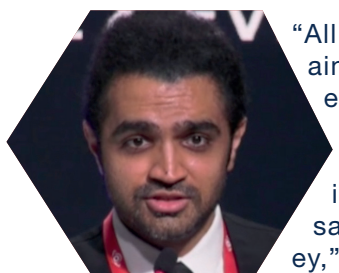


At the 2023 APACRS Singapore, leading experts gathered during Thursday's lunch symposium to share their knowledge of how the power of integrated workflow solutions improves patient care and cataract surgery outcomes.

Enhancing Cataract Workflow Efficiency with Digital Technology

Naren SHETTY, MD, India



"All of us aim to be efficient to save time and indirectly save money," Dr. Naren Shetty, MBBS,

MD (India) said as he began his presentation on enhancing the cataract workflow. Many clinicians have traditionally been using manual markers for toric marking, using tools such as the pre-operative toric reference marker, the Barrett dual axis toric marker, and the Whitman axis marker among many. However, there are many common issues with manual toric marking that clinicians may face. At times, there may be no reference point, head tilt, cyclotorsion, or removal of the mark due to excessive corneal wash. Furthermore, for every one degree of misalignment, toric lenses lose 3% of their corrective effect.

The routine 3-step technique for manual toric intraocular lens (IOL) marking consists of marking the eye at the horizontal meridian on the slit lamp or other various marking devices, intraoperatively using another device with angular gradations, and marking the limbus or cornea at the desired angle of alignment with a marking pen or needle. With this routine technique using a bubble marker, the mean error in axis has been found to be 2.48 while the total error in toric IOL alignment is 4.98.

"This is where the CALLISTO eye® comes into the picture," Dr. Shetty said. "It is a markerless system where you get an intraoperative overlay in your microscope." The CALLISTO eye® provides this intraoperative reference point, compensates for cyclotorsion,

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and provides access to all the markings.

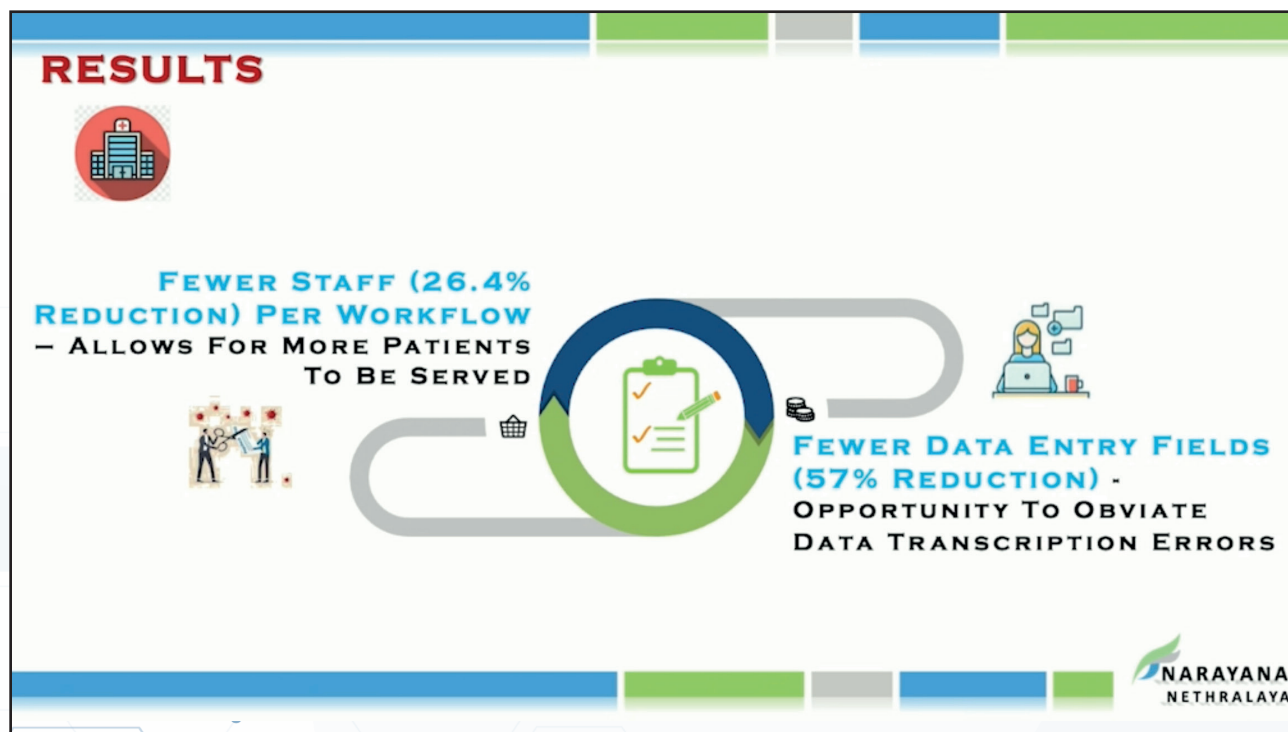
One feature of the markerless system is the incision assistant feature which can superimpose the exact position and size of incisions to ensure precise surgery. Another feature is performing capsulorhexis by superimposing the exact shape and size of the rhexus to ensure IOL centration of the optical axis of the eye. Finally, the CALLISTO eye® also has automated eye tracking to ensure the position of the superimposed assistance functions are properly aligned on the eye.

