SEEING THE EYE IN A NEW LIGHT

Dynamic new technologies driving better outcomes.

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Do you feel that your current OR microscope lets you see all the intraocular details you need to? The Zeiss OPMI Lumera and Lumera T Surgical Microscopes (Carl Zeiss Meditec, Inc., Dublin, CA) are designed to give the best possible view of the red reflex. They incorporate Stereo Coaxial Illumination (SCI) technology to provide steady, high-quality recognition of detail. In my opinion, this technology is a remarkable innovation. It generates a bright, homogenous field, and it provides phenomenal depth perception and a steady image—no more of the dancing red reflex. Figure 1 illustrates the principle. A conventional scope is shown on the left and the SCI technology on the right. The surgeon peers through two oculars to look into the pupil. A conventional microscope supplies the light down through the middle of the scope. It usually has to be offset 2º to avoid a flashback from the corneal apex. The surgeon must manipulate the light’s position until it floods the retina and achieves a red reflex.

With the SCI technology, Carl Zeiss Meditec figured out a way to send a beam of light down the same pathway as each eye. These beams parallel each other through the microscope, and then they hit the retina concurrently before bouncing back up. The result is a much more consistent red reflex, particularly with the more optically distorted eyes: those with small pupils; dark pigmentation; tilting; and even dense cataracts. For example, at the slit-lamp, I have been convinced that I would need trypan blue for visualization in the OR, yet I was surprised when the Lumera was able to achieve a good red reflex. Thus, I believe this technology is a true innovation.

To reiterate, the OPMI Lumera shows cataracts in ways never seen before. Its enhanced stereoillumination aligns with the user’s ocular pathways every time to dramatically enhance stereopsis. The microscope also features the DeepView depth-of-field management system and apochromatic optics to achieve a high-contrast, high-quality image. It will dramatically show the fluid wave from a hydrodissection. Additionally, the OPMI Lumera T is outfitted with an integrated video monitor that can be placed in various positions so that your staff may follow the operation. Having all these features and more in one surgical microscope makes me feel much more secure about entering and working in the eye.

Read on to hear respected practitioners describe how definitively the Lumera enhances the red reflex. I firmly believe that the microscope's superior optics will lead to safer surgery for both routine and challenging cataract cases.

—Roger F. Steinert, MD
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Managing Vitreous With the OPMI Lumera

Superior visualization brings the surgeon confidence in one challenging case.

BY ROBERT H. OSher, MD

I have been lucky in my lifetime to witness many exciting advances in ophthalmology: the evolution of phacoemulsification; improved ophthalmic viscosurgical devices; smaller and smaller incisions; and an explosion in IOL technology. Surgical microscopes, however, have not changed much in the last few decades—until the OPMI Lumera (Carl Zeiss Meditec, Inc., Dublin, CA) (Figure 1).

AN IMPRESSIVE DIFFERENCE

When a representative from Zeiss came to my office at the Cincinnati Eye Institute to demonstrate the Lumera, I was not excited about the prospect of trying a new surgical microscope. I loved my old Zeiss and even opted to keep it when the rest of my group upgraded their equipment. I certainly was not ready to give up my old microscope for what I anticipated would be a newer, slightly different model. Instead, my team and I were shocked by what we could see with the OPMI Lumera.

I had never observed ocular anatomy with such clarity. I was mesmerized by the degree of detail. For the first time, I could watch the coalescence of the channels in the Healon5 (Advanced Medical Optics, Inc., Santa Ana, CA). I could see the features of the posterior polymorphous dystrophy on the corneal endothelium. I could not believe what I saw in the lens; instead of simply identifying a nuclear, cortical, or posterior subcapsular cataract, I could view intralenticular changes that I had never previously seen. The depth of field was extraordinary, and I saw the vitreous anatomy like never before. The red reflex was consistently brilliant in every case irrespective of the pupil size, the maturity of the lens, or the angle of the microscope (Figure 2A and B). I cannot overemphasize the dramatic difference between my view with the Lumera compared to that of the traditional microscope.

