

The new era: Complete solutions for a lifetime of vision

About the speakers



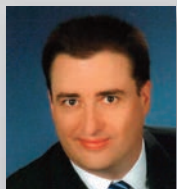
Robert Ang, MD, practices at the Asian Eye Institute in Manila, Philippines. Specializing in refractive surgery, cornea, cataract, and glaucoma, Dr. Ang has been active in various clinical trials and has participated in various studies involving LASIK, IOLs, and presbyopia.



David Kent, MD, is one of New Zealand's leading eye specialists. He is recognized as a leader in the field of LASIK surgery and is currently the New Zealand representative to the International Society of Refractive Surgery (ISRS) and the New Zealand representative to the Australasian Society of Cataract and Refractive Surgeons (AUSCRS). Dr. Kent is a leading user of the multifocal and toric intraocular lenses and is now one of the prolific users of the Crystalens® accommodating IOL (Bausch + Lomb, Rochester, N.Y., U.S.).



Damen Gatinel, MD, currently heads the ophthalmology department of anterior segment and refractive surgery in the Rothschild Foundation in Paris, France. He performs approximately 700 cases of refractive surgery and over 500 cataract cases per year. He has taken up a special interest in corneal topography and subclinical keratoconus detection. Together with Dr. Alain Saad, he developed software that can be incorporated into the Orbscan® IIz (Technolas Perfect Vision) to screen for risk of corneal ectasia and detect early stage keratoconus.



Frieder Loesel, PhD, is chief strategy officer, Technolas Perfect Vision. He has been involved intimately with the research and development of femtosecond lasers for surgical applications. In 1999, he co-founded 20/10 Perfect Vision. The company formed a joint venture with Bausch + Lomb's refractive business in 2009, resulting in the creation of Technolas Perfect Vision and the development of the VICTUS™ Femtosecond Laser Platform. Dr. Loesel has been described as a "serial inventor"—he has filed more than 50 international patents and patent applications.



Vincent Lee, MD, is general manager of the Hong Kong Eye Laser Centre and an honorary professor at the ophthalmology department of the Medical Faculty of the University of Hong Kong. He received his training in ophthalmology at the University of California-San Diego, and he specializes in cataract and refractive surgery and also actively does research in glaucoma. He was among the first surgeons in Hong Kong to perform femto phaco and LASIK flap creation using the VICTUS platform.



Kasu Prasad Reddy, MD, is CEO of the Maxivision Eye Hospitals, India, and current president of the Hyderabad Ophthalmic Association. Being one of the pioneers of refractive laser surgery, Dr. Reddy introduced the first LASIK procedure to India in 1996, and established the first LASIK center in Hyderabad, India, after completing his fellowship in London. Dr. Reddy has been working very closely with TPV on the development of the VICTUS platform, providing his valuable advice since November 2010 for the CE mark clinical trials. He has now performed over 750 femtosecond cataract procedures with the VICTUS system.



Chee Soon Phaik, MD, is head and senior consultant of the Cataract Service at the Singapore National Eye Centre (SNEC), as well as being an associate professor in the Department of Ophthalmology of the National University of Singapore. Her research interests in cataract are mainly in the management of complicated cataracts such as dense posterior polar cataracts, subluxated cataracts, and IOL fixations and explantations. She started using the VICTUS laser in SNEC in April 2012, and will also be using the laser in her specialization with challenging cases.

New technologies providing "complete solutions for a lifetime of vision" were the focus of the 4th Technolas Perfect Vision (TPV, Munich, Germany) Alliance meeting held at the Shangri-La Pudong Hotel on 31 May 2012.

The meeting introduced TPV's wide range of offerings, which has recently been expanded to provide patients and surgeons with new approaches to visual problems that include all kinds of cataract and refractive errors, up to and including presbyopia, often acknowledged as the "holy grail" of ophthalmology.

The new technologies, said Kristian Hohla, CEO, TPV, are designed to serve the ophthalmic patient "from 20 to 85—from the beginning to the end of one's lifespan."

The 4th TPV Alliance meeting was chaired by **Chan Wing Kwong, MD**, senior consultant, Eye & Retina Surgeons, and visiting consultant, Singapore National Eye Centre.

SUPRACORT™ presbyopia treatment

"As we know, there's a growing population of presbyopic patients," said **Robert Ang, MD**. "Whether it's in Europe, the U.S., or Asia, people continue to grow old, and this will represent a big chunk of the population in the years to come."

