists. The networking has been a tremendous asset. I've learned that what is good for the patient is good for the practice.

**Dr. Karpecki:** This is proof that wavefront technology actually can shift the way you practice, depending on how you apply it to patient care. **OM**

# Minimizing Refractive Errors

Learn how the latest in aberrometry can improve and possibly change the way you perform refractions.

**Dr. Karpecki:** Many of us are starting to use the wavefront aberrometer as an autorefractor. Is that the case for you?

**Dr. Lowe:** Yes, but not solely. We've always prided ourselves on performing great refractions. We still run our patients through our autorefractor, however, because it has a keratometer in it. When we started using the Z-View Aberrometer, we saw that, in most cases, our refraction, autorefractor and wavefront readings all correlated. When they didn't, the aberrometer usually provided the accurate prescription. I continued to perform a conventional refraction with retinoscopy until I realized how redundant it had become.

**Dr. Campisi:** We had the same experience. I haven't picked up my retinoscope in a while. I prescribe lenses right from my Z-View.

## Modifying a prescription

**Dr. Gindoff:** Does everyone on the panel prescribe an iZon lens according to the Z-View Aberrometer readings? Or do you modify the lower-order aberrations (sphere, cylinder and axis) on the prescription printout form, thereby keeping the neutralization for the higher-order aberrations?

**Dr. Quon:** As I understand it, the protocol for using the Z-View to prescribe iZon lenses is to use the cylinder and axis as is and possibly modify the sphere as needed. I begin each refraction with the Z-View's readings. If I get a soft refraction, generally I'll use the results from the Z-View and modify the sphere slightly. If I get a refraction with a 20° difference in axis as compared to the reading recommended by the Z-view, I use my own manifest refraction.

**Dr. Gindoff:** Are you still ordering the iZon lens with your phoropter data?

**Dr. Quon:** Generally, I do. I may modify the data if I have a refraction that's between quarter-diopter steps. Then, I'll choose the 1/8th diopter that's indicated.

**Dr. Gindoff:** We've just begun to prescribe in 1/8ths since introducing the Z-View Aberrometer. I do this

even when I prescribe for a lens other than the iZon. The lab personnel aren't thrilled about this, but I do it for the patient's benefit.

**Dr. Campisi:** I agree that it's more difficult to illustrate 1/8 diopter prescriptions to a patient sitting behind a phoropter. I also agree that the smaller prescriptions create more of an impression for patients with HOAs. Traditionally, I wouldn't prescribe for +/- .25 or less. The Z-View has altered the way I prescribe. Now I tell my patients: "Look, if you take this prescription anywhere else, the staff will probably laugh at you because the prescription is so small. I've never worked in such small increments until I acquired this technology, but the advantages are greater than what one would expect when combining this with the iPrint data.

Wavefront technology ... has the potential to revolutionize patient care in the way we perform refractions, detect disease and improve vision.

— Paul M. Karpecki, O.D.



## Refracting and scanning techniques

**Dr. Gindoff:** Do you refract more for progressive or single-vision iZons?

**Dr. Campisi:** I prescribe more progressives than single-vision iZon lenses. Also, I should note that I always perform binocular testing, so I don't disregard the entire refractive process. I do near and far phorias, which are crucial when prescribing PALs. If a patient has a high phoria at near, I perform base out-compen-

sating vergences to ensure they can get their eyes into the progressive channel. If they can't, I'll prescribe some base-in prism so they can better converge at near, making it easier to adapt to the PAL.

**Dr. Gindoff:** I think iZons are different, though, because I can find the channel. It's wonderful.

**Dr. Campisi:** Adaptation is difficult for a patient with 12 prism diopters of exophoria or convergence insufficiency no matter what progressive brand you use.

I'd noticed that my high exophoria patients weren't scanning accurately. One of the engineers at Ophthonix, the manufacturer of the Z-View Aberrometer, suggested I scan monocularly if a patient had poor binocular vision. The Z-View gave me a better refraction when I had the patient fixate monocularly on the instrument. I use this philosophy in reverse sometimes. If a patient doesn't scan accurately, I investigate the binocular system more closely. Nine times out of 10, they're good candidates for vision therapy.

### Expanding utility

**Dr. Karpecki:** With the Z-View Aberrometer, as we've discussed, you no longer need to perform retinoscopy. Your staff has incorporated the technology into the screening process. Does this help with patient flow?

**Dr. Quon:** I'd like to see an auto-keratometer or a topographer combined with the Z-View.

**Dr. Campisi:** I'm hoping the Z-View will be paired with a digital refracting device some day, because transferring the data from the Z-View to the phoropter can slow the refractive process down. Digital technologies enable the AR/AK information to be wired into the digital phoropter. I plan to purchase a digital refraction system this year to work with the Z-View Aberrometer.

**Dr. Gindoff:** The aberrometer can slow down the screening process in the beginning, but the exam becomes more efficient once you and your technicians become accustomed to how it works. My aberrometer isn't linked to the phoropter. We take five scans, which requires more time, but I prescribe from the aberrometer data. This is the first instrument that's enabled me to write prescriptions accurately without having to use other equipment. I recently learned, however, that the most recent software release for the Z-View does include the interface required for commercially available digital phoropters.

**Dr. Campisi:** Sometimes, to improve efficiency, I scan patients who aren't going to receive iZon lenses, such as children, because the refraction is so accurate.

**Dr. Lowe:** Scanning patients who we know may not be candidates for iZon lenses has streamlined my refraction process as well. I'm able to perform refractions much more quickly. I still do binocular checks, but scanning all patients cuts down on my refraction time. This gives me more time to talk to them about their visual needs, which I didn't have before.

I begin each refraction with the Z-View's readings. If I get a soft refraction, generally I'll use the results from the Z-View and modify the sphere slightly.

— Daniel E. Quon, O.D.



### New way to practice

**Dr. Karpecki:** Does this technology have the potential to change the way optometrists perform refractions? Dr. Layman, as the doctor who was named optometrist of the year in 2006, what do you think?

**Dr. Layman:** This technology is for any practitioner interested in differentiating his or her practice as cutting-edge. Only the discriminating patient will expect a tool like this that offers such an advanced degree of clarity as well as an opportunity for more incisive diagnoses and more accurate correction.

**Dr. Campisi:** With the introduction of digital refractions, it's acceptable within our community to use the aberrometer as an autorefractor. From the patient's perspective, when they sit behind the Z-View Aberrometer and find out it will take less than a minute, and there's no need to say "one" or "two" anymore, they get excited.

### Revolutionizing patient care

**Dr. Karpecki:** Using wavefront technology to customize spectacle lenses for patients is, indeed, exciting. It has the potential to revolutionize patient care in the way we perform refractions, detect disease and improve vision. The more we talk about the benefits of this technology and how it can significantly improve the lives of patients, the more likely our colleagues will be to introduce it and transform their practices. **OM**

