

# Cataract & Refractive Surgery TODAY

## Torsional Ultrasound: **The Grass Really Is Greener**

Why surgeons are switching to  
the INFINITI Vision System  
with OZil Torsional Ultrasound

# Is It Time to Switch to a Revolutionary Ultrasound Movement?

Ophthalmic surgeons are showing a lot of interest and enthusiasm for the unique OZil Torsional ultrasound technology available only on the INFINITI Vision System (Alcon Laboratories, Inc., Fort Worth, TX). With the recent introduction of two new phacoemulsification consoles, many surgeons are evaluating multiple manufacturers' units when assessing their purchase options. As you will read here, several of these non-Alcon-based surgeons were so impressed with the "new paradigm"

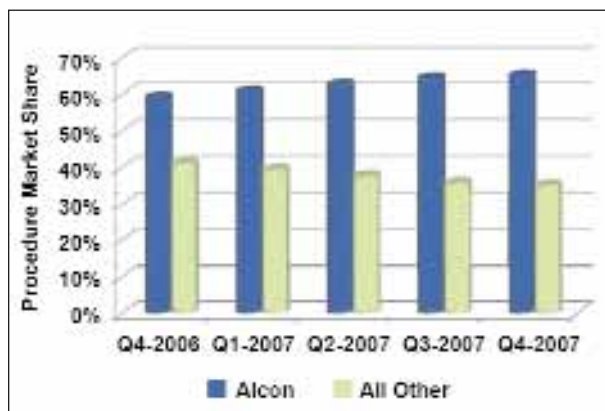


Figure 1. Phaco machine market share by quarter.

1. Q4-2007 Cataract Quarterly Update. Manchester, MO: Market Scope LLC; 2007;10.

## Contents

### 4 GREATER EXCITEMENT AND CONFIDENCE

"The INFINITI with OZil Torsional ultrasound has definitely made my life easier."

By James P. Gills, MD

### 6 OZIL TORSIONAL DELIVERS IMPROVED PATIENT OUTCOMES

"I am happier because my patients are happier."

By Manus C. Kraff, MD

### 7 THE DECISION WAS QUITE EASY TO MAKE

"We were enticed by idea that a phaco machine could add value to our bottom line through discernibly better results."

By Thomas Walters, MD

### 9 EXCEPTIONAL SERVICE AND TECHNOLOGIES

"The OZil Torsional technology was just amazing."

By Jitendra Swarup, MD

### 11 COMPARING PHACO TECHNOLOGIES IN A TEACHING HOSPITAL

"It is hard to believe what difference a tip can make."

By Tal Raviv, MD

### 14 OVERHYPED, OR A REAL TECHNOLOGICAL ADVANCE?

"I feel confident that I chose the phaco technology that is going to revolutionize the procedure."

By Jason Jones, MD

### 17 GROWING YOUR PRACTICE WITH INFINITI AND OZIL TORSIONAL ULTRASOUND

"Collectively, these factors made surgery better and safer."

By David M. Kwiat, MD



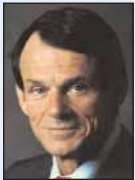
and proven surgical benefits of OZil Torsional that they agreed to describe their experiences and reasons for switching to the INFINITI platform.

The domestic US phacoemulsification market share numbers are reflecting the buzz. According to research from Market Scope, LLC (Manchester, MO), Alcon phaco machine procedural unit market share grew approximately 6 percentage points

between Q4 2006 and Q4 2007 (Figure 1).<sup>1</sup>

Considering how the surgical environment is evolving and changing with new surgical options such as premium IOLs, does torsional ultrasound make sense for your technique and practice? Learn from your peers about the thought process that drove their decision to cross the fence and transition to the future of phacoemulsification!

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# Greater Excitement and Confidence

“The INFINITI with OZil Torsional ultrasound has definitely made my life easier.”

BY JAMES P. GILLS, MD



My staff and I at the St. Luke's Cataract and Laser Institute in Tarpon Springs, Florida, have had experience with quite a few phaco systems over the years, including the Chiron Phacotron Gold and the Millennium Microsurgical System (both from Bausch & Lomb, Rochester, NY), the Sonic Wave (STAAR Surgical Company, Monrovia, CA), and the Sovereign Compact with WhiteStar (Advanced Medical Optics, Inc., Santa Ana, CA). I was happy with the Sovereign, but I tried the INFINITI Vision System with the OZil Torsional handpiece (Alcon Laboratories, Inc., Fort Worth, TX) at the recommendation of several colleagues. Although we had initial concerns that the additional cost of the INFINITI cassette was prohibitive for our outpatient facility model, we eventually switched to the torsional because of its ease of use, time savings, and performance.

“When I first heard about torsional, I thought it was just an advertising gimmick. After trying it, however, I changed my opinion.”

## FIRST IMPRESSIONS

My son, Pit Gills, MD, was trained on the INFINITI unit, so the transition was easy for him. Although it took me a few weeks longer to fully adjust to it, I realized it was the easiest machine I had ever used. My first reaction was, “This is so easy, it is going to add 5 years to my career.” Within half an hour of testing the machine, I could tell that the OZil Torsional handpiece offered great advantages. By the end of my first day using it, I knew I wanted this unit. It felt stable and was effective. It was like driving a high-performance automobile; the system did everything the way it should. It had all of the parameters a surgeon would want. The OZil Torsional technology is better than any phaco system I have used before. Now, I start my surgical day with much greater excitement and confidence, rather than expecting surgical challenges.



Figure 1. The author has slightly decreased the angle at which he holds the OZil handpiece to take advantage of the angled tip's ability to emulsify deeper into the nucleus than straight phaco tips.

## SURGICAL PERFORMANCE

I had to adjust to using the 45° bevel mini-flared Kelman tip, which emulsifies the lens material slightly differently than nonangled tips. Because the angled tip emulsifies deeper into the nucleus when I create my initial grooves, I learned to adjust my hand position so that I slightly decrease the angle at which I hold the handpiece during the sculpting of the nucleus (Figure 1).