FIRST EXPERIENCE

I enjoyed testing the OPMI Lumera throughout various stages of the intraocular surgery. The stereo coaxial illumination shows the edges of the capsulorhexis in amazing contrast. I was astounded by every step, except the view during the phacoemulsification, which seemed on par with that provided by my previous microscope. Because of the increased depth of field that puts all structures in focus, a bit of a learning curve was necessary. The detail of the cortex being removed and the capsular striae during vacuuming was breathtaking. Even the dots on the toric lens I implanted stood out conspicuously against the red reflex. By experimenting with different lighting...
options, I was able to enhance the contrast and the red reflex during various steps of the procedure.

A CHALLENGING CASE VIEWED WITH THE LUMERA

The first day I used the Lumera in cataract surgery, I had a case in which I got into trouble. I attempted to inject a single-piece IOL using a new cartridge and found out that this combination does not work with the usual one-handed injector of my own design. The lens abruptly disengaged and ruptured the posterior capsule. I tried to elevate the IOL's optic through the capsulorhexis while positioning the haptics in the capsular bag. At this point, I encountered vitreous.

After performing a brief vitrectomy during which I clearly and easily identified the vitreous strands with the Lumera, I was able to capture the optic and complete the case.

AN EXCELLENT RESULT

I could not have executed the intraoperative maneuvers with nearly this amount of confidence if I had not been able to see the anatomic structures so vividly. I am convinced that the successful outcome in this challenging eye was due to the excellent visualization afforded by the OPMI Lumera. Moreover, the clarity of the operative video is perhaps the best that I have ever recorded.

Figure 2. The creation of the capsulorhexis (A and B) as seen through the OPMI Lumera. Note the clarity of the red reflex.
In my opinion, the introduction of the Version 5 Advanced Technology Software for the IOLMaster (Carl Zeiss Meditec, Inc., Dublin, CA) has made a tremendously useful product even better. Although the earlier versions of the IOLMaster’s software were impressive, it was unable to measure the axial length of some patients’ eyes. Additionally, its keratometry readings suffered from a certain degree of variability. The IOLMaster’s new Version 5 software is touted for its ability to acquire axial-length measurements in more patients, which is certainly a big benefit. I think a more exciting feature of the software, however, is the quality of the keratometric data it acquires. Surgeons can select premium, toric, and multifocal lenses directly from the machine’s K readings. My results have been terrific, and this article describes the value that this new software has brought to my practice.

Routine is Now Premium

Everyone who works in ophthalmology today is excited about premium lenses, but I think surgeons forget that their routine cataract patients have really become premium IOL patients who expect a premium refractive outcome. Patients judge the quality of our surgical skills by how close we can get their refraction to plano, a task that is challenging to achieve without accurate biometry. We can do the most difficult phaco surgery in the world—preserving the capsule in the face of bad zonules, to name an example—but if the patient ends up +1.50 D, he will think the surgery was a disaster. So, whereas many surgeons think they will only invest in the IOLMaster if they get into premium IOLs, they will find that the device will greatly benefit them with routine patients as well.

Benefits of the New Software

The IOLMaster’s Version 5 software is better able to filter signal-to-noise ratios than its predecessor, thereby expanding its range of measurable patients. To me, however, the machine’s greater advantage is its ability to provide very accurate, high-quality keratometric readings.
that I can depend on right out of the box. I do not have to verify my K readings against a different machine or manual keratometry, and this increases my office’s efficiency significantly without sacrificing accuracy.

CASE EXAMPLE
Recently, I operated on a woman who had very high myopia. Her right eye was -17.00 D, and her left eye was -14.00 D and had a scleral buckle. Of course, she wanted to see perfectly after the surgery. The IOLMaster’s axial length and keratometric readings called for a -3.00 D IOL OD and a +4.00 D lens OS (Figures 1 and 2). Although this was a large discrepancy between the two eyes, I have used the machine for so long and have such faith in the software that I believed the measurements were sound. I informed the patient that the discrepancy in her IOL powers was unusual but that, based on the readings, I planned to implant these two powers of IOLs. Both of her eyes hit their refractive target exactly, and she was pleased to achieve a 20/20 result.

Most surgeons would not be comfortable proceeding with surgery if they got measurements like that with immersion A-scan, and they would probably send the patient somewhere else to be measured. The IOLMaster’s Version 5 software, however, is invaluable in the way it removes variability from the measurement process.

VALUE IN THE DAY-TO-DAY
I have been surprised at how much the IOLMaster helps me with routine surgical cases, and this is the primary message I want to convey to surgeons considering its purchase. Not only is my patient flow much smoother, but I also have more confidence in my surgical planning, because I am able to choose a patient’s implant based on the machine’s calculations and be as assured as possible with current technology that I am going to meet my target refraction.