"In all my patients, I implant a capsular tension ring (CTR)," Dr. Shetty said, "because it expands the bag, and it brings the anterior and posterior capsule closer together so

that it increases the contact between the IOL and the bag." This process can be validated using the OPMI LUMERA® 700.

"Comparing marker and markerless systems, when you look at quality of vision, markerless systems are significantly better, especially if you're implanting trifocal or extended depth of focus (EDOF) IOLs," Dr. Shetty said. "The slightest rotation can lead to a significant drop in visual quality."

In terms of the evolution of the microscope, the ZEISS ARTEVO 800 Digital Microscope has become a key player in the field of cataract surgery. This system was designed to take care of three primary people: doctors, patients, and trainees.



Using the EQ Workplace provides a more efficient experience compared to using a manual workflow for cataract surgeries.

“Comparing marker and markerless systems, when you look at quality of vision, markerless systems are significantly better, especially if you’re implanting trifocal or extended depth of focus (EDOF) IOLs.”

Naren SHETTY, MD

For doctors, neck and back pain have been a long-time occupational hazard, especially if one is trained to sit in an awkward position. With the ZEISS ARTEVO 800, surgeons can finally sit upright and relax, look at the screen, and perform surgery with ease. For patients, the visualization system operates at a significantly lower illumination so that they are much more cooperative. Finally, for trainees, there is a shorter learning curve. There is no limit to the number of fellows and trainees a surgeon can have on deck because they can use simple and cheap 3D glasses to look at the screen. They are able to see the depth of each step of surgery which is crucial in building their skills as surgeons.

But are good machines and good hands enough for a smooth surgical process? Dr. Shetty states that we additionally need a seamless connection of machines and hands. The ZEISS EQ Workplace does just that.

Workup such as biometry measurements, topography, 3D OCT data, and slit lamp imaging can be done, and all data can be wirelessly transferred to the EQ Workplace. The data can be easily accessed in one’s office or the operating room.

Surgical planning can also be done easily with the EQ Workplace. Surgeons are able to personalize their experience by inputting what formulas and IOLs they typically use, how they orient the IOL, what axis the IOL should be oriented, and where they want to create incisions. Furthermore,

surgeons can personalize the IOL constant rather than using the default constant that comes with the IOL.

In order to determine how efficient the EQ Workplace is, Dr. Shetty conducted a study to evaluate the efficiency in time and resource utilization using manual data transcription or the digital workflow solution. This study was conducted for cataract surgeries on monofocal non-toric IOLs.

Dr. Shetty recorded time efficiency at various steps in the workflow: time for patient data entry, time for preoperative measurements (OCT, microscopy, etc.), time for calculating IOL power, time to operate, and finally, time for data verification.

The results of Dr. Shetty’s study showed staggering differences between the digital workflow and the manual workflow. There was a 25% reduction in total workflow time with the digital workflow being superior to the manual workflow. There was a 56.9% reduction in time for total data entry, and there was a 26.4% reduction in total staff required for the surgical process. All results were statistically significant. “This is simply amazing,” Dr. Shetty said. And because fewer staff is required when the digital workflow is utilized, more patients can be served.

In the scenario that the hospital already has an electronic medical record (EMR), time efficiency can also be seen when compared to using the

digital workflow. Dr. Shetty was able to show a time savings of 7.5 minutes when using the EQ Workplace compared to using an EMR.

Every 7.5 minutes saved during a procedure for 150 surgeries per day (the number of surgeries that typically occur at Dr. Shetty’s hospi-

tal) translates to a savings of 18.75 hours per day. Since a cataract surgery typically takes 5 minutes for Dr. Shetty, “we can do an extra 225 surgeries per day, 5,850 surgeries per month, and 70,200 surgeries per year. A small difference like this creates a very significant impact on your outcome.”

ZEISS QUATERA 700: First Impressions

Paul G. URSELL, MD, UK



Paul G. Ursell, MBBS, MD, FRCOphth (United Kingdom) discussed the ZEISS QUATERA

700 during his presentation and explained three primary benefits of the phacoemulsifier. “It’s called QUATERA because of the pump,” Dr. Ursell stated. The ZEISS patented QUATTRO Pump of the QUATERA 700 is a synchronized fluid exchange system that directly measure and simultaneously control both infusion and aspiration values in real-time.

With constant fluid going in and out with four membranes (two pushing in fluid and two pushing out fluid), surgeons are able to control the amount of fluid very precisely. “The main thing this feature gives you is a very stable anterior chamber,” Dr. Ursell said. “If

you have a stable anterior chamber, you’re safe.” The fast sampling time of the volume of liquid that goes in and out provides this safety net. The second benefit of the ZEISS QUATERA 700 is giving the surgeon the choice of using either the vacuum (Venturi) or flow (peristaltic) mode. Having the choice means that surgeons are able to operate at their desired intraocular pressure (IOP) and aspiration values.

What makes the QUATERA 700 stand out from other devices for Dr. Ursell, though, is the dual linear foot pedal control. “I’m in big favor of [the foot pedal],” he said. “What I find most difficult to deal with is post-occlusion surge. All machines struggle with this. The reason for that is the foot pedal.” Surgeons need to operate with high vacuum and high phaco, and “with normal foot pedal control, you can’t do that.”

The dual linear foot pedal allows for surgeons to move up and down as well as sideways. The QUATERA 700 allows for many options, which one may not have with a traditional foot pedal. “You can have

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high vacuum and low phaco or high vacuum and high phaco,” Dr. Ursell said. “You can have all four combinations.” The conjunction of not facing post-occlusion surge with a stable anterior chamber gives surgeons the ability to choose how they want to carry out the procedure.

Dr. Ursell’s first impressions of the QUATTRA 700 were very positive. Having a choice of settings to suit one’s needs and the ability to maximize efficiency through controlling different parameters (vacuum and phaco) of the movement of fluid, Dr. Ursell found a renewed interest in phacodynamics and has seen a higher quality of ease during his surgical cases.

Dr. Ursell provided more detail on how to get accustomed to the dual linear foot pedal control if one is used to the traditional foot pedal. “You learn quite quickly how to take the foot off the pedal to control and cut through the nucleus with phaco,” he said. “What you find is that the density of the cataract governs how far down you go [on the pedal]. So a very hard cataract will need quite a bit of juice to get it out, and a softer cataract will need much less. You find the points on the foot pedal for that particular hardness of nucleus that cuts it, and you stay there. Then, you titrate the amount of vacuum needed by going sideways with the foot pedal.”

SMILE Pro: A Journey Spanning 20 Years

Sabong SRIVANNABOON, MD, Thailand



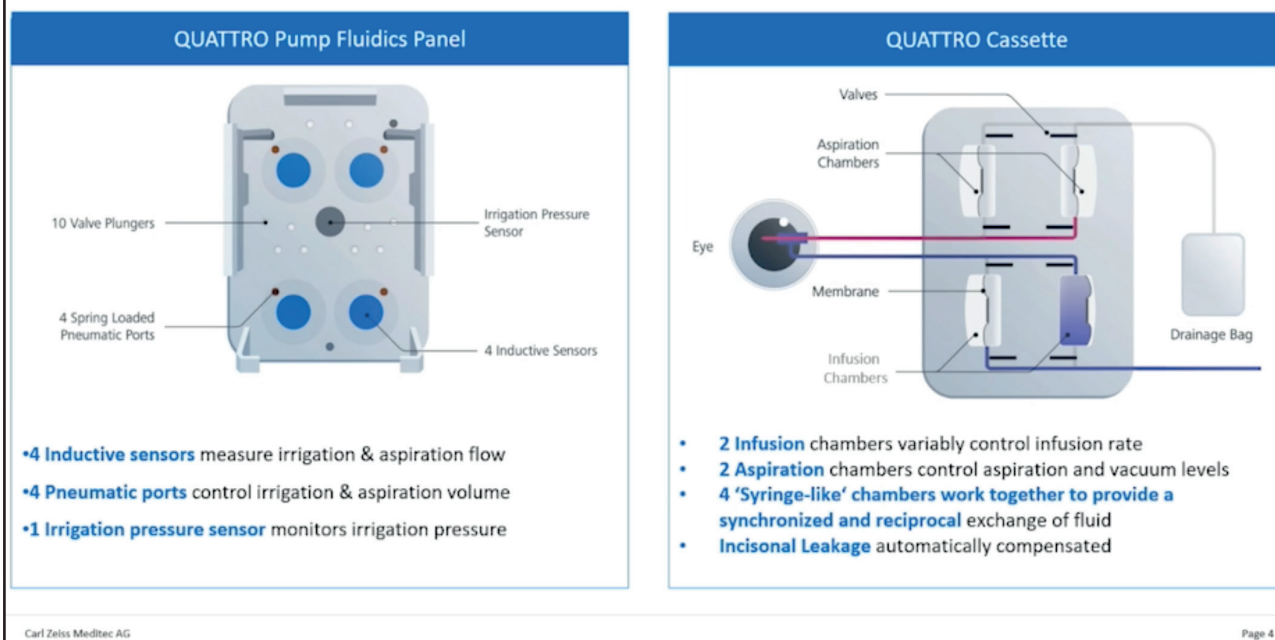
A journey of twenty years provides a plethora of learning experiences, and Sabong Srivannaboon, MD (Thailand) joined the lunch symposium to share his experiences with lenticule extraction. One of the first cases he performed was in 2010 and

provided good results: he was able to see the surface under the lenticule during surgery.

In one example, Dr. Srivannaboon compared the corneal topography of ReLEx small incision lenticule extraction (SMILE) to femtosecond-assisted (femto) laser in-situ keratomileusis (LASIK). Using the same treatment, the optics of the cornea appeared much better with SMILE compared to the optics from the excimer laser ablation. From the image Dr. Srivannaboon provided, one can see that the lenticule extraction induced less spherical aberration when compared to the excimer laser ablation from femtoLASIK, providing the patient with better optics.

Dr. Srivannaboon continued to explain that during lenticule extraction, the first refