

Supplement to

CRST

Cataract & Refractive Surgery Today

May 2015

Sponsored by
Abbott Medical Optics Inc.

Advanced Lasers and Imaging for Cataract Surgery

*Members of the Vanguard
Ophthalmology Society discuss
the premium technologies
they rely on for optimal results.*



ADVANCED LASER CATARACT TECHNOLOGY FOR A PREMIUM LEVEL OF SURGERY

This monograph highlights Abbott Medical Optics' laser cataract technology. It is the follow-up to the supplement on advanced IOL technology that ran in Cataract & Refractive Surgery Today in April.

It is a great time to be a refractive cataract surgeon. We are fortunate to live in an era of advanced surgical care where we can offer our patients effective solutions that significantly improve their quality of life. The goal behind this roundtable discussion was to gather some of the next generation's best and brightest minds in ophthalmology to discuss what surgical tools they are currently using and why. Each surgeon who participated is a member of the Vanguard Ophthalmology Society (VOS) and was chosen for his or her unique area of expertise in refractive cataract surgery.

New-technology lasers and phaco systems are modifying the way we understand and treat cataracts and specific forms of refractive error. For example, femtosecond lasers for cataract surgery now use image guidance to create free-floating capsulotomies in a matter of seconds. They also soften cataractous nuclei with customized grid patterns. Finally, dual-pump phaco systems may redefine fluidics for femto-phaco procedures, thereby increasing the efficiency of removing both nuclear and cortical material.

The VOS was formed to recognize and unite future thought leaders in ophthalmologic subspecialties related to the anterior segment. VOS works to identify and develop future ophthalmic trends via the collaborative sharing of ideas on topics related to research and the conception of future medical and surgical therapeutics, diagnostics, informatics, marketing, practice development, ethics, and philanthropy. Read on to see how this group is performing state-of-the-art refractive cataract surgery, and their decision-making processes behind it all.

— George O. Waring IV, MD

PARTICIPANTS



George O. Waring IV, MD, (Moderator) is the director of refractive surgery and an assistant professor of ophthalmology at the Storm Eye Institute, Medical University of South Carolina. He is also the medical director of the Magill Vision Center in Mt. Pleasant, South Carolina. He is a paid consultant to Abbott Medical Optics Inc. Dr. Waring may be reached at waringg@muscc.edu.



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INDICATIONS: The OPTIMEDICA CATALYS Precision Laser System is indicated for use in patients undergoing cataract surgery for removal of the crystalline lens. Intended uses in cataract surgery include anterior capsulotomy, phacofragmentation, and the creation of single-plane and multi-plane arc incisions in the cornea, each of which may be performed either individually or consecutively during the same procedure. See important safety information continued on page 8.

Dr. Waring: We have gathered here to discuss the state-of-the-art femtosecond technology available with the **Catalys** Precision Laser System (Abbott Medical Optics Inc.). Since it acquired Optimedica in 2013, AMO has invested a great deal of development in the **Catalys** system, evident in multiple updates over the past couple years. Here, current users describe the clinical applications of these updates, including the most recent software upgrade, called cOS3 (cataract operating system).

A software upgrade to **Catalys** system in late 2014 added new improvements to the user interface and OCT (Figure 1A and B), as well as other OR advantages. Dr. Ayres, will you please describe this software upgrade, cOS3?

NEW cOS3 CATARACT OPERATING SYSTEM

Dr. Ayres: The new **Catalys** cOS3 cataract operating system was implemented to streamline the treatment workflow and enhance the user experience. It features more than 50 new, innovative technologies that **Catalys** system customers requested, such as: guided docking to patients' eyes; a redesigned user interface; streaming, real-time OCT images with enhanced confirmation and control of incisions; and an enhanced **Integral Guidance** system with automatic limbal offsets.

Dr. Waring: What has been your clinical experience with this new software upgrade?

Dr. Ayres: First, I want to note that I have access to both the LenSx Laser (Alcon) and the **Catalys** Precision Laser System. Before the recent upgrade, I thought the **Catalys** System's laser user interface was very attractive and intuitive. The redesigned interface, however, is now even more user friendly. With the touch of a button, the surgeon can modify the corneal surface maps if a customized procedure is warranted (Figure 2). He or she can drag and drop overlays of incisions on the surface maps, and

"In my experience, the updated patient interface on the **Catalys** system produces absolutely fantastic imaging."

—Brandon D. Ayres, MD

then view the projected alignment of these incisions on real-time streaming OCT scans with 0.5 to 2.0-Hz resolution (Figure 3).