Because the IOLMaster still cannot measure a small percentage of eyes, I have not given up immersion A-scan completely. I no longer have my technician perform manual keratometry routinely, however, and I only use this method to take topographic readings from premium IOL patients. Our primary goal is not to verify the patients’ K readings but rather to confirm they do not have anomalies in their overall topography that might contraindicate the implantation of a premium IOL.

MORE HAPPY PATIENTS
I think most surgeons now agree that the IOLMaster’s technology is superior to immersion A-scan, but many of them are daunted by the initial financial investment. I advise surgeons to consider how their practice and patients can benefit from the technology. Instead of investing a lot of time and effort counseling (and correcting) patients with undesirable refractive outcomes, surgeons can use the IOLMaster’s Advanced Version 5 software to avoid missing surgical targets and make more patients happy. A greater number of happy patients will grow your practice, and in this way, the machine becomes quite cost effective. Remember, even if you are strictly a cataract surgeon, your “product” is giving people the refractive results they want to achieve.

Figure 2. An image of the IOLMaster’s IOL Power Calculations printout per the case example.
When used together, the ATLAS 9000 corneal topography system, which functions on Placido-disk technology, and the Visante OCT Anterior Segment Imaging and Biometry (both manufactured by Carl Zeiss Meditec, Inc., Dublin, CA) formulate a more complete and accurate picture of the eye for improved corneal and intraocular surgery.

The Visante OCT, which is slightly larger than a topographer, provides exquisite images of the anterior segment and clear pictures of the shape of the cornea and the structure of the angles (Figure 1). In some eyes, it can even image the ciliary body. The corneal views assist in excimer laser surgery and corneal transplants, and the intraocular views facilitate treatments ranging from glaucoma management to phakic IOL implantation. Roger F. Steinert, MD, and David Huang, MD, PhD, coauthored Anterior Segment Optical Coherence Tomography, which is a great resource for understanding the Visante’s capabilities.

The following cases provide examples of how I have used the ATLAS and Visante OCT within my practice to optimize surgical outcomes.

CASE No. 1
A 30-year-old white female taking Topamax (topiramate; Ortho-McNeil-Janssen Pharmaceuticals, Inc., Titusville, NJ) for migraines for 2 weeks presented with progressively declining vision that had reached 20/400. Her refractions were -3.50 D in the right eye and -5.00 D in the left (both correctable to 20/20). The Visante OCT showed that the anterior chambers in both eyes were relatively shallow and that the angles were approximately 25° (Figure 1). I asked her to discontinue the Topamax.

At 2 weeks, her vision had returned to 20/20 uncorrected with slight hyperopia. The Visante showed an obvious dynamic change internally. The anterior chamber had deepened from an endothelial-anterior lens capsule distance of 2.26 to 2.79 mm. The gonio angles also opened up from 25° to 43°. Notable changes in the crystalline lens rise were also seen, with a reduction from 900 µm to 520 µm (Figure 2).

CASE No. 2
A 20-year-old white male with a refraction of -14.25 -2.75 X 115 in the right eye and -11.25 -1.00 X 090 in the left eye was seeking refractive surgery. My staff and I evaluated the patient for implantation of the Verisyse phakic IOL (Advanced Medical Optics, Inc.,...
Santa Ana, CA) in the right eye and iLASIK (Advanced Medical Optics, Inc.) in the left eye. The VeriCalc software (Advanced Medical Optics, Inc.) calculated the distance from the Verisyse lens’ edge to the endothelium as 1.92 mm. However, the Visante 2.0 software with its phakic IOL model predicted 1.59 mm and a crystalline lens rise of 300 µm. The actual measurement after implantation proved to be 1.64 mm. Additionally, the Visante’s preoperative module was able to predict a 41.67-µm vault distance between the surface of the anterior crystalline lens and the posterior surface of the Verisyse IOL. The actual distance postoperatively was 38.67 µm. Figure 3 shows the right eye with the implanted Verisyse superimposed in a model. It is important to remember that the anterior chamber depth is reduced by approximately 20 µm per year, with an increased rise of the crystalline lens and consequential narrowing of the vault distance. This phenomenon increases the risk for late postoperative complications.

**VISANTE 3.0 SOFTWARE**

The newest software upgrade in development, Version 3.0, combines the ATLAS’ anterior corneal topographic information with the OCT’s enhanced pachymetric map. ATLAS models 993, 995, and the newer 9000 are all compatible with this new software. This unique combination establishes a gold standard for Placido-disc anterior surface information as well as for highly precise OCT-enhanced pachymetric data for details about the posterior curvature. Another upgrade feature, the V-Trac Alignment System, provides precise imaging and registration of the corneal vertex in both the ATLAS and the Visante systems’ images. This registration of the vertex ensures proper matching of the locations of the topographic and pachymetric

![Figure 4. Combining the anterior surface data and pachymetric data allows for the derivation of posterior surface data in the new Version 3.0 software.](image)

![Figure 5. An ATLAS image of pellucid marginal degeneration.](image)

![Figure 6. Anterior and posterior elevations and curvatures.](image)

![Figure 7. Elevated keratometric values in keratoconus.](image)

![Figure 8. ATLAS-Visante mapping confirmed keratoconus.](image)
data point locations. The screen shows two images: one with Placido-disc mapping, which provides the anterior elevation information, and the pachymetric data from the Visante (Figure 4). This combination can now be used to provide some information on the posterior curvature and elevation.

**CASE No. 3**

Figure 5 shows the ATLAS image of an eye of a 53-year-old black female with pellucid marginal degeneration. The pachymetric map shows corneal thinning inferiorly. Combining the information from the ATLAS with the pachymetric map revealed anterior elevation inferiorly on both the anterior and posterior mean curvature maps as well as the anterior and posterior elevation maps (Figure 6). They were all consistent with classic pellucid marginal degeneration.

**CASE No. 4**

In September 2006, I performed a corneal transplant for keratoconus on the left eye of a 13-year-old white male. Although the fellow eye was asymptomatic, over the course of the next year, the mires changed, and the keratometric values increased from 46.00 to 56.00 D (Figure 7). His keratoconus progressed further, and eventually, I performed an IntraLase-enabled keratoplasty (Advanced Medical Optics, Inc.). Prior to this procedure, his pachymetric data were regularly concentric and approximately 450 µm thin in the center. The ATLAS-Visante combined mapping showed the central nipple of the cone, which correlated with the posterior elevation (Figure 8).

**CASE No. 5**

A 34-year-old white female wanted a LASIK enhancement of -0.25 -1.75 X 010. Her initial surgery, which I had performed, was for a refraction of -8.00 -2.75 X 020 with a central pachymetry of 515 µm. In the initial procedure, I had used the IntraLase FS laser (Advanced Medical Optics, Inc.) to make a 100-µm flap and then applied a CustomVue treatment (Advanced Medical Optics, Inc.). The residual stromal tissue was 270 to 280 µm (Figure 9). Three months afterward, I chose to perform a PRK enhancement on this eye. Figures 10A and B show the postoperative maps (pre-enhancement) from the ATLAS. The anterior elevation map (10A) correlates with the tissue ablation. Figure 10B shows the anterior mean curvature. After the enhancement, the posterior elevation map (Figure 10C) appeared perfectly spherical, and the posterior mean curvature map (Figure 10D) was unremarkable. Fortunately, this patient is seeing well, and her vision has remained stable postoperatively. This is a good example of a borderline case in which the ATLAS and Visante’s data gave me confidence in my chosen treatment course.

**SUMMARY**

In conclusion, the combination of the Zeiss ATLAS and the Visante Anterior Segment OCT produces an incredible tool for evaluating the anterior and posterior surfaces of the cornea. The devices provide valuable, dynamic, advanced information for pre-LASIK evaluations as well as follow-up progress. Additionally, the Visante’s phakic IOL module enables highly accurate preoperative implantation evaluations with lens models placed inside the anterior chamber. These combined tools are an incredibly strong asset for any cornea and refractive surgeon.

Easier Patient Selection in Refractive Surgery

Clinical experience with the new PathFinder II Corneal Analysis Software and the Visante OCT Topography Link Software.