In Dr. Ang's practice, anywhere from 20-30% of patients consult with no specific eye problem. Instead, these patients consult either for routine eye checks or to look for alternatives to wearing eyeglasses—reading or otherwise.

"This is a very opportune market for us," said Dr. Ang. "Before we would just do clear lens extraction for the desperate patients who don't mind having surgery, but now we want something less invasive."

In the past, lens-based options involving clear lens extraction were the most basic procedures Dr. Ang would offer patients at his clinic; today he offers a more complete range of options, depending on each patient's refractive error.

For patients who are slightly hyperopic, up to +1 D, Dr. Ang offers INTRACOR® presbyopic treatment, a femtosecond-based corneal solution. For those who are slightly more myopic, from -0.5 to -1.5 D, he recommends monovision, treating the dominant

eye for distance and leaving the nondominant eye untreated.

Beyond this range, including patients with hyperopia of +3 to +4 D or myopia of greater than -1.5 D, as well as post-LASIK patients and pseudophakes, Dr. Ang has a new alternative: SUPRACOR.

SUPRACOR, said Dr. Ang, is basically a LASIK procedure using an algorithm optimized for presbyopia correction. The procedure uses the Technolas Excimer Workstation 217P to provide what he called “varifocal” or modified multifocal vision, with specific areas of the cornea optimized for either near or distance vision.

Dr. Ang emphasized that because the procedure doesn’t result in monovision, patients can achieve excellent near, far, and intermediate vision while retaining good depth of field and contrast.

“Usually we vary the refractive outcome by about 0.5 difference to expand the range of vision,” he said. “The goal of treatment is to improve near and intermediate vision while maintaining or improving distance vision.”

The desired topography of the cornea following SUPRACOR includes a “central bump” surrounded by an aspheric neutral region. The central bump is for near vision, while the midperiphery is for distance vision.

When a patient reads, the pupil constricts, and the patient sees through the central bump. When the patient looks at objects at a distance, the pupil dilates, and the midperipheral area comes into play.

The most basic advantage Dr. Ang sees in the SUPRACOR procedure is that it is essentially LASIK, a procedure that both doctors and patients have become familiar with and have had good experience with in the last decade. In addition, as the treatment does not induce unwanted aberrations, this allows touch-ups and is less invasive than other procedures.

The main disadvantage is the potential for flap-related complications. Dr. Ang recommended creating thin flaps for SUPRACOR, avoiding the possibility that thicker overlying flaps can obscure the refractive effect of the treatment.

Dr. Ang and his colleagues have looked into the application of SUPRACOR in various patient groups that represent potential markets for the procedure: hyperopic patients, pseudophakes, post-LASIK patients, and myopic patients.

The results have been quite good, showing consistency across all the groups: Around 80-90% of each group achieved vision of 20/25 (6/7.5) or better at the end of the follow-up period. Post-LASIK patients, he added, seem to do particularly well, possibly because pre-op refraction takes into account the pre-existing flap; since no new flap needs to be created in these patients, the potential for unexpected additional aberrations induced by flap creation is eliminated.