The patient docking mechanism has been updated as well to optimize the performance of the entire **Catalys** system. It now includes two sizes of interfaces to fit more eyes, including those with smaller palpebral fissures. The **Catalys** system is the only laser cataract surgery platform that offers two sizes of patient interfaces for the capability to dock more patients. In fact, the system's new **Liquid Optics** interface 12 has an inner diameter of 12 mm when undocked (Figure 4).

Furthermore, the **Liquid Optics** Interface now features Guided Docking, which helps to minimize the residual forces to the eye during the "lock" step. With both interfaces, the IOP of eyes that are docked rises only ~10 mm Hg.¹

In my experience, the updated patient interface on the **Catalys** system produces absolutely fantastic imaging.

Dr. Kieval: I thought the original **Catalys** system was extremely user friendly, but since the new cOS3 software was implemented, the improvements in customization have significantly improved the efficiency in which patients are docked, imaged, and treated. Every aspect of the treatment can be adjusted by simply dragging the overlay image to allow for faster adjustments to a patient's treatment plan. Likewise, the real-time OCT has allowed for better visualization of structures to enhance efficiency of the procedure.

Dr. Waring: Dr. Wiley, you had the third **Catalys** Precision Laser System in the United States. Please share why you chose this laser.

Dr. Wiley: In a competitive market, a technological purchase like this is a big decision. My group literally traveled the world to test different laser technologies, including the LENSAR Laser System (LENSAR, Inc.) and the LenSx Laser. To laser an eye, precise imaging is essential, and the **Liquid Optics** Interface on the **Catalys** system, I feel, is a superb foundation for all of the femtosecond laser systems.

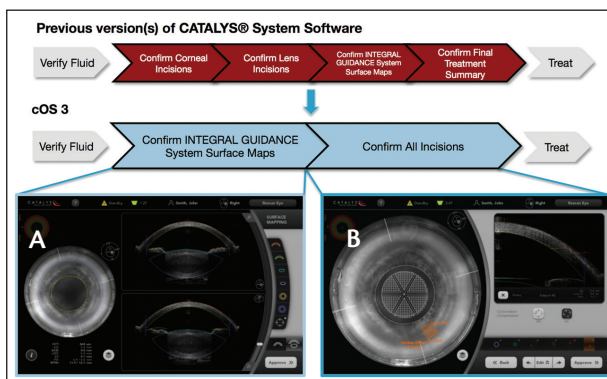


Figure 1. The redesigned user interface of the **CATALYS** Precision Laser system requires fewer steps than the original model (A and B).

*This comparison is based on publicly available sources available in the US as of February 26, 2015. They are subject to change at the discretion of their respective manufacturers.

LIQUID OPTICS INTERFACE FOR MINIMAL DISTORTIONS

Dr. Waring: The Liquid Optics Interface is clearly a distinguishing feature of the Catalys technology. Why is that so important?

Dr. Wiley: When I observed the compressive technology and contact interfaces of various lasers, I realized that a number of negative side effects could occur. Contact interfaces may possibly distort the cornea by inducing corneal folds or impacting the actual position of the lens. If the image is distorted, it can decrease the system's ability to identify and locate structures inside the eye. Then, the laser has to pass through that same distortion, so its delivery may be affected by the distorted image.

Dr. Waring: Great point. Certainly, one of the strengths of the Catalys system technology is that its Liquid Optics Interface does not distort the light's path. I believe this is why, to date, my capsulotomies have been 100% free floating.^{2,3}

STREAMING OCT FOR PRISTINE IMAGE GUIDANCE

Dr. Waring: I consider real-time image guidance for cataract surgery to be a true clinical breakthrough. I tell every one of my patients on the table, as I am docking their eye and acquiring the image, that this is true image-guided surgery. The Catalys system has a proprietary, full-volume, real-time 3D OCT system that uses algorithms to automatically identify the corneal surface and create safety zones. The imaging technology has revolutionized this procedure.

Dr. Wiley, would you please describe the features of the Catalys' real-time OCT imaging system?

Dr. Wiley: Anterior segment surgery is finally embracing real-time intraoperative data and measurements as opposed to relying solely on preoperative information. The Catalys system provides streaming OCT that refreshes at a rate of 0.5 to 2.0 Hz during the incision confirmation step. Then, as part of the new software, the Catalys system's Integral Guidance System detects the area of the clear cornea and automatically positions primary and sideport incisions within its outermost edges. The Integral Guidance system on the Catalys system allows us to execute this exact placement of the capsulotomy.