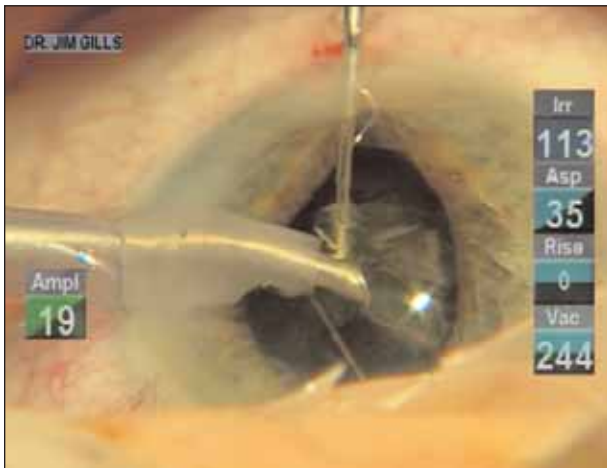
Also, I especially appreciate how the torsional technology allows me to better handle challenging surgeries by allowing me to work more centrally in the eye (Figure 2). Furthermore, I am presently working with Alcon engineers to develop and introduce a phaco irrigation sleeve that is especially useful for small pupils and cases of intraoperative floppy iris syndrome. The sleeve contains only one irrigation port, so it directs fluid posteriorly and thereby avoids the cornea and iris. It is quite surgically efficient when using torsional ultrasound, and it works well with that type of energy to provide incredible anterior chamber stability, decreased fluidic turbulence, and crystal clear corneas. Many of my patients have Fuchs' dystrophy, and some have very unhealthy corneas.

Directing the fluidic flow to the posterior chamber helps to preserve compromised endothelium, which helps to maintain the clarity of the postoperative cornea. I also feel it lessens the risk for posterior capsular rupture, because the fluidic flow is always pushing the capsule away from the phaco tip. The idea and benefits of the single-hole sleeve has also been promoted by John Hart, MD, of West Bloomfield, Michigan, for many years.

The fluidics of the OZil Torsional handpiece also provides me excellent control of low-end vacuum power, which allows for exceptional, capsule-friendly polishing. This added polishing of the anterior capsule helps me to give my premium IOL patients excellent outcomes. I have evaluated but am not currently using micro-incisions, because I implant a fair number of premium IOLs that require a 2.8-mm incision.

### SAVING TIME AND EFFORT

I feel that the INFINITI Vision System with OZil Torsional ultrasound offsets its cost by saving our sur-



**Figure 2.** OZil Torsional ultrasound draws nuclear material to the phaco tip, which is especially important in challenging surgeries, such as this case of intraoperative floppy iris syndrome.

“Surgically, I find it an easier and more consistent machine to use.”

geons and staff time and effort. The OR staff are able to turn the machine over more quickly and easily than with previous systems. Surgically, I find it an easier and more consistent machine to use. Although I do not try to speed through my phaco surgery, I have realized that the torsional procedure is much more surgically efficient than with traditional longitudinal ultrasound. The system has improved fluidics that are highly controllable and responsive. It permits a very slow technique when necessary, such as with a dislocated lens. With a hard cataract, I can increase the parameters and adjust the torsional and even blend in small amounts of longitudinal energy as needed. I reserve the longitudinal ultrasound for the densest lenses only, perhaps in one out of 500 cases. With any amount of energy, I find the system gentle on patients’ corneas. Even with challenging cases, vitreous loss has been much more rare for me than in the past.

For all of its performance power, the INFINITI with OZil Torsional is also very durable. Obviously, all machines suffer breakdowns, but I expect to have fewer with this machine than any other I have used.

### CONCLUSIONS

To me, the biggest selling point of this machine is its torsional phaco technology. When I first heard about torsional, I thought it was just an advertising gimmick. After trying it, however, I changed my opinion. Torsional is an extremely significant improvement in phaco technology. Overall, although I have not conducted statistical analysis, I believe that the system has improved my outcomes. The INFINITI with OZil Torsional ultrasound has definitely made my life easier. ■

# OZil Torsional Delivers Improved Patient Outcomes

“I am happier because my patients are happier.”

BY MANUS C. KRAFF, MD



I have been performing phacoemulsification since I took the course by Charles Kelman, MD, in January 1974. I have used all the generations of phaco instruments; most recently, I was using the Sovereign WhiteStar with the ICE system (Advanced Medical Optics, Inc., Santa Ana, CA). I was interested in the new phaco technologies, so I asked to evaluate the INFINITI Vision System with OZil Torsional ultrasound (Alcon Laboratories, Inc., Fort Worth, TX). After careful consideration and evaluation, I now use this system exclusively.

## ONE SIMPLE SELLING POINT

My reason for adopting the INFINITI system can be summed up in two words: better outcomes. The OZil technology delivers an impressive “wow” factor on day 1. I see clearer corneas than I have with previous phaco technologies, and my patients are impressed with their excellent vision. I am happier because my patients are happier, and this is important because at least 70% of my patients come from other satisfied patients.

The reason for INFINITI Torsional ultrasound’s clear corneas is the oscillatory motion of the OZil handpiece. A sweeping motion keeps nuclear fragments at the tip of the phaco needle (an action termed *followability* by Dr. Kelman), whereas the anterior/posterior movement of a phaco needle with traditional longitudinal ultrasound causes material to bounce at the tip.

I have especially noted an improvement when emulsifying very dense cataracts, thanks to the greater followability of OZil, reduced turbulence, and overall quieter procedure. With very dense cataracts, I use the 30° bevel tapered tip (Alcon Laboratories, Inc.) and a combination of torsional and longitudinal ultrasound. Even with this combination, the OZil technology keeps the nuclear fragments in better contact with the vibrating phaco tip and thus minimizes turbulence within the eye versus my previous modulated, longitudinal ultrasound system.

## EASY TRANSITION

Transitioning to the INFINITI and OZil Torsional technology was easy. My staff had no problems with learning the

“The OZil technology delivers an impressive wow factor on day 1 for both my patients and me. I see clearer corneas than I have with previous phaco technologies, and my patients are impressed with their excellent vision.”

new system, and it did not affect our patient flow. I had to become accustomed to the unit’s power settings and the Kelman tip, but these adjustments were not technically challenging. I look forward to making such transitions when it comes to adopting new technology. Most surgeons are willing to modify their technique or instrumentation to get better surgical results, and simply put, I felt my results were better on day 1. The eyes look better, and my patients have better vision compared with previous phaco technologies. I have also evaluated micro-coaxial surgery with the INFINITI, and I feel the main advantage of this will be more stable anterior chambers (less chamber fluctuation) during phacoemulsification, since the wound size is only 2.2 to 2.4 mm.

## ALCON SERVICE

Alcon’s service is terrific. My honest, uninfluenced opinion is that no company provides better service or is more responsive to requests than Alcon. If I ask for something, I get it quickly. Also, I am impressed with the company’s representatives. I think they are the best trained in the industry. They are very knowledgeable about their product, and they know how to share information with their physician clients to help adapt and evolve their individual surgical technique.

## BOTTOM LINE

My bottom line is always about the patient. To me, the decision to switch platforms was very simple: clearer corneas and better vision sooner for my patients. ■



# The Decision Was Quite Easy to Make

“We were enticed by idea that a phaco machine could add value to our bottom line through discernibly better results.”

BY THOMAS WALTERS, MD



Our physician-owned ambulatory surgery center (ASC) is a 13-ophthalmologist practice with seven cataract surgeons. We had used the same phaco technology since the ASC opened more than 9 years ago, the Millennium Microsurgical System with Custom Control Software upgrade (Bausch & Lomb, Rochester, NY). In addition to the age of our unit, two other factors compelled us to consider purchasing a new phaco system. First, some of the new doctors who joined our practice had been trained on other phaco systems. They felt that they could not perform surgery as well with the Millennium technology, and they began taking patients outside the ASC to do their procedures. Also, we were sometimes disappointed with our first-day outcomes for dense cataracts with the Millennium.

## DEMOCRATIC DECISION PROCESS

We decided to make the selection process for a new phaco system democratic among all the surgeons and surgical support staff. In the last quarter in 2007, each surgeon tested three systems for 1 month each: the WhiteStar Signature System with Fusion Fluidics (Advanced Medical Optics, Inc., Santa Ana, CA), the Stellaris Vision Enhancement System (Bausch & Lomb, Rochester, NY), and the INFINITI Vision System with the OZil Torsional handpiece (Alcon Laboratories, Inc., Fort Worth, TX). We created a standard report that we filled out for each system at the end of its trial month. The report described what we thought were the strengths and weaknesses of each system and whether we would want to purchase it. The support staff had their own report card to evaluate each phaco unit. They rated the systems on setting up, taking down, and sterilizing the equipment for the next case. Surprisingly, the INFINITI with OZil Torsional received nearly unanimous approval from all involved. So, whereas we expected to have to resolve differing opinions between so many people, the decision was quite easy to make.

Interestingly, a third-party opinion reinforced our purchase decision. The majority of patients treated at our practice

“Using torsional ultrasound with the 45° Kelman mini-flared tip is nothing like I have ever seen in 25 years of doing cataract surgery in that it does not repel nuclear material and rarely occludes, two features that are unexpected in the surgeon’s initial use.”

receive postoperative care from one doctor who specializes in the postsurgical management of most of our cataract patients. We had informed this doctor that we were testing new phaco machines and asked him to let us know if he noticed any difference in the quality of patients’ outcomes on the first postoperative day. We did not tell him which unit we were using each month. The second week of our using the INFINITI with OZil Torsional technology, following a large group of postoperative patients, he reported that something had changed, that the results showed quieter eyes, clearer corneas, and better first-day outcomes than the previous two units. He wanted to know which unit it was and expressed hope that we would acquire that one. We were enticed by idea that a phaco machine could add value to our bottom line through discernibly better results.

## HOW THE INFINITI COMPARES

### Learning Curve

Using the INFINITI with Torsional ultrasound for the first time is surprising. The OZil handpiece performs completely differently from any other longitudinal phaco handpiece. Using torsional ultrasound with the 45° Kelman mini-flared tip is nothing like I have ever seen in 25 years of doing cataract surgery in that it does not repel nuclear material and rarely occludes, two features that are unexpected in the surgeon’s initial use. “Adapting” to OZil Torsional ultrasound basically means eliminating these two necessary side effects of longitudinal phaco. Without

repulsion, the surgeon no longer has to search for nuclear fragments; they simply follow into the tip. The only adjustment the surgeon has to make is to anticipate a more effective and smoother phaco procedure that does not involve repeated starting and stopping.

### Dense Nuclei

This level of performance remains consistent even with dense cataracts. When we were testing new phaco systems, we wished to reduce if not eliminate the standard corneal edema that is associated with the longitudinal emulsification of a dense lens. The OZil handpiece with the 45° Kelman mini-flared tip has accomplished this goal. Even

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“High-quality postoperative vision and fast healing are two of the most important marketing tools for growing a product.”

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with cataracts of significant density, this technology emulsifies so readily that the occlusion mode in the fluidics is almost nonexistent. Because of the increased cutting efficiency of the OZil handpiece, much less energy is used to remove a dense cataract, resulting in less early postoperative corneal edema as well as anterior chamber inflammation, which significantly improves patients' speed of recovery and corneal clarity.

### Chamber Stability

Without the repeated stopping and starting of occlusion, the system's fluidics does not have to work hard at all, so the chamber remains inflated at a constant level. The increased anterior chamber stability associated with use of the OZil Torsional handpiece is an important point. Not only is the emulsification stabilized from an energy standpoint, but the OZil handpiece also helps to maintain a stable anterior and posterior chamber from a fluidics standpoint.

### Customizable Parameters

One of the best features of the OZil Torsional technology is the ability to customize settings that take advantage of the benefits of each ultrasound technology for lens removal, including the blending of linear and torsional duty cycles to further reduce the possibility of occlusion. Additionally, these fluidics and power settings can be adjusted in any given surgical mode or step. At any point during the phaco procedure, the surgeon can customize the parameters to each stage of cataract removal, including sculpting, quadrant removal, epinuclear, and cortex removal, etc.

### PRACTICE BUILDING WITH THE INFINITI

As we continue to adopt new premium elective treatment modalities with premium pricing, such as lenticular surgery for correcting refractive error or new-technology IOLs for presbyopia, patients increasingly expect a rapid visual recovery and a high quality of vision immediately postoperatively. It is important for these patients to know that they have invested their money wisely and are getting a good value, and high-quality postoperative vision and fast healing are two of the most important marketing tools for growing a product. We do little to no advertising and instead rely on our outcomes to grow our practice, and the INFINITI with OZil Torsional technology contributes to that endeavor significantly. Not only have our word-of-mouth referrals increased since acquiring this machine, but we also receive many referrals from eye doctors who do not perform cataract surgery. It is very important that these patients return to their referring doctor seeing well. Those doctors are very discriminating when they examine a postoperative eye, because they can choose where to refer their patients. Thus, we must be able to provide a consistent standard of outcomes that continues to attract referrals.

In addition, the INFINITI Vision System attracted an additional physician to our surgery center who is not part of our practice, and we hope to continue increasing our business this way. We had been trying to bring new doctors to our surgery center for more than 5 years, but our previous phaco technology discouraged them.

### EXCELLENT SUPPORT

One other critical component of our purchasing decision was the quality of support from Alcon's technical staff, who bring more to the table than just superior equipment. Alcon representatives are always available and able to provide us with the tools we need to put out a better product. For example, they improved my surgical technique by offering advice on using the machine's different settings in various surgical situations. In my opinion, Alcon does an incredible job of training their surgical support staff to make owning their machine a value-added experience. I assume the technical support is just as good, although we have not had to rely on that yet.

### SUMMARY

In short, we can only build our practice through referrals generated by superior outcomes, and we can only achieve these with the best technology available—the INFINITI Vision System with OZil Torsional ultrasound. ■



# Exceptional Service and Technologies

“The OZil Torsional technology was just amazing.”

BY JITENDRA SWARUP, MD



I practice in the Northeastern part of North Carolina in a large ophthalmic clinic that includes four offices with two ophthalmologists and three optometrists. My main focus is cataract surgery. My previous phaco systems were the Sovereign with WhiteStar and the Sovereign Compact (both by Advanced Medical Optics, Inc., Santa Ana, CA). I began looking into different phaco machines because, in this relatively rural area, I see a lot of extremely dense cataracts (of 3 to 4+), and I wanted a phaco technology that would handle these types of lenses better.

## A NOTICEABLE DIFFERENCE

First, I tested the WhiteStar Signature System with Fusion Fluidics (Advanced Medical Optics, Inc.). Although it has improved fluidics over the Sovereign and Compact, I found the improvement only marginal. When I tried the INFINITI Vision System with the OZil Torsional handpiece and the 45° Kelman mini-flared tip (Alcon Laboratories, Inc., Fort Worth, TX), it was a totally different experience for me. First, it kept the anterior chamber completely stable. Most impressive, however, was its cutting ability and how efficiently it could emulsify nuclear material. It emulsified a 4+ cataract with minimal energy. My cumulative dissipated energy levels stayed between 3 and 6, and occasionally reached 7. My patients' corneas were much clearer compared with my previous experience. Plus, my phaco time on the INFINITI after just a few cases was significantly better than using highly modulated, longitudinal ultrasound. I have to say, the OZil Torsional technology was just amazing.

## FACILITATION OF TECHNIQUE

My preferred technique is a modified phaco chop with a back-crack maneuver that does not involve rotating the nucleus and therefore minimally impacts the capsular bag and zonules. The 45° Kelman mini-flared tip facilitates my technique by creating a wider groove so I can access and crack the nucleus. When I try to separate the posterior portion of the cataract, this

“When I tried the INFINITI Vision System with the OZil Torsional handpiece and the 45° Kelman mini-flared tip, it was a totally different experience for me.”

additional space allows me to use my second instrument to more efficiently back-crack it into two hemispheres. I no longer have to make two or three passes to widen the groove for the second instrument. After this initial step, I want holding or purchasing power to be able to impale and maneuver each hemisphere upward to back-crack it with the second instrument. I was initially concerned that the torsional technology would not allow me to occlude the tip and achieve the vacuum I wanted. My local Alcon representative worked with me to adjust the machine's settings to provide the purchasing power I needed while delivering improved response and chamber stability versus the other phaco systems.

## OUTSTANDING SUPPORT

Despite our remote location, my sales representative has been very responsive and available. His exceptional level of service and expertise with the INFINITI system played an important role in my decision to purchase this device over another. His knowledge of the settings and fluidics has helped me optimize my surgical outcomes. He responds quickly if I need something for surgery, such as an IOL or an additional component of the machine. He also helped me to transition from a 2.75-mm to a micro 2.2-mm clear corneal incision.

When I first tested the INFINITI system, I liked it immediately, but I wanted to trial it for more cases. He brought the console to me again, and we did another 40+ cases in 3 days. He also trained my surgical technician on the machine and its disposable components before I tested it in the OR, and she also made the transition very easily. Trying a new surgical technology can be stressful, and I appreciated having a representative

there who could understand my technique and explain the benefits of the technology to me. This level of commitment has continued, and it makes a big difference.

### CHALLENGING CASES

#### Dense Nuclei

On most of my cases, I use only torsional ultrasound. With extremely dense nuclei, I sometimes introduce a small amount of longitudinal to the torsional movement. I cannot help being excited about the exceptional performance of OZil with brunescant nuclei. It is refreshing to be able to emulsify such lenses without pushing against the cataract and worrying about the zonules. I was a bit hesitant using the new technology in my first few cases, but by the fifth or sixth case, I was moving fairly comfortably. By my 15th case, I was working so efficiently and felt so comfortable with the chamber's stability that I had reduced my surgery time from 10 or 11 minutes to 7 or 8 minutes. This is not an exaggeration.

#### Weak Zonules

I see a lot of patients with weak zonules due to pseudoexfoliation and intraoperative floppy iris syndrome (IFIS), and I am impressed with the way the INFINITI with OZil Torsional handles these delicate structures. In an IFIS eye, the pupil will dilate well initially and the surgeon can often get a decent capsulorhexis, but during the case, the pupil comes down and becomes very floppy. What I find reassuring about the INFINITI system is

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that once I make the initial groove down the middle of the nucleus and crack it into hemispheres, if the pupil comes down, I know I have a fairly large capsulorhexis underneath it and a stable chamber. I can insert the Kelman phaco tip sideways to impale the hemisphere and tip it up through the smaller pupil so that I can extract it at the iris plane. The angled tip is very helpful in this regard, because I do not have to turn it at the incision and distort the wound's size.

### SUMMARY

I am very happy with the INFINITI with OZil Torsional ultrasound, much more than I ever was with my previous phaco technology. It makes the procedure much easier and more comfortable for the surgeon and better for the patient. My practice is in the process of replacing all of its existing competitive phaco machines with INFINITI Vision Systems with OZil Torsional technology. ■

# Comparing Phaco Technologies in a Teaching Hospital

“It is hard to believe what difference a tip can make.”

BY TAL RAVIV, MD



My affiliation with the New York Eye and Ear Infirmary in Manhattan, where I perform cataract surgery on my private practice patients and teach ophthalmology residents, has given me a unique opportunity to compare a wide range of phaco plat-

forms. The Infirmary's ASC-like OR houses most of the current phaco machines, including the WhiteStar Signature Phacoemulsification System (Advanced Medical Optics, Inc., Santa Ana, CA), the Stellaris Vision Enhancement System, the Millennium Microsurgical System (both by Bausch & Lomb, Rochester, NY), and the INFINITI with OZil Torsional ultrasound (Alcon Laboratories, Inc., Fort Worth, TX). During the past 12 months, I have used and compared different machines almost weekly as I move between the facility's ORs. I do not find this burdensome; rather, I truly enjoy testing and optimizing the newest phaco technologies to benefit my patients. Furthermore, I am better able to



Figure 1. The Kelman 45 mini-flared tip enhances torsional cutting efficacy and puts torsional phaco "on steroids."