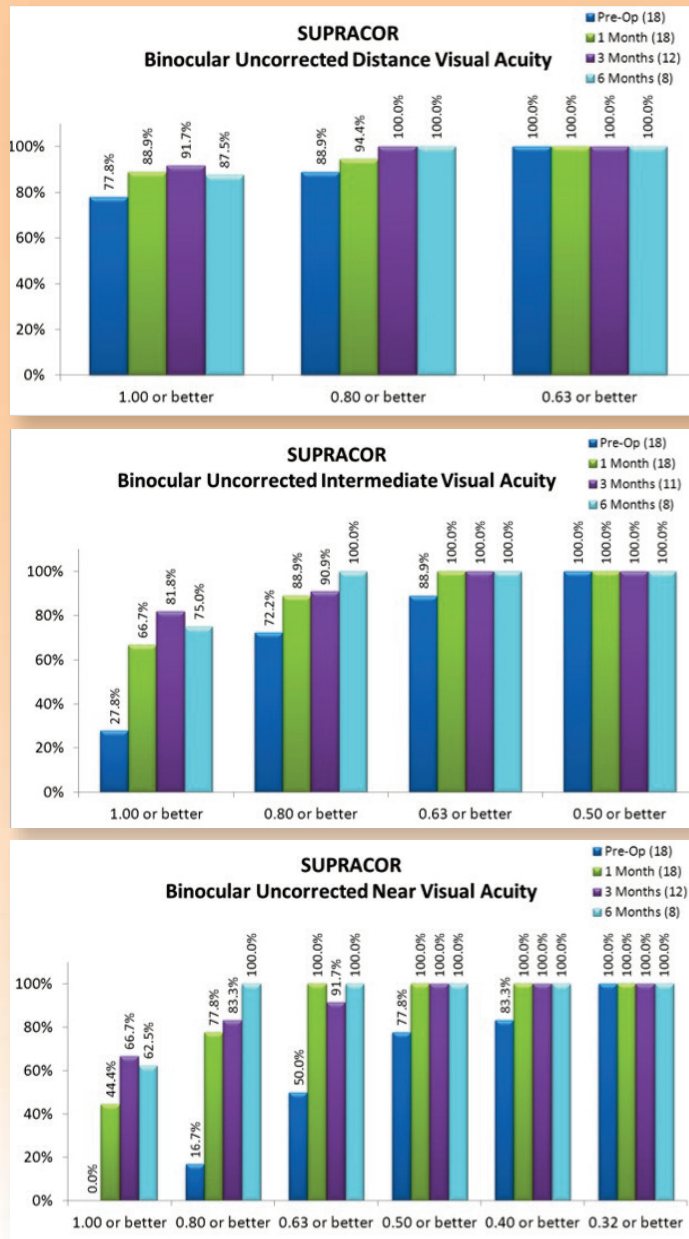


Figure 1. Binocular outcomes with SUPRACOR in pseudophakes (Note: Fellow eyes were not treated within this study and may be ametropes, affecting binocular vision.)

One thing to keep in mind about SUPRACOR patients is the target age group: All potential patients will be 45 years or older, so “everybody gets dry eye,” said Dr. Ang. In all patients included in Dr. Ang’s studies, he used silicone punctal plugs the day after surgery, and if necessary would actively treat dry eye.

Finally, when talking to patients, Dr. Ang recommended making sure surgeons do not promise too much, but nonetheless ensure that they deliver enough distance and near vision to make patients happy.

Nomogram for Q-factor corrected aspheric excimer laser treatments

“When you’re doing excimer laser surgery, it’s very important to hit the target and to achieve the desired refractive outcome,” said David Kent, MD. “In my practice, I use the Zyoptix® aspheric mode of the Technolas laser basically for all my low to moderate myopes as I find it’s a very accurate method of correcting myopia. One of the things I’ve looked at is how I can improve the results, and as a result get happier, more satisfied patients.”

One way Dr. Kent has done so is by optimizing his nomogram for his patients.

In 2006, when Dr. Kent first started using the Technolas laser, the initial recommendation was to add 10% to the sphere and treat the result. This worked fine, but Dr. Kent wanted to make sure he had the most accurate nomogram possible.

He looked back at his own data to see if he could develop a more accurate nomogram for his patients. He looked at the 3-month results of nearly 1,700 eyes treated from April 2006 to the end of 2011 at his clinic. About 5% of these eyes had undergone PRK, while the remaining 95% had undergone LASIK, reflecting Dr. Kent's general practice.

The pre-op characteristics of these patients were as follows: mean age of about 36 years; low to moderate myopes with little astigmatism; average optical zone 6.7; average Q-value 0.81; mean K about 542 microns; mean ablation depth about 70 microns.

To develop a nomogram, Dr. Kent tried to work out a number to be added to the subjective sphere in order to get the sphere value needed to treat—a number he called the "spherical correction factor."

"I calculate that using the results at 3 months and work it out by looking at the difference between the pre-operative subjective sphere—what did I actually treat?—and therefore what number I should be adding to get the right result in most patients," he said.

Examining sphere alone, Dr. Kent ended up with a spherical correction factor of about 9%. However, this factor resulted in a large amount of scatter—"not a marvelous nomogram if you only include sphere," he said.

He then looked at combining sphere with other factors. Adding cylinder resulted in a slightly better nomogram; there appeared to be a coupling between sphere and cylinder, but the resulting effect was very small, perhaps magnified to statistical significance by the large number of patients included in his data.

The factors Dr. Kent analyzed to develop his nomogram were patient age, pre-op sphere, pre-op cylinder, Q-value, K-value, and the optical zone. After performing a multiple linear regression analysis, he found that age, sphere, and cylinder were the factors that reach statistical significance, although cylinder was "only just barely statistically significant."

Performing another regression analysis on age, cylinder, and sphere revealed that only age and sphere were statistically significant.

"It turns out you may need to treat a little bit more in younger patients than you do in older patients, and that has nothing to do with accommodation, because otherwise if the patients are accommodating, then you'd actually have to treat less," he said.

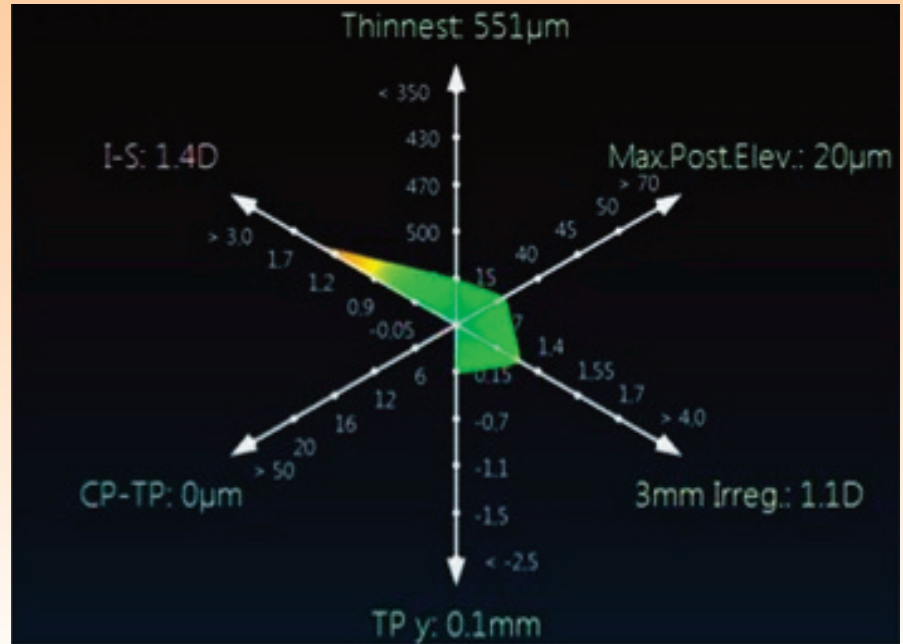


Figure 2. SCORE analyzer radar map

"So my final nomogram, the one that I use today, includes the patient's age and the pre-operative sphere," he added. "Interestingly enough, in Zyoptix wavefront-guided, age is also statistically significant."

SCORE: A new approach to keratoconus analysis

Ectasia remains "the most feared complication" of LASIK, according to **Damien Gatinel, MD**. Identifying patients with forme fruste keratoconus, the main risk factor for ectasia, is therefore an important goal in screening patients. On the other hand, surgeons may be rejecting "false positive" patients when using only Placido techniques. Using these techniques puts a flag on patients with steep corneas, although the Orbscan may look fine other than the corneal steepness; in these cases, said Dr. Gatinel, surgeons may not want to overrule the Placido results without agreement from other diagnostic factors.

Dr. Gatinel worked with his colleague **Alain Saad, MD**, to "create a unique number from which you can tell if the cornea is suitable for LASIK or not."

"You will always have difficulty when going from one or several indices showing statistically significant differences to clinically relevant differences," said Dr. Gatinel. "But if you combine 12 indices, then you can achieve better separation between normal and ectasia-susceptible groups."

This, he said, is the "core" of SCORE—screening for corneal objective risk of ectasia.

The SCORE was developed from data that Dr. Gatinel and Dr. Saad had accumulated over the last 5-10 years. Using SCORE, surgeons can determine whether a patient is a candidate for LASIK or not, and it can even be useful for choosing between PRK and LASIK for each patient.

The SCORE incorporates Placido analysis, elevation analysis, posterior and anterior elevation, and pachymetry analysis. This is in contrast with other techniques that usually either use Placido analysis alone or exclude it altogether.

As with all screening techniques, a good quality examination is important. This addresses the myopic population in particular. "In the myopic population, you will have ectasia-susceptible patients because you are going to thin the center of the cornea," he said. Myopic patients are usually younger than hyperopic patients who, said Dr. Gatinel, "barely develop ectasia."

For the examination, he said, surgeons should set the acoustic factor to 0.92, the acoustic factor used to perform the calculations.

Once the software is available, SCORE is easy to use. Basically, said Dr. Gatinel, if the SCORE is positive, greater than zero, then surgeons should avoid LASIK.

The zero value of SCORE is the best cut-off value incorporating 12 indices that Dr. Gatinel and Dr. Saad identified as they were developing their software. "It is also important that we simplify the life of the doctors with providing a number and to avoid the

doctor having to look all over the map to decide what to do," he said. "Without the SCORE analyzer, the interpretation of the Orbscan map is subjective."

Moreover, he said, it requires that surgeons look at various points on the map, resulting in a process that is often confusing.