Another feature of the new software, called *Integral Guidance Dimensions*, means that the software is able to identify the physical dimensions of the ocular structures, which is a very useful tool. Also important is the ability to disable planned cuts while the patient is docked,

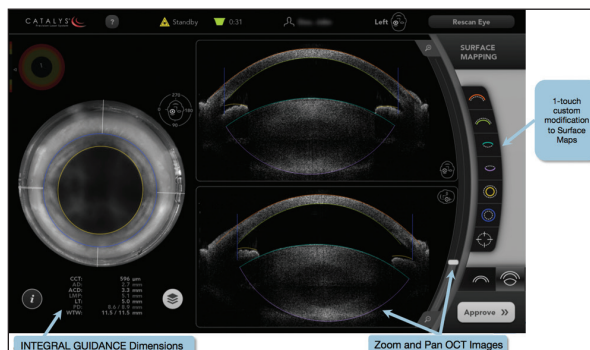


Figure 2. Simple surface map configuration. The streamlined surface map screen allows for easy modifications to the corneal surface maps for the precise placement of incisions. The surgeon must confirm all changes before the system will proceed.



Figure 3. Simple incision confirmation allows options for customization that give the surgeon control over incisions.

should the surgeon need to do so. Excellent optics provide a lot of flexibility.

FREE-FLOATING LASER CAPSULOTOMY

Dr. Waring: The quick and exact creation of a laser capsulotomy is one of the primary advantages of femtosecond cataract surgery. Studies show that laser-produced capsulotomies are more precise, accurate, and more reproducible compared with those created with a manual technique.³

Can each of you share your free-floating capsulotomy rates with the Catalys system?

Dr. Wiley: My rate of achieving free-floating capsulotomies with Catalys laser is approximately 99%. The only time I have experienced tears in the anterior capsulorhexis with this laser is in the presence of corneal pathology, such as a radial keratotomy incision or corneal body scar.

Dr. Kieval: My experience has been the same. One patient who had undergone a prior penetrating keratoplasty had an incomplete capsulotomy, so I would say my rate of free-floating capsulotomies with the Catalys system is 99%.

WARNINGS: Before initiating laser treatment, inspect images created from the OCT data, surface fits, and overlaid pattern in both axial and sagittal views, and review the treatment parameters on the Final Review Screen for accuracy. Safety margins for all incisions are preserved only if Custom Fit Adjustments to ocular surface(s) are applied in accordance with the instructions for use. Purposeful misuse of the Custom Fit Adjustment to ocular surfaces can result in patient injury and complication(s), and therefore must be avoided.

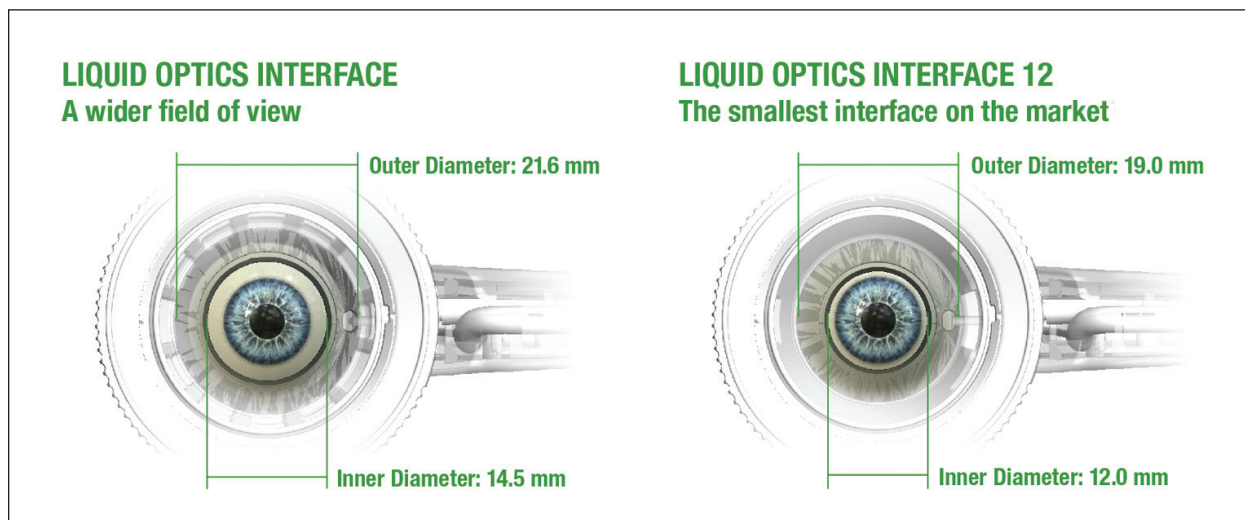


Figure 4. The CATALYS system now has two sizes of patient interfaces, the original 14.5-mm, and the new, 12-mm option.