“The most exciting advance in phaco energy delivery since modulated power is Alcon's INFINITI with OZil Torsional ultrasound.”

demonstrate the latest technologies to the Infirmary's residents.

In general, new-generation machines continue to evolve the science of phacoemulsification. In the past 3 years, all of the platforms have benefited from improved fluidics that feature greater programmable settings, advanced sensors, low-compliance tubing, and overall improved efficiency. On the phaco energy side, power modulations such as hyperpulse with variable duty cycles have become standard, offering better followability, a safer thermal profile, and the ability for micro-incisional phacoemulsification. With traditional longitudinal ultrasound, these power modulations decrease chatter and improve surgical cutting efficiency.

## TORSIONAL PHACO

### Paradigm Shift

I believe that the most exciting advance in phaco energy delivery since manufacturers introduced modulated power is Alcon's INFINITI with OZil Torsional ultrasound. When the INFINITI was first introduced, I was also using the Millennium Microsurgical system and the Sovereign WhiteStar with ICE (Advanced Medical Optics, Inc.), and I thought all three systems were very good. I liked the





**Figure 2.** The author demonstrates a 2.2-mm quick-chop maneuver using OZil Torsional to impale the nucleus.



**Figure 3.** After occlusion with maximum vacuum, the author returns the torsional power to zero and chops the nucleus into two halves.

speed, agility, and dual-linear control of the Millennium; its Venturi fluidics allowed for safe and efficient segment removal. The Sovereign's power modulations and occlusion mode did a lot of work behind the scenes to optimize phaco energy output. Admittedly, I was not initially enamored of this machine's nonlongitudinal technology. I thought the INFINITI with Torsional ultrasound was an excellent platform that worked well and had very good followability, but it did not particularly stand out to me.

My opinion changed dramatically when I recently switched phaco tips from the standard 30° tapered to the newer 45° mini-flared tip (Alcon Laboratories, Inc.) (Figure 1). It is hard to believe what difference a tip can make, but the results were very positive.

### “Extreme Nuclear Breakdown Efficiency”

Instead of pounding or hammering the nucleus head-on, the INFINITI's OZil tip oscillates side to side, creating a much more powerful shearing force. The wider angle of the 45° mini-flared tip provides greater surface area contact for this shearing action, which creates extreme nuclear breakdown efficiency—even more than with the compressional force of longitudinal ultrasound.

The difference between the two forces can be illustrated by an unrelated example—a block of ice. In one scenario, a dense block of ice is easily broken down to ice crystals by an ice shaver. The alternative would be to break it into chunks with a hammer or ice pick. With the hand ice shaver, the block stays still as it is gently grated down. Conversely, with a hammer, the energy is distributed throughout the entire ice block, which shakes with each strike. Similarly, in the eye, torsional ultrasound minimizes chatter/repulsion, and the perfectly

constructed and angled tip can actually cut more effectively than with longitudinal energy.

Clinically, without any meaningful repulsion, once a nuclear fragment nears the 45° Kelman tip, it just folds itself into the handpiece and disappears. Furthermore, whereas I experienced some clogging with the 30° tip, the 45° OZil tip does not become clogged; the surgeon simply moves it close to any nuclear piece, and it will attract, shear, and crumble material effortlessly. With such efficient nuclear breakdown, I find that I actually need less manipulation with my second instrument, which I normally utilize to reposition nuclear pieces at the tip. Torsional ultrasound actually requires less skill on the surgeon's part, because he or she does not have to emulsify around the edges of nuclear segments to avoid stagnation and clogging, the way we have learned to do with traditional longitudinal ultrasound.

### Power Modulations Unnecessary

The efficiency of the INFINITI Torsional platform negates the need for power modulations, in my opinion. I love the power modulations such as hyperpulse, variable duty cycle, etc., that make longitudinal phacoemulsification more efficient. I expected the INFINITI console's power modulations to similarly enhance the torsional technology, but it actually slowed down phacoemulsification. The pulse action introduces a pause to the shearing process that is unnecessary and counterproductive to OZil's efficiency. The OZil Torsional technology is almost a new paradigm for phacoemulsification.

The 45° mini-flared tip not only provides increased surface area for torsional phacoemulsification to work, but also a larger amplitude of movement per oscillation.

I consider the jump in performance from the OZil 30° tapered tip to the 45° mini-flared angled tip to be equal to the difference between traditional longitudinal and torsional phaco technology. It is just that dramatic.

### Decreased Fluidic and Power Settings

I noticed that besides not needing hyperpulse, the OZil Torsional handpiece does not need high flow and vacuum rates. I was able to decrease these settings to approximately two thirds of what I had been using with longitudinal ultrasound without losing efficiency. This option is a tremendous benefit for surgeons, as it reduces total fluid usage in the eye and further lessens the chance of postocclusion surge, thus making the procedure safer and more efficient overall.

Since switching to the new tip, I have not had to mix in more than 5% longitudinal ultrasound to the torsional ultrasound. In fact, I have typically been using a maximum of 80% torsional power to emulsify 1 to 4+ nuclei. When I first used the system with the 30° tip, I programmed combination settings for nuclear densities of 1, 2 and 3, 4, but I have since found that I needed fewer settings. Now, my settings are for grades 1 and 4, and the latter mixes in about 5° longitudinal ultrasound. I recently scheduled a 5+NS black cataract that ordinarily I would not have dreamt of attempting with a pure torsional setting. The 45° mini-flared tip handled this cataract with aplomb, even without longitudinal ultrasound. Although it did take some patience, the tip did not get clogged, and the lens was safely emulsified—chatter free.

### TECHNIQUE

Having always used a straight phaco tip with other platforms, switching to the angled Kelman 45° tip was my only minor learning curve with the INFINITI system.

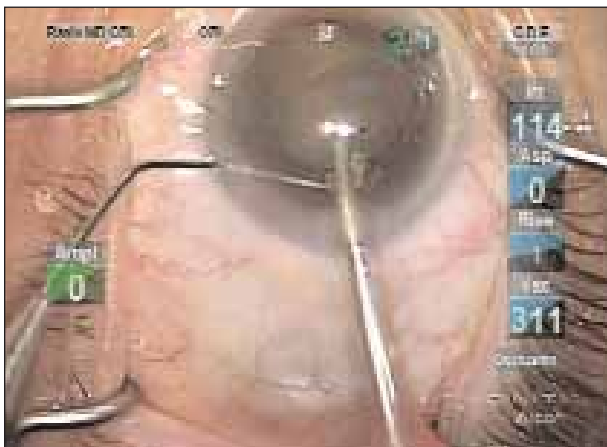


Figure 4. The author uses the Kelman 45° tip sideways in this shallow chamber at the start of a supracapsular technique.