BY JON G. DISHLER, MD

Several products by Carl Zeiss Meditec, Inc. (Dublin, CA) have achieved the status of gold standard in many areas of ophthalmology. For example, the IOLMaster has established itself as the gold standard for cataract evaluation, and the Lumera OPMI appears to be raising the bar for surgical microscopes. My clinic has been fortunate to be a study site for the Visante Topography Link Software, which links the OCT pachymetry with the ATLAS topography to provide information on the posterior corneal surface, and the ATLAS PathFinder II Corneal Analysis Software, which has come a long way since its first version. The new PathFinder II Software features an advanced algorithm that I feel accurately predicts which patients are candidates for corneal refractive surgery and which are not. For this and other reasons, I find these tools invaluable in my practice.

“The new PathFinder II Software features an advanced algorithm that I feel accurately predicts which patients are candidates for corneal refractive surgery and which are not.”

NEW FEATURES

The original PathFinder Software analyzed three parameters: the Shape Factor, the Toric Keratometric Mean, and the Corneal Irregularity Measurement. The updated PathFinder II is able to provide a much more refined analysis of the corneal surface.

Figure 1. Mean curvature provides a local average curvature at each point, which suppresses corneal astigmatism to reveal the underlying curvature. The Pathfinder II software incorporates nine parameters taken from the Mean Curvature map.
more detailed analysis. The system evaluates an eye against the original three parameters as well as nine other parameters from the new mean curvature map. Mean curvature is different from traditional topography maps in that it suppresses corneal astigmatism to reveal the underlying curvature at each point (Figure 1). Then, the software uses the same traffic-light system as the IOLMaster for identifying any outlying results. Green means that the parameter readings fall within 90% of the normal population; yellow is a standard deviation away, from 90% to 98% of the normal population; and red means beyond 98%.

PathFinder II also features a database of five different clinically recognized corneal conditions, as determined by a multicenter clinical study (data on file with Carl Zeiss Meditec, Inc.). The conditions are normal corneas, suspect/clinical keratoconus, myopic laser vision correction, hyperopic laser vision correction, and other unusual conditions such as corneal transplants. The software compares these evaluations against its clinical database to make its determination. The result is a probability that the topography falls into the five categories mentioned previously (Figure 2). These classifications were proven to be very accurate in the same clinical trial. In fact, when validated against an independent data set, the PathFinder II’s algorithm demonstrated greater than 90% sensitivity, specificity, and accuracy in detecting normal versus abnormal corneas.1

TAKING THE GUESSWORK OUT OF DIAGNOSES

For years, practitioners thought that corneal thickness was the main parameter for safe LASIK surgery, but we now know there are many more factors. Thick corneas can have ectasia, and thin ones can be normal. It is in these questionable cases where I think the Visante OCT Topography Link to the ATLAS becomes invaluable. The following case examples demonstrate the utility of the Visante OCT and ATLAS in clinical practice.

Suspect Keratoconus, Case No. 1

Figure 2 shows an eye diagnosed with suspect keratoconus. The axial curvature map looks abnormal, the mean curvature map confirms it, and the diagnosis is the only one the PathFinder II Software suggests.
This is a relatively straightforward case; the red hot spot is clearly visible in the axial map.

**Suspect Keratoconus, Case No. 2**

Figure 3 shows a slightly irregular topography, the kind we see so routinely in clinical practice. The eye might be normal, or it might be keratoconic. We do not want to chance making a misdiagnosis in today’s medicolegal climate. Compare the posterior elevation map and the posterior mean curvature map (Figure 4), which both appear very normal. These readings confirm that this patient does not have keratoconus. What makes the Visante-ATLAS Topography so invaluable to me during these examinations is the combination of its diagnostic software and back-surface corneal topography.

**Normal or Suspect?**

Figure 5 is of an eye for which the diagnosis of normal or keratoconic is more questionable. On the screen displaying both the anterior and posterior elevation maps, the posterior data make the diagnosis more obvious. Note the inserted Visante OCT image (Figure 6), which shows a cross section of the thinning directly over the areas of the cornea that are elevated and have high curvature.

**CONCLUSION**

I have been very impressed with the diagnostic capabilities of the ATLAS PathFinder II Software and the performance of the Visante OCT Topography Link Software as well. My staff and I have come to rely on these tools in our clinical practice.