Dr. Ayres: I too have a rate of 99% free-floating capsulotomies on the Catalys System.

CAPSULOTOMIES IN COMPLEX EYES

Dr. Waring: Dr. Ayres, you perform more complex cataract cases than most people in the country. What has been your experience with treating these eyes with femtosecond laser technology?

Dr. Ayres: There is no question that this technology enables us to achieve a more centered, continuous capsulorhexis in a mature lens, whether it is a white lens or a dense, root beer-brown lens. My staff and I have had cases in which we have used the laser to soften even hyper-mature lenses. The laser can be used to purposely decenter the capsulorhexis, which creates a much stronger capsulotomy than a manual technique. It is definitely a tool we want to have in our toolbox.

I think that a complete capsulotomy is stronger than a manually created one, unless there is a micro tear somewhere. I have hung lenses with hooks many times, and a femtosecond laser-created capsulotomy is easily as strong or stronger than a manually made one. Once the capsulotomy is complete, the rest of the case has basically been won.

FAST LENS FRAGMENTATION

Dr. Waring: The Catalys Precision Laser System offers a grid pattern of nuclear fragmentation (Figure 5). Why is this so important?

Dr. Wiley: Because the imaging of the Catalys laser is so precise, you can apply the laser quite close to the posterior capsule. In a typical case, I can administer the laser within

500 μ m of the posterior capsule and within 200 μ m of the anterior capsule, softening the full depth of the nucleus as well as outside the diameter of the capsulorhexis. The width of the laser's application zone is only affected by the pupil, permitting a very wide and deep softening pattern

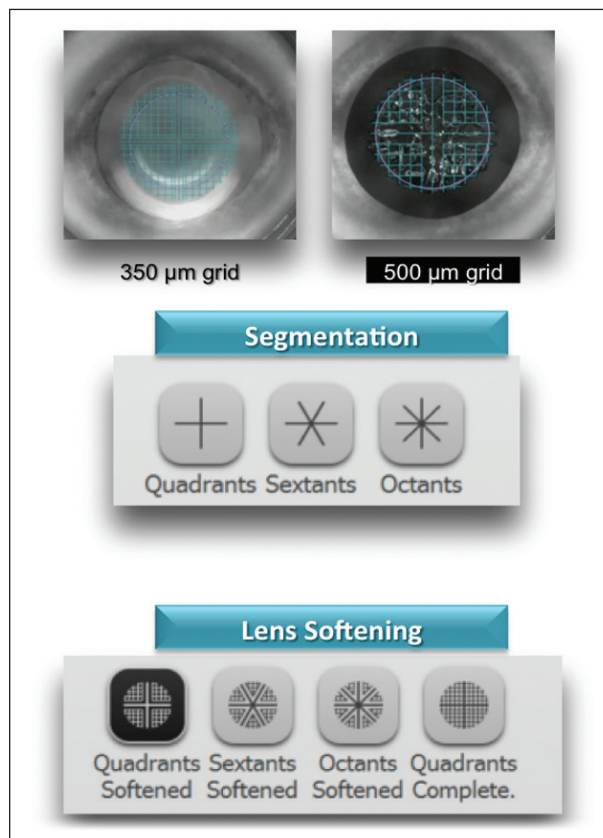


Figure 5. The CATALYS Precision Laser System offers several patterns for segmenting and softening the cataractous lens.

PRECAUTIONS: Cataract surgery may be more difficult in patients with an axial length less than 22 mm or greater than 26 mm, and/or an anterior chamber depth less than 2.5 mm due to anatomical restrictions. Use caution when treating patients who may be taking medications such as alpha blockers (e.g. Flomax) as these medications may be related to Intraoperative Floppy Iris Syndrome (IFIS); this condition may include poor preoperative dilation, iris billowing and prolapse, and progress intraoperative miosis. These conditions may require modification of surgical technique such as the utilization of iris hooks, iris dilator rings, or viscoelastic substances.

(Figure 6). Beyond that, I can adjust the grid from 150 μm to 1,000 μm , depending on the density of the nucleus.

CUSTOMIZEABLE SETTINGS

Dr. Waring: The ability to customize the settings of the Catalys laser is very interesting. How have your settings evolved in terms of your lens fragmentation patterns?

Dr. Kieval: I like being able to customize the lens fragmentation. I use a 500- μm grid spacing in the central nucleus, but use smaller segmentation of 200- μm fragments in the periphery. This allows me to engage and hold the quadrant more effectively with my phaco tip while still allowing for minimal energy use for lens removal.

Dr. Ayres: The way that the Catalys laser can fragment the lens is unbelievable. When I have compared different lasers, fragmentation capability has been a definite highpoint for me on the Catalys system. I think one of the most important benefits to multiple laser cataract platforms is that competition pushes them to continue to improve, and other lasers are adopting the grid pattern of the Catalys laser.

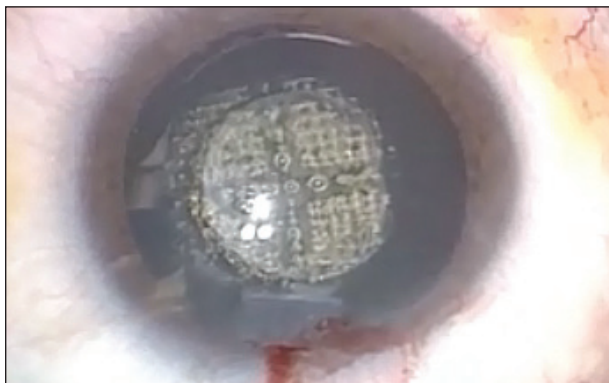


Figure 6. The laser's application zone is determined by the pupil, which allows for a wide, deep softening pattern.

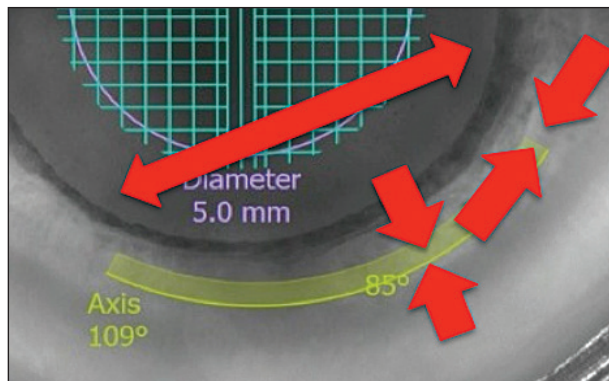


Figure 7. The CATALYS laser ensures that arcuate incisions are placed on the proper axis.

CONTRAINDICATIONS: The CATALYS System is contraindicated in patients with corneal ring and/or inlay implants, severe corneal opacities, corneal abnormalities, significant corneal edema or diminished aqueous clarity that obscures OCT imaging of the anterior lens capsule, patients younger than 22 years of age, descemetocoele with impending corneal rupture, and any contraindications to cataract surgery. **PRECAUTIONS:** The CATALYS System has not been adequately evaluated in patients with a cataract greater than Grade 4 (via LOCS III); therefore no conclusions regarding either the safety or effectiveness are presently available.

“Looking at cataract surgery now, there is a movement toward the freedom to personalize each cataract procedure. The femtosecond laser adds the ability to provide different lens softening settings as well as create very precise arcuate incisions.”

—Paul C. Kang, MD

ARCULATE INCISIONS

Dr. Waring: It is my belief that laser-enabled arcuate incisions are very precise, as long as they are placed on the proper axis (Figure 7).⁴ Also, a nonapplanated cornea allows for precisely placed arcuate incisions (Figure 8). How are you all applying this technology to your surgeries?

Dr. Kieval: When I perform anterior penetrating arcuate incisions, I make the optical zone approximately 9 to 10 mm, at 80% depth, fully opening the incision at the time of surgery. Some surgeons may pair the incisions and open both of them, or they may make a wound that they only adjust postoperatively as needed. (see the sidebar Vertical Curvature of the Cornea on page 7).

Dr. Ayres: I make my arcuate incisions at the 9 mm optical zone and 80% depth. For the most part, I open them on the table.

Dr. Wiley: I also create my incisions to be about 9 mm and 80% depth, and then I titrate them as guided by an intraoperative aberrometer. There are some interesting future applications here, but for now, I adjust my incisions postoperatively.

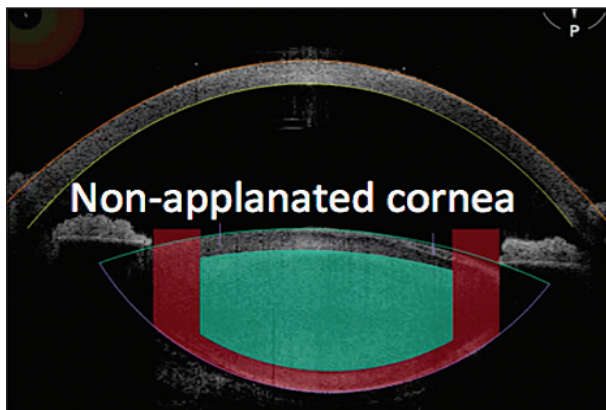


Figure 8. The optimized optical pathway for corneal incisions.