The SCORE software interface provides surgeons with various view options. Aside from the basic quad map, the interface also provides a radar map that simplifies the Orbscan map on a 6-axis graph. "In this radar map, you can see immediately if there is a yellow or red color, indicating that the parameter is abnormal," he said (Figure 2).

The interface also offers an averaged pachymetry display, which shows the mean pachymetry averaged radially for the cornea, as well as the rate of thinning toward the center (Figure 3).

The rate of thinning is similar to an index on the Pentacam described as the "breadth of peripheral thickening," but the SCORE analyzer's label and display makes more sense clinically, as ectatic diseases are characterized by increased central thinning, not increased peripheral thickening.

Dr. Gatinel said clinically, the SCORE provides an objective measure that is highly repeatable compared with subjective measures. In addition, it quantifies the status of the cornea with a single value (the SCORE number) and can therefore be used to quantify the rate of progression of keratoconus, allows further clinical analysis (including other mathematical operations or statistical analysis), and can be used to quantitatively assess the efficiency of keratoconus treatment by providing a geometry-based assessment of the effects of treatments such as crosslinking.

One question the SCORE can help answer is when to perform PRK in patients. In Dr. Gatinel's experience, PRK is potentially useful in patients with a SCORE from 0 to 1, possibly as high as 1.5, but not beyond except for particular situations.

Some surgeons may worry that the SCORE will further reduce the LASIK rate by

eliminating too many patients. "That's not true," said Dr. Gatinel. Instead, he said, the SCORE will only help better qualify patients for LASIK surgery by providing an objective and user-friendly discrimination tool.

VICTUS™ femtosecond laser technology

The femtosecond laser is a powerful tool for ophthalmic surgery. This has long been established in the cornea; now the technology has been proven to work within the lens as well.

"One single femtosecond laser pulse creates a microscopic ablation," said **Frieder Loesel, PhD.** "By adding them together, we can generate microscopically precise patterns."

The laser thus provides a "very powerful tool that by computer control can allow us to do any kind of incision, cut, or fragmentation pattern we can envision," he said.

Among all the currently available femtosecond laser platforms, the VICTUS platform (TPV/B+L) has a number of key design features.

First, said Dr. Loesel, the VICTUS incorporates a very specific optical delivery design developed by leading optical engineers. This design allows the laser to perform everything from corneal flaps to capsulotomy and lens fragmentation with a very high level of precision.

VICTUS is the first femtosecond laser available that can do both refractive and cataract surgery.

"We all know these are expensive devices; they are not cheap to make, either," said Dr. Loesel. "So why have two of them sitting around if you can have all in one? That was the design goal for VICTUS—making a versatile device that can perform refractive corneal procedures as well as cataract procedures."

Another important design innovation is the platform's patient interface. Many refractive lasers use a flat docking interface; the VICTUS uses a curved patient interface that is designed to maintain a more natural anterior curvature of the eye.

Initially, the curved interface was developed with corneal surgery in mind—flap making and keratoplasty procedures. However, the interface may also have an added benefit for cataract surgery: The design is intended to maintain corneal integrity and avoid the formation of posterior corneal folds that can potentially interfere with the beam.

The VICTUS has an easy-to-use two-piece patient interface—a suction clip goes onto the eye, the patient is then positioned under the delivery aperture of the laser and raised to meet the curved patient interface. Once in position, the surgeon can close the suction clip, creating a stable connection between the patient's eye and the delivery system.

In addition to the curvature, the patient interface incorporates intelligent pressure sensors (IPS) that detect the eye's position in three dimensions. The software provides a graphic indication of how much pressure the curved interface is exerting on the eye.

This pressure can be adapted to the requirements of the particular procedure to be performed. For instance, said Dr. Loesel, the surgeon uses a stronger docking pressure when performing corneal surgery, since every micron of contact between the cornea and the interface counts in these procedures. On the other hand, the surgeon uses a lighter pressure when performing cataract surgery, to minimize the possibility of corneal folds.

In addition, because the intelligent pressure sensors detect pressure in three dimensions, they help ensure the centering of the laser, giving the surgeon full control over position.

Another element of the VICTUS is real-time OCT. Other devices might use OCT for planning the procedure, but the VICTUS uses the OCT continuously, allowing the surgeon to monitor the procedure as it happens.

All of this is presented on an easy-to-use graphical user interface that makes control of the platform at every point in any procedure very straightforward.

Furthermore, the VICTUS features a very fast laser source. The VICTUS delivers pulses at a rate of 80 kHz for cataract surgery and 160 kHz for flap procedures. For cataract surgery, the VICTUS is currently faster than competitors such as the LenSx (Alcon, Fort Worth, Texas/Hünenberg, Switzerland).¹ "This means that you get a very fast capsulotomy and lens fragmentation procedure—typically 15-20 seconds," said Dr. Loesel. The full duration of the procedure thus depends on the pattern the surgeon has chosen.

These high pulse rates are combined with considerably lower energies. "VICTUS uses lower energies than some other lasers for performing the capsulotomy and lens fragmentation," said Dr. Loesel.² "We believe this is the result of the curved interface in combination with intelligent pressure sensors because we can adjust the docking in a way where you

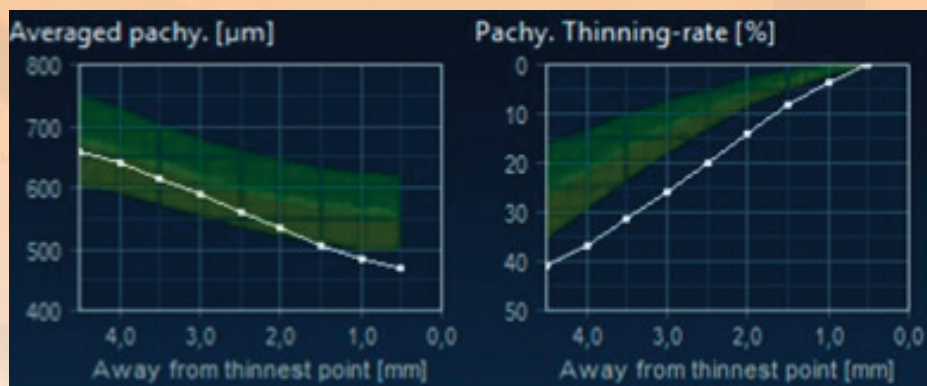


Figure 3. SCORE analyzer averaged pachymetry display

minimize any corneal wrinkles that may distort the laser beam as it passes through the cornea.

"In summary, the key technological features of VICTUS boil down to four aspects: It's a versatile machine—you only need one femto to perform both cataract and refractive procedures; it has a real-time OCT, allowing not only planning but also monitoring during the treatment; it uses a two-piece curved interface in combination with the intelligent pressure sensors to optimize docking; and it has a fast laser source that allows these procedures to be performed at a fast rate to minimize chair time," said Dr. Loesel.

VICTUS clinical experience in Asian eyes

Although he was among the first in Hong Kong to perform cataract and LASIK flap surgery using the VICTUS, **Vincent Lee, MD**, is a relative newcomer to the platform, having performed about 65 cases of femto phaco and about 20 cases of flap creation at the time of the Alliance meeting.

"We use the VICTUS because we run a refractive laser center and also do cataract operations," said Dr. Lee. "Thus having one femto platform that can do two procedures is advantageous to us."

The insights he provided at the meeting are of particular relevance to surgeons who have just started performing femto phaco, or are only beginning to consider making the shift to femto-assisted surgery.

When starting with a femtosecond laser system, surgeons should be prepared to make a few adjustments to their standard technique. However, Dr. Lee commented that all of the cataract platforms require some adjustments, but the VICTUS system makes the transition to femto-cataract smooth, straightforward, with an easy learning curve.

Dr. Lee recommended that surgeons use the rhexis forceps to grasp the edge of the capsule, pulling it centripetally, before removing the capsule, ensuring there are no tags. Once comfortable with the procedure, surgeons can then use the phaco tip to suck up the capsule.

For the capsulotomy diameter, Dr. Lee suggested starting with a larger diameter capsulotomy such as a 5.5-mm diameter, as "even when you're doing a conventional ultrasound phaco, it's easier to perform surgery with a larger capsulotomy," he said. "Then as you get more comfortable with the femto-cataract technique, you can make the diameter smaller."

However, he noted, surgeons should start using smaller capsulotomy diameters when implanting toric IOLs; Dr. Lee currently uses 4.8-mm capsulotomies for his toric cases.

In terms of the fragmentation pattern, Dr. Lee prefers to include a partial concentric cut or two in one of the nuclear quadrants created by a crosscut (Figure 4), known as the quad-



Figure 4. For operating on hard nuclei through a small capsulotomy opening, Dr. Lee adds a partial concentric cut to one of the nuclear quadrants following a standard crosscut.

rant cut. After taking out the smaller fragment, the remaining fragments come out "like Lego pieces," he said. This pattern is particularly advantageous for capsulotomies with a small diameter.