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Novel Applications of ATLAS Corneal Topography for the Cataract Surgeon

By Iqbal I. K. Ahmed, MD, and Jennifer Calafati, MD

In cataract surgery, we can only treat the irregularities we can identify. Fortunately, diagnostic imaging for the eye is advancing impressively. Carl Zeiss Meditec, Inc. (Dublin, CA), has developed new software for its upgraded ATLAS 9000 Corneal Topography System that I think will prove quite useful for cataract surgeons. This innovation in diagnostic corneal imaging combines the readings from the ATLAS 9000 with mapping information from the Visante OCT (also from Carl Zeiss Meditec, Inc.) to provide a comprehensive view of the eye. I call this combination ATLAS corneal imaging, because it is more than just topography.

MYRIAD BENEFITS
Meeting Higher Expectations

Routinely performing corneal topography on cataract patients helps us assess the effect of corneal aberrations—whether lower- or higher-order, and including cylinder, irregular, or asymmetric—on patients’ visual outcomes. The ability to preoperatively discern certain corneal pathologies and more accurately select IOL implants is especially important for premium IOL patients, who expect excellent postoperative results. Technology such as the ATLAS 9000 system will help us meet their expectations.

Ocular Alignment for Mapping

One of the issues we surgeons have with any scanning technology, whether it is used in the anterior or posterior segment, is reproducibly achieving proper alignment with the eye’s axes to ensure reliable mapping. The ATLAS 9000 and Visante OCT have new features to improve this function. When conducting topographical mapping, we are used to working with a variety of curvature maps, such as axial, tangential, and mean curvature. These same data maps can be developed from simulated keratometry and videokeratoscopy and evaluated with a topographical device.

Astigmatism Management

The use of corneal topography in astigmatic treatments, whether using lenticular or corneal methods, is a somewhat new area of diagnosis that is generating great interest. As cataract and refractive surgeons implant more premium IOls, it is becoming increasingly important to manage astigmatism. Corneal curvature maps
can be quite helpful for surgeons to plan the placement of limbal relaxing incisions and toric IOLs along the appropriate axis. For example, Figure 1 shows a patient with a little bit of against-the-rule cylinder. The surgeon could choose to make two limbal relaxing incisions to flatten the steep axis, or he may decide to place a toric IOL in an equal but opposite power.

Corneal Aberrations

The new ATLAS 9000 software offers several diagnostic features that provide additional information about corneal aberrations. One particularly advantageous function is image simulation, which shows patients an example of how an eye chart may appear to them under the influence of their corneal aberration. This application also helps surgeons to explain why patients may still not see clearly after cataract surgery and why they may need additional treatment to correct certain aberrations. The software’s modulation transfer function and Zernike analysis can be used to further customize IOL technology. With three choices of aspheric IOLs available (the Tecnis [Advanced Medical Optics, Inc., Santa Ana, CA], the AcrySof IQ [Alcon Laboratories, Inc., Fort Worth, TX], and the Sofport AO [Bausch & Lomb, Rochester, NY]), how can we select the most appropriate lens for the patient? The ATLAS gives us the ability to determine corneal spherical aberration (Figure 2, arrow), which, as George Beiko, MD, found in a large population of cataract patients,1 can vary widely. By determining the patient’s specific corneal aberration, we can select the appropriate IOL to correct the entire amount or leave some residual spherical aberration, depending on the patient’s visual preferences. This is how we can use the ATLAS to custom-select corrective lenses for our patients.

Pupillometry

I find pupillometry to be increasingly important in both LASIK and cataract surgery. We know that pupil size can play a role in IOL selection. For example, pupils smaller than 2 mm may not experience sufficient near vision from refractive multifocal IOLs, and pupils that are too large may have suboptimal experiences with diffractive lenses. Larger pupils may also be at risk for dysphotopsia. Figure 3 shows scotopic and photopic imaging of the pupil with the ATLAS. Note the difference in the pupil size of two different patients under scotopic and photopic lighting. This comparison demonstrates that due to the relative size of the pupil, one particular multifocal IOL may be preferred over the other in consideration of light conditions. Obviously, the utility of this technology is very exciting.

CONCLUSIONS

As I have tried to illustrate in this overview, I see multiple potential applications for the ATLAS technologies, which I consider to be beyond corneal topography. As ophthalmologists adopt more advanced surgical techniques, we need measurements that we can trust, and I have confidence in the reliability of Carl Zeiss Meditec’s devices. The use of corneal topography in managing perioperative astigmatism, the assessment of high-order corneal aberration, aspheric IOL selection, and the use of pupillometry in multifocal IOL preference are just some of the potential uses of the ATLAS 9000 for the cataract surgeon.