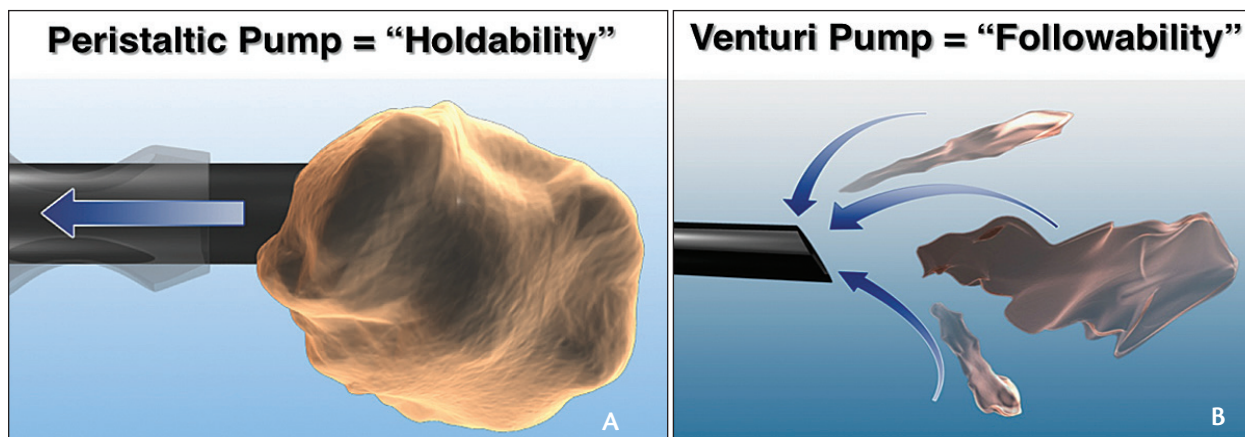


Figure 9. A peristaltic pump (A) excels at “holdability,” whereas a Venturi pump (B) is preferable for “followability.” Physicians are able to switch between both types of fluidics pumps on the **WHITESTAR SIGNATURE** Phacoemulsification System.

Dr. Kang: My depth is the same. I usually go to 80%, and my optical zone is about 9 mm. Typically, I do not have it penetrate the surface; I will leave about 10 to 15 μ m untouched.

PREMIUM ADVANCEMENTS IN PHACOEMULSIFICATION

Dr. Waring: Dr. Kang, I know that you recently incorporated the **WhiteStar** Signature Phacoemulsification System (Abbott Medical Optics Inc.) into your practice, and now you are using it exclusively. Why did you take that step, and what are the key differences you have noticed?

Dr. Kang: Looking at cataract surgery now, there is a movement toward the freedom to personalize each cataract procedure. The femtosecond laser adds the ability to provide different lens softening settings as well as create very precise arcuate incisions. Lens extraction should allow that same flexibility. With the **WhiteStar Signature** system, we have the aid of both peristaltic and Venturi modalities within the same case. I find peristaltic fluidics best for holding a fragment, while Venturi fluidics are much more efficient and appropriate for fragment removal in the eye (Figure 9). With laser cataract surgery, the lens is already divided. I can often skip the “chop” setting and go directly to “quadrant removal,” whereas with the Venturi system, the nucleus flows efficiently to the tip.

I do not perform laser cataract surgery on all of my patients, and when I have to manually chop the cataractous

lens, I need a peristaltic pump. Having both options in one phaco system really allows me to customize my procedure for each patient.

I have found that hydrodissection and cortical removal can be more challenging in the context of laser cataract surgery. The Venturi pump is much more efficient in this setting as well. The cortex is drawn toward the tip of the I/A handpiece, often making it unnecessary to move into the periphery of the capsular bag to achieve occlusion and remove cortical material.

Dr. Waring: Laser cataract surgery is a much more fluidics-driven procedure, and Venturi fluidics may be ideal, because we can employ high flow and low vacuum. Conceivably, we will all be able to optimize the settings as you have described, and this will help in designing the next generation of phaco units, specifically for use with laser cataract surgery. The **WhiteStar** Signature system is poised to provide flexibility currently in the platform. Dr. Wiley, has this been your experience as well?