Dr. Lee has had some interesting experiences using the VICTUS. In one case, owing to procedure scheduling, the phaco part of the patient's cataract operation was performed about an hour after the femto part. Dr. Lee found that the bubbles had cleared, but the capsulotomy and nuclear cuts were still clearly visible. Another observation Dr. Lee made is that the pressure rise with the VICTUS platform is mild. In Dr. Lee's experience, this has resulted in quiet, clear eyes with white conjunctivas after surgery.

VICTUS for flaps

For flap creation, the first thing Dr. Lee learned was that surgeons should "start with at least a 120-micron flap"; as surgeons start to feel more comfortable with the laser, they can start creating thinner flaps. Dr. Lee has found that patients can actually see throughout the procedure during flap creation. Surgeons should thus counsel patients appropriately, informing them of the slight blurring in vision as the bubbles form during flap creation.

"The centration is very predictable," Dr. Lee commented.

Ultimately, Dr. Lee was pleased with the clear advantages the VICTUS technology provides in practice. "Basically, I think this is a must-have," he said. "If your practice includes refractive and cataract surgery, the VICTUS is a platform that you will be very happy with."

Clinical insights after 750 VICTUS procedures

Kasu Prasad Reddy, MD, is a true pioneer of femtosecond-assisted cataract surgery. In November 2010, he had the opportunity to work with the first prototype of what would later become the VICTUS femtosecond platform and has been using the machine since;

at the time of the Alliance meeting, he had performed 750 cases. With a cataract surgery rate of 11,000 to 12,000 a year at Dr. Reddy's Maxivision Eye Centre, he has most certainly added to that number.

"I have completed approximately 750 eyes without a single case of dropped nucleus," said Dr. Reddy. "The total credit goes to the VICTUS laser."

With all the features incorporated into the laser's design, including the real-time OCT and IPS, which Dr. Reddy called "the beauties of this machine," he said, "the laser minimizes problems with capsulotomy and fragmentation. In my experience, it is safe."

"The one thing I would like to comment on is the microscope," he said. The microscope helps with accurate pupil-centered docking and gives the option of operating in the same OR or in a different OR.

One of the key advantages of using the VICTUS platform is the precision of the capsulotomy to get the best results for patients; he said that it is very important to have that overlap of 0.5 mm on the IOL optic's edge, and with Crystalens® (B+L), where capsulotomy accuracy is important, he found precise capsulotomy extremely beneficial. Faced with cases such as those involving intumescent cataracts common in the Asia-Pacific, the high quality microscope, along with the IPS that is designed to prevent corneal folds, are very valuable, he said.

"In all these situations, you will find VICTUS extremely helpful," he said.

Initially, Dr. Reddy and his colleagues were asked to perform a small study evaluating the capsulotomy in 78 eyes using VICTUS, comparing the diameter, centration, and circularity with 86 eyes performed manually.

In all three parameters, the VICTUS consistently outperformed the manual procedure.³

"Replacing a handheld surgical instrument with a computer-controlled and OCT-guided laser system is superior," he said. "No manual technique can beat that. With the VICTUS, you can achieve a higher level of consistency and accuracy in terms of diameter, centration, and circularity."

Having tried all the different fragmentation patterns possible using the VICTUS, Dr. Reddy has established some cut pattern recommendations based on cataract grade.

For cataracts grade 1 to 2, Dr. Reddy recommends circular cuts; for grade 3 to 5, he prefers radial (cross) cuts; for grade 5 brown cataracts common in the region, he prefers a combination of radial and circular cuts.

In all his cases, the capsule was free-floating and easy to remove, he said.

"I think we were among the first to observe that the VICTUS platform not only makes an accurate fragmentation, but the capsulotomy is very accurate," he said.

Capsulorhexis is "one of the most important steps in phacoemulsification, especially

under topical anesthesia, when the patient can be quite apprehensive," he said. This stage of the procedure remains the most significant challenge for manual cataract surgery, illustrating the advantage of using the VICTUS. "In all those situations, I find laser refractive cataract surgery with the VICTUS brilliant.

"It typically takes 15 to 20 seconds and helps you to operate on almost any kind of cataract," he added. "It saves time on difficult cases."

All in all, he said, "laser refractive cataract surgery is definitely a milestone in cataract surgery. It provides excellent reproducibility of centration, circularity, and diameter of the capsule and accurate fragmentation. I am sure people will take this up as they did femtosecond flap making."