“I was able to decrease [my] settings to approximately two thirds of what I had been using with longitudinal ultrasound without losing efficiency.”

I now utilize it the same way as a straight tip. On occasion, if the eye's chamber is very shallow, I may turn the OZil handpiece on its side. I use one of two techniques, either a supracapsular or a quick-chop technique. Like divide-and-conquer, quick chop produces four nuclear quadrants, an approach in which torsional ultrasound excels in efficiency (Figures 2 and 3). In the supracapsular technique, which I use for soft and intermediate lenses, I skip the initial grooving and go right into emulsification (Figure 4). I have found that the OZil handpiece is very efficient in that technique as well.

### Micro-Incisional Phaco

One other very important benefit to the 45° mini-flared tip is its ready adaptability to coaxial micro-incisional cataract surgery (C-MICS). By simply switching the traditional Micro sleeve to the Ultra sleeve (both from Alcon Laboratories, Inc.), surgeons can maintain all of the power and safety benefits of OZil through a 2.2-mm incision. The flared tip shaft design is constructed to allow maximum irrigation flow with the Ultra sleeve. I have used OZil with C-MICS with excellent results, without needing to change my vacuum or flow settings. I simply increase my bottle height for the 2.2-mm incision to maximize irrigation flow. Practically speaking, there is minimal-to-no learning curve when switching from 2.75-mm phacoemulsification.

Certainly, aside from the benefits of OZil, micro-incisional cataract surgery is the clear future direction of phacoemulsification. With 2.2-mm surgery, we can achieve a more minimally invasive procedure with less astigmatism, less iris prolapse, and maybe even a slightly lower risk of endophthalmitis. The ability to match a full spectrum of IOLs through the micro-incision, including aspheric, toric, and presbyopic lenses, makes the Alcon platform currently a leader in C-MICS in the US.

### CONCLUSION

Torsional phacoemulsification, especially with the 45° mini-flared tip, represents a significant advancement in phaco energy delivery. Although I continue to use the Stellaris and the Signature and enjoy the unique attributes of the differing technologies, OZil changes the paradigm. Simply said, it makes phaco surgery easier, and by allowing lower fluidic and power settings, it also increases surgical safety. ■

# Overhyped, or a Real Technological Advance?

“I feel confident that I chose the phaco technology that is going to revolutionize the procedure.”

BY JASON JONES, MD



My father founded Jones Eye Clinic in the 1970s. During the course of his career, he readily adopted new technologies such as phacoemulsification and IOLs. In the 1980s, the practice expanded to include an ambulatory surgery center (ASC), and my father cultivated a Medicare-based patient population.

When I joined the Jones Eye Clinic practice several years ago, my colleagues and I were using the Millennium Microsurgical System (Bausch & Lomb, Rochester, NY). Over time, we adopted a few upgrades to the system's pump and software that made a significant difference in patients' outcomes, but when the system approached 10 years of age, it was time to think about a new phaco machine.

## THE SELECTION PROCESS

When my colleagues and I began looking for our new phaco system, we had to choose from several new technologies on the marketplace. I had briefly used the INFINITI Vision System (Alcon Laboratories, Inc., Fort Worth, TX) when I was a resident. Although the machine was impressive, at that time, it offered only longitudinal ultrasound with the NeoSoniX handpiece (Alcon Laboratories, Inc.). When OZil Torsional ultrasound (Alcon Laboratories, Inc.) became available on the INFINITI, I was not sure if this new technology was overhyped or a real technological advance. Our local Alcon representative offered to provide a demo machine for 1 week, and after I used it for several days, I knew that the torsional technology lived up to the hype. I saw a real difference in my patients' outcomes, and I was able to comfortably approach various grades of cataracts and difficult surgical situations. Right away, the OZil Torsional technology proved itself.

For the sake of comparison, my staff and I considered other machines, such as the Stellaris Vision Enhancement System (Bausch & Lomb). I was less enthusiastic about this option, however, because of my previous experience with the Millennium, in which my colleagues and I felt that we had suffered from a technical support standpoint. Due to our geographic location, we had a high turnover

“My experience with the INFINITI and torsional was ‘eye opening,’ and I chose the phaco technology that I believe is revolutionizing cataract surgery. I think this system benefits surgeons and patients alike, and I encourage any practice to try it.”

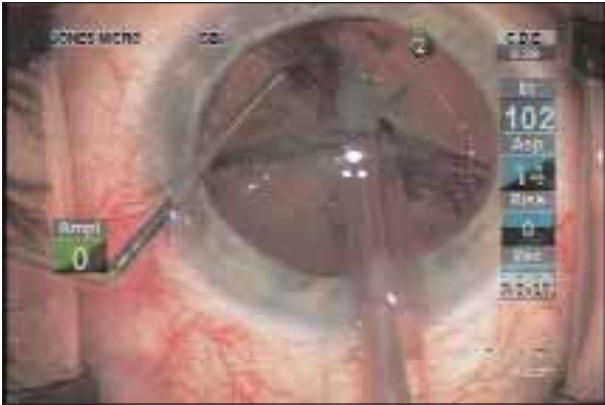
of Bausch & Lomb equipment representatives over a short period of time. Geographically, we are somewhat isolated, and we are located at the border between two different territories for representatives. In addition, I wondered how the recent buyout of Bausch & Lomb by Warburg Pincus LLC (New York, NY) would affect the company's long-term technical and field support.

We tested the Sovereign Compact with WhiteStar 2 years ago, and more recently the WhiteStar Signature system (both by Advanced Medical Optics, Inc., Santa Ana, CA), but the Signature did not have nonlongitudinal ultrasound technology during the demo. I was less interested in the phaco systems produced by Advanced Medical Optics, Inc., because I feel they do not offer the same technological advancement and efficiency that is available today from the INFINITI with OZil Torsional technology. I think that the Signature system has great potential and will be a good competitor in the marketplace, but it may take some time for its manufacturer to iron out any operational issues that any new platform can experience. The INFINITI platform has been in the marketplace for a few years, so many of its teething issues have been worked out, and I am confident that it will be a workhorse during a busy surgical day. I concluded that I wanted the INFINITI.

## HOW INFINITI DIFFERED

Compared with the INFINITI Vision System, the Millennium system took a long time to get through a





**Figure 1.** The author performs a vertical chop maneuver using torsional ultrasound. Note that the 0° amplitude denotes the occlusion of the impaled Kelman 45° angled tip.