Dr. Wiley: I strongly agree with Dr. Kang’s statement. My team has done a lot of work on using redesigned I/A tips that are not connected to the phaco unit for removing nuclear pieces. These tips cannot be inserted into the nucleus and held while occlusion builds up; the nucleus has to be previously softened or cubed. However, I agree with Dr. Kang that cortex removal is more difficult with the femtosecond cataract procedure, and when using a peristaltic pump, I was able to get occlusion just on small pieces of cortex and allow that to be aspirated. The ability to switch back and forth between the different pump modalities on the fly makes cases easier to manage.

Dr. Ayres: I operate with a lot of fellows and residents, and the ability to switch back and forth between Venturi and peristaltic fluidics also aids in the learning curve. With

Vertical Curvature of the Cornea

Anterior Cornea = 52% Posterior Cornea = 87%

This creates net plus power along the horizontal meridian.⁵

the Venturi pump, things happen faster; particles come to the tip very quickly, and that can be scary both for the new surgeon and the patient. Since the advent of femto-phaco surgery, removing the cortex has become more difficult, bringing about a resurgence of bimanual I/A. As discussed, this is more challenging in peristaltic mode, as we can easily outstrip the irrigation and induce surge in the anterior chamber. It takes incredible foot control to manage the peristaltic pump in this situation, and the ability to switch back and forth can be a big advantage.

I use a diamond-dusted bimanual I/A (Micro Surgical Technology, [MST]), so as I am aspirating, I am basically sanding the capsule at the same time.

Dr. Wiley: There are multiple instruments available for this purpose, and it is surprising how much residual material

comes off. When you see that, it will make you want to polish your capsules as well.

Dr. Waring: What we have discussed here is significant. A number of us have been involved with the development of instruments and new surgical techniques for femtosecond laser cataract surgery. This new technology is shaping the most common surgical procedure in the world, and customizing the dual pump for femtophaco surgery is a fitting example of this. ■

1. Schultz T, Conrad-Hengerer I, Hengerer FH, Dick HB. *J Cataract Refract Surg.* 2013;39(1):22-7.
2. Talamo JH, Gooding P, Angeley D, et al. Optical patient interface in femtosecond laser-assisted cataract surgery: contact corneal appplanation versus liquid immersion. *J Cataract Refract Surg.* 2013;39(4):501-510.
3. Friedman NJ, Palanker DV, Schuele G, et al. Femtosecond laser capsulotomy. *J Cataract Refract Surg.* 2011;37(7):1189-1198.
4. Culbertson W, Gonzalez J, Woo R, et al. Optimization of corneal incision parameters with a femtosecond laser for cataract surgery. Paper presented at: The XXX Congress of the ESCRS; September 11, 2012; Milan, Italy.
5. Koch DD, Ali SF, Weikert MP, et al. Contribution of posterior corneal astigmatism to total corneal astigmatism. *J Cataract Refract Surg* 2012;38:2080-2087.

IMPORTANT SAFETY INFORMATION

Rx Only

ATTENTION: Reference the labeling for a complete listing of Important Indications and Safety Information.

CATALYS® Precision Laser System

WARNINGS: Prior to **INTEGRAL GUIDANCE** System imaging and laser treatment, the suction ring must be completely filled with sterile buffered saline solution. If any air bubbles and/or a meniscus appear on the video image before treatment, do not initiate laser treatment. Before initiating laser treatment, inspect images created from the OCT data, surface fits, and overlaid pattern in both axial and sagittal views, and review the treatment parameters on the Final Review Screen for accuracy. Safety margins for all incisions are preserved only if Custom Fit Adjustments to ocular surface(s) are applied in accordance with the instructions for use. Purposeful misuse of the Custom Fit Adjustment to ocular surfaces can result in patient injury and complication(s), and therefore must be avoided. Standard continuous curvilinear capsulorhexis (CCC) surgical technique must be used for surgical removal of the capsulotomy disc. The use of improper capsulotomy disc removal technique may potentially cause or contribute to anterior capsule tear and/or a noncircular, irregularly shaped capsulotomy. Verify that the suction ring is correctly connected to the disposable lens component of the LIQUID OPTICS Interface during the initial patient docking procedure. **PRECAUTIONS:** The Catalys System has not been adequately evaluated in patients with a cataract greater than Grade 4 (via LOCS III); therefore no conclusions regarding either the safety or effectiveness are presently available. Cataract surgery may be more difficult in patients with an axial length less than 22 mm or greater than 26 mm, and/or an anterior chamber depth less than 2.5 mm due to anatomical restrictions. Use caution when treating patients who may be taking medications such as alpha blockers (e.g. Flomax) as these medications may be related to Intraoperative Floppy Iris Syndrome (IFIS); this condition may include poor preoperative dilation, iris billowing and prolapse, and progress intraoperative miosis. These conditions may require modification of surgical technique such as the utilization of iris hooks, iris dilator rings, or viscoelastic substances. Surgical removal of the cataract more than 30 minutes after the laser capsulotomy and laser lens fragmentation has not been clinically evaluated. The clinical effects of delaying surgical removal more than 30 minutes after laser anterior capsulotomy and laser lens fragmentation