The VICTUS femtosecond laser platform in challenging cases

"In the beginning, we didn't want to use this instrument in challenging cases because it is already a challenge when learning a new tool," said **Chee Soon Phaik, MD**. Nevertheless, given her almost legendary affinity for and skill in the management of challenging cataract cases, Prof. Chee found herself plunging into the thick of things, armed with the VICTUS.

"Challenging cases" for femtosecond laser cataract surgery, Prof. Chee realized, entail a "slightly different classification" from that to which surgeons using manual phaco might be accustomed. "Normally, we just think about the cataract for the case," she said. "When you think about using the femtosecond laser, you have to think about other possible challenges, such as those that you might encounter in docking, and those you might face after you have treated the eye with the femto laser."

Small eyes represent one of the difficulties surgeons might face with docking, particularly in the Asia-Pacific region. Prof. Chee recommended looking at patients as they come in, considering not just the eye at the slit lamp, but at other features, including the bridge of the nose, the ocular rim, even apparently unrelated anatomical structures such as the spine—spinal deformities may prevent patients from lying flat on the surgical bed.

Initially, when learning to perform femtosecond laser cataract surgery, Prof. Chee challenged herself by accepting all comers, anyone she thought might benefit from the system. In these cases, she would omit the speculum when inserting the suction clip and would prepare herself for the possibility of using peribulbar blocks (although she has not yet had the need to use them).

Some challenges are particular to laser treatment and require certain adjustments in technique.

In one early case, Prof. Chee described how she modified her technique to accommodate the effects of the femto laser. Although the pupil was a reasonable size at the start of the surgery, synechia had formed by the time the patient had transferred to the phaco suite, and Prof. Chee had to operate through a small pupil.

"I suspect it has something to do with thick and heavily pigmented irises," she said.

Since then, Prof. Chee would have her patients use drops to begin dilating their pupils at home, giving them ample time to maximally dilate.

In this case, instead of chopping as she normally would, Prof. Chee used a cracking technique to break the nucleus along the crevices created by the femtosecond laser.

Some other challenges surgeons may face include: completely white intumescent cataracts, in which a femtosecond laser would be useless for fragmentation; the presence of a corneal scar, which might interfere with the beam; a fibrous anterior capsule; a shallow anterior chamber; or a dislocated lens. The phaco part of the procedure might be complicated by a white nucleus, a very dense black nucleus, or a deficiency in the posterior capsule.

For hard cataracts, she said, "the challenge is to minimize phaco energy, especially if the patient has a low endothelial cell count." In her experience, fragmenting and cutting the nucleus into pieces reduces the amount of phaco energy needed, so in these cases, the surgeon can use the laser to create six segments instead of four.

In these cases, she said, the pupil should be maximally dilated, the capsulotomy complete (trypan blue staining should be used to determine completion when in doubt) and slightly larger than usual. "I normally choose a 5-mm, but I would consider a 5.5-mm rhexis for such a case," she said.

Trypan staining is also useful when dealing with intumescent white cataracts, when it can be particularly difficult to assess the completeness of the capsulorhexis. Surgeons need to look out for capsular tags, which may form during femto capsulotomy, when cataract fluid escapes while the capsule is being cut, causing the capsule to shift and possibly creating gaps in the beam path.

"In some cases the result is a free-floating cap that will auto deliver, but it is important in these cases, especially if you are just starting out, to use a capsular dye stain in order to ensure the completeness of the capsular opening," she said.

"I have been told that it's not possible to cut a cataract if it's white," said Prof. Chee; she decided to try it anyway. In that particular case, she said, the cataract was "not really intumescent" or "very white." "It had a brown tinge and was actually a pretty hard nucleus, and the liquid part was not that thick a layer," she said. "We were still able to create semblances of cuts that I believe the laser created successfully, though I also had to add some additional chops to the nucleus."

The VICTUS has proved a boon to Prof. Chee. "In my personal experience, using the VICTUS has enhanced my ability to safely handle complicated cases, achieving excellent outcomes," she said.

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SUPRACOR is CE marked. SUPRACOR for myopic, emmetropic, pseudophakes, and post LASIK patients is currently in clinical evaluation. SUPRACOR is not approved for use in the U.S.

The VICTUS platform has CE marking for capsulotomy, lens fragmentation, arcuate corneal incisions, LASIK flap, and INTRACOR. Indications may vary by country. The VICTUS Platform is cleared in the United States for creation of a corneal flap in patients undergoing LASIK surgery or other treatment requiring initial lamellar resection of the cornea and anterior capsulotomy during cataract surgery.

SCORE is not approved for use in the U.S. CE marking is pending.

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