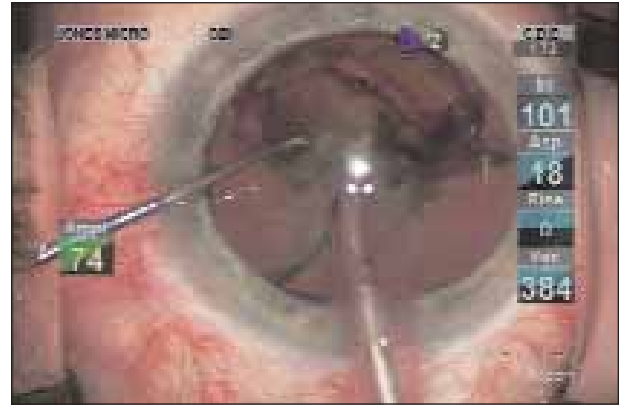
fairly dense cataract. Our core patient base is what I call “reluctant customers”—older patients in their mid-80s who present with brunescant cataracts and often have pseudoexfoliation and Fuchs’ dystrophy of the cornea. I was amazed that the INFINITI allowed me to extract dense cataracts in approximately the same amount of time as it took to remove less challenging lenses. I expected the INFINITI to shorten my phaco time somewhat, but the difference was significant.

The INFINITI’s torsional technology has not only increased my operative efficiency, but it has also improved my patients’ outcomes. Their eyes look quiet and clear immediately postoperatively, and I feel that their vision recovers faster and to a higher level than I previously expected. Such results give me more confidence when I interact with patients preoperatively because I have greater comfort to approach patients with IOL options regardless of their nuclear density. I feel this confidence translates into greater conversions to premium IOL technology, both multifocal and toric IOLs.

I also notice a difference in the phaco wounds postoperatively. Although I have never had a significant issue with wound burn with any machine, I think the INFINITI system preserves the tissue better. The corneal wound looks less disturbed. I believe this is because the increased efficiency of the INFINITI’s procedure reduces the length of time the phaco needle spends in the eye, thus reducing the amount of fluid going through the eye. As we all know, less fluid means less turbulence. In addition, the torsional technology minimizes incisional friction during the procedure by its OZil phaco needle’s different mechanism of movement.

### SURGICAL TECHNIQUE

I usually use vertical chop for my cataract procedures (Figure 1), because I feel it applies equally well to soft and advanced cataracts. After sampling several phaco tips with



**Figure 2.** The OZil handpiece and 45° angled mini-flared Kelman tip efficiently emulsify nuclear fragments.

the INFINITI, I found the 45° mini-flared Kelman tip (Alcon Laboratories, Inc.) was the most advantageous. Its 45° bevel increases the amount of surface area available to the shearing forces of the torsional phaco, which helps enhance the procedure’s efficiency. Additionally, this tip’s lower mass allows it to swing side to side more efficiently than larger tips such as the 1.1-mm flared (Alcon Laboratories, Inc.). My favorite aspect of the INFINITI’s 45° mini-flared tip is that it feels small and maneuverable in the eye, which is a new sensation for me. Also, the system’s OZil handpiece is very light and extremely comfortable to use, and this enhances my sense of increased maneuverability and flexibility during the procedure.

Although some surgeons may be concerned that performing a vertical-chop or a quick-chop technique with torsional ultrasound could interfere with occlusion, I have not found this to be the case. I typically use 100% torsional ultrasound for my phaco procedure. I add some longitudinal ultrasound (10%) for very dense cataracts and for eyes with any zonular instability in order to minimize any building of vacuum and keep the tip clear. This option greatly increases the safety and the efficiency of phacoemulsification for those challenging eyes. Also, I like that the INFINITI system allows for longitudinal energy to be independently controlled and set for intermittent burst and pulse patterns. I often use a burst setting with the longitudinal option to reduce the duration of ultrasound in the eye.

### EASY TRANSITION

Changing phaco machines naturally requires some adjustment, but transitioning to the INFINITI has been easy for my staff and me. The surgeon’s interaction with any phaco machine boils down to the handpiece and the foot pedal, as well as the system’s auditory feedback. The handpiece, as I mentioned, is very comfortable to hold and performs excellently. The INFINITI’s foot pedal allows ample flexibility, and it has programmable buttons that let the

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“An important consideration when purchasing a new phaco machine is the level of support provided by the manufacturer and the field representatives. I have found that Alcon’s representatives are some of the best-trained in the industry; they really know their machine and its settings.”

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user transition from one step in the procedure to the next if desired.

The machine’s auditory tones give good feedback and indication of aspiration and vacuum levels. The INFINITI’s software allows the surgeon a high degree of interaction with and control over the device. Also, the machine’s menu-based user interface is easy to understand and convenient for staff to use. Surgeons can preset their power settings into a drop-down menu that is easily accessed during surgery.

Videotaping my surgeries helped me perfect my technique with the new machine. The first day I used the INFINITI, I could tell that it had advantages over other units, but I was not achieving the surgical effectiveness I really desired. Watching my videos helped me realize that I needed to interact differently with this machine than I had with previous technologies. Thereafter, I was able to make the transition fairly quickly. As soon as I understood how to interact with the system, using it became very easy and enjoyable. Also, our Alcon equipment and IOL representatives both were very helpful in encouraging and guiding me during the transition.

### TECHNICAL AND FIELD SUPPORT

An important consideration when purchasing a new phaco machine is the level of support provided by the manufacturer and the field representatives. I have found that Alcon’s representatives are some of the best-trained in the industry; they really know their machine and its settings. They are also well versed in phacoemulsification and can readily offer pearls to help surgeons excel with the machine. Furthermore, the company’s representatives go to great efforts to collect information from surgeons about the INFINITI settings they employ and how well these perform. It is readily apparent that the representatives know how settings need to be managed for different cataract grades and techniques, and their knowledge can prove invaluable when approaching a particular procedure.

I have found this same level of expertise with the Alcon engineers with whom I have interacted. During a trip to the INFINITI’s R&D and manufacturing facility, I was very impressed that the engineers with whom I spoke perfectly understood my description of the phaco procedure. Alcon engineers visit surgeons’ ORs to watch how their company’s instruments are used and base their design decisions on this real-world feedback. Their depth of knowledge was impressive and helped convince me that their products are an excellent choice for this kind of technological advancement.

### COST AND VALUE

Alcon has been a premium player in the ophthalmic marketplace, with both lenticular and phaco technologies. Although some perceive the company’s pricing as being unfriendly to physician-owned ASCs, its technology is unmatched, and I feel that the efficiency of the INFINITI with the OZil Torsional procedure offsets some of the system’s cost. I also believe that Alcon’s phaco machines are becoming more price-competitive for ASCs.

My staff and I have found that the features on the INFINITI that cost a little more, such as the single-use FMS cassette, translate into savings of time and worry. My staff do not have to manipulate the reusable cassette and tubing for turnover on a case, which has reduced their manual labor and stress during a procedure. With this step eliminated, they can now spend more time and effort to set up the OR properly and make sure the patient is ready and comfortable for surgery. Overall, this seemingly small change has made the procedure more enjoyable for all involved.

### CONCLUSIONS

When a surgeon and staff are used to executing a procedure in a certain way, they accept it as the norm. My staff and I had to try the INFINITI Vision System with OZil Torsional to understand the differences it would make surgically, which then became evident. Having the freedom to spend more time and energy on patient care and less on worrying about the machine is a tremendous advantage, especially as we look toward premium IOLs and “premium patients.”

Purchasing equipment is difficult, and surgeons often feel influenced by their peers and their past experience. My experience with the INFINITI and torsional was “eye opening,” and I chose the phaco technology that I believe is revolutionizing cataract surgery. I think this system benefits surgeons and patients alike, and I encourage any practice to try it. Finally, I think the market competition that this technology generates will benefit the entire specialty in the end. ■

# Growing Your Practice With INFINITI and OZil Torsional Ultrasound

“Collectively, these factors made surgery better and safer.”

BY DAVID M. KWIAT, MD



I currently practice in a two-doctor office with an adjacent ambulatory surgery center located in upstate New York. Our patient population here is diverse, but the majority of those we treat are older than 55. The cataract volume for our office is in excess of 1,000 cases per year. We offer traditional ophthalmic services in combination with refractive and cosmetic procedures.

## CHOOSING A NEW PHACO SYSTEM

During my residency, I trained on the Millennium Microsurgical System (Bausch & Lomb, Rochester, NY). Overall, I found the system to be satisfactory and helpful in developing proficient cataract surgery skills. I did, however, experience occasional issues with chamber stability and followability that frustrated me as well as some of my attending surgeons. During my years in private practice, I have extensively utilized two other phaco systems, the Sovereign Cataract Extraction System with WhiteStar (Advanced Medical Optics, Inc., Santa Ana, CA) and the INFINITI Vision System (Alcon Laboratories, Inc., Fort Worth, TX). Recently, our center needed to purchase new cataract surgery equipment. My partner and I desired a system that would deliver safe and effective as well as economical surgery. With the fortunate advantage of having experience with many different systems, the choice was a very informed one. Based on my experience, we selected the INFINITI Vision System with OZil Torsional ultrasound (Alcon Laboratories, Inc., Fort Worth, TX).

## PHACO EFFICIENCY

Of the systems, the INFINITI was simply the most efficient in my hands. With it, my cataract surgery times decreased noticeably. Part of this efficiency was due to the recently introduced torsional ultrasound technology, which delivered very focused energy that more effectively emulsified the nuclear fragments. The OZil hand-piece's followability was excellent, with negligible chat-

“With the fortunate advantage of having experience with many different systems, the choice was a very informed one. Based on my experience, we selected the INFINITI Vision System with OZil Torsional ultrasound.”

ter and repulsion, due in part to the system's decreased dependence on high fluidic parameters needed with longitudinal phacoemulsification. The INFINITI fluidics produced a more stable anterior chamber that allowed more control and easier lens manipulation. Collectively, these factors made surgery better and safer.

## STIMULATING PRACTICE GROWTH

Another consideration when my partner and I were deciding to purchase a new phaco system was the potential for practice growth. I was drawn to the INFINITI's ability to create astigmatically neutral cataract removal through a 2.2- or 2.4-mm incision. For our refractive IOL patients, this technology was crucial. We could customize our incision size based on the patients' astigmatism and corneal topography to facilitate an astigmatically neutral result. This facet has helped us grow the refractive IOL portion of the office.

## EASING CHALLENGING CASES

The potential for improved outcomes with our more complex cases was another draw. Fuchs' dystrophy patients, for example, require very clear corneas in order to be happy with their result. With decreased surgical time and comparatively less fluid passing through the anterior chamber, the INFINITI minimizes stress to the corneal endothelium. Also, because I feel more comfortable with the system's fluidics and use less longitudinal



phaco energy, I reintroduce viscoelastic in these cases less than I did previously, and thus save time.

### TECHNIQUE AND SETTINGS

My partner's and my transition to torsional phacoemulsification from longitudinal was uneventful, with an extremely fast learning curve. The introduction of the 45° bevel mini-flared Kelman tip (Alcon Laboratories, Inc.), which maximizes the torsional technology, enhanced the OZil's sculpting and segment removal capability. I experienced more comfort during sculpting, as the angled tip afforded less incisional torque to engage the nucleus. Further, the mini-flared Kelman tip more effectively facilitated nuclear purchase. Thus, the tip fits well into my surgical approaches.

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“Because the system has allowed us to more consistently deliver an improved ‘wow’ factor following surgery, we now use more premium IOLs and are in a better position to satisfy these patients’ higher expectations.”

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I use two different temporal clear corneal phaco techniques with a high integration of astigmatic correction, including limbal relaxing incisions. For harder nuclei, I perform a stop-and-chop technique. For softer nuclei, I use my own modification of the flip-and-chip technique. My settings on the INFINITI system work extremely well for all approaches. For sculpting, I utilize a

small amount of traditional longitudinal phaco and a larger amount of torsional power to offset this. For segment removal, I no longer utilize longitudinal ultrasound in any of my routine cases. I use the torsional power at a level of 75% to 80%, which clears the lens fragments quite effectively. With mature cataracts, I add longitudinal power in a pulsed fashion to torsional, which enhances fragment removal without increasing repulsion significantly.

### VALUE

My partner and I have found several ways to boost our bottom line with the INFINITI Vision System. First, the consistent and efficient manner of our new system has allowed us to get into a surgical “groove.” We have decreased our surgical time, which has allowed us to increase our volume and maximize patient flow. The volume we can accommodate has increased by 15% to 20%, from 15 to 18 patients per surgery day. Second, because the system has allowed us to more consistently deliver an improved “wow” factor following surgery, we now use more premium IOLs and are in a better position to satisfy these patients’ higher expectations. Last, as a minor issue, the efficiency of the INFINITI system has decreased the amount of balanced salt solution we use per case, which translates to a small savings.

### SUPPORT AND RELIABILITY

Alcon's customer support clinched our decision to purchase the INFINITI system. The setup and transition were smooth and easy, and our representative(s) responded quickly to our questions. Their ongoing attentiveness, quick offering of upgrades, and timely response to maintenance issues has reassured my staff and me that we made the right choice. ■



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