are unknown. The LIQUID OPTICS Interface is intended for single patient use only. Full-thickness corneal cuts or incisions should be performed with instruments and supplies on standby, to seal the eye in case of anterior chamber collapse or fluid leakage. Patients who will undergo full-thickness corneal incisions with the Catalys system should be given the same standard surgical preparation as used for patients undergoing cataract surgery for the removal of the crystalline lens. During intraocular surgery on patients who have undergone full-thickness corneal incisions with the Catalys system, care should be taken if an eyelid speculum is used, in order to limit pressure from the speculum onto the open eye. Patients who will be transported between the creation of a full-thickness corneal incision and the completion of intraocular surgery should have their eye covered with a sterile rigid eye shield, in order to avoid inadvertent eye injury during transport. Patients must be able to lie flat and motionless in a supine position and able to tolerate local or topical anesthesia. **ADVERSE EFFECTS:** Complications associated with the Catalys system include mild Petechiae and subconjunctival hemorrhage due to vacuum pressure of the LIQUID OPTICS Interface Suction ring. Potential complications and adverse events generally associated with the performance of capsulotomy and lens fragmentation, or creation of a partial-thickness or full-thickness cut or incision of the cornea, include: Acute corneal clouding, age-related macular degeneration, amaurosis, anterior and/or posterior capsule tear/rupture, astigmatism, capsulorhexis notch during phacoemulsification, capsulotomy/lens fragmentation or cut/incision decentration, cells in anterior chamber, choroidal effusion or hemorrhage, conjunctival hyperemia/injection/erythema/chemosis, conjunctivitis (allergic/viral), corneal abrasion/depithelialization/epithelial defect, corneal edema, cystoid macula edema, Descemet's detachment, decentered or dislocated intraocular lens implant, diplopia, dropped or retained lens, dry eye/superficial punctate keratitis, edema, elevated intraocular pressure, endothelial decompensation, floaters, glaucoma, halo, inflammation, incomplete capsulotomy, intraoperative floppy iris syndrome, iris atrophy/extrusion, light flashes, meibomitis, ocular discomfort (e.g., pain, irritation, scratchiness, itching, foreign body sensation), ocular trauma, petechiae, photophobia, pigment changes/pigment in corneal endothelium/foveal region, pingueculitis, posterior capsule opacification, posterior capsule rupture, posterior vitreous detachment, posteriorly dislocated lens material, pupillary contraction, red blood cells in the anterior chamber (not hyphema), residual cortex, retained lens fragments, retinal detachment or hemorrhage, scar in

Descemet's membrane, shallowing or collapsing of the anterior chamber, scoring of the posterior corneal surface, snailtrack on endothelium, steroid rebound effect, striae in Descemet's, subconjunctival hemorrhage, thermal injury to adjacent eye tissues, toxic anterior shock syndrome, vitreous in the anterior chamber, vitreous band or loss, wound dehiscence, wound or incision leak, zonular dehiscence.

WHITESTAR Signature® System

Rx Only

IMPORTANT SAFETY INFORMATION: Read the Safety Precautions and Warnings carefully before you use the Whitestar Signature System in surgery. Read and understand the instructions in this manual before they use the system. Failure to do so might result in the improper operation of the system. Do not use non-AMO approved products with the Whitestar Signature System, as this can affect overall system performance. AMO cannot be responsible for system surgical performance if you use these products in surgery. Handle the phaco handpiece with extreme care. The piezoelectric crystal in the handpiece is very sensitive to shock. If the handpiece is dropped, it is possible that the handpiece might not function correctly. If this happens, contact for repair information or replacement handpiece. Complications of cataract surgery may include broken ocular capsule or corneal burn. This device is only to be used by a trained licensed physician.

INDICATIONS: The **AMO WHITESTAR** Signature Phacoemulsification System is a modular ophthalmic microsurgical system that facilitates anterior segment (i.e., cataract) ophthalmic surgery. The modular design allows the users to configure the system to meet their surgical requirements. **IMPORTANT SAFETY INFORMATION:** Risks and complications of cataract surgery may include broken ocular capsule or corneal burn. This device is only to be used by a trained licensed physician.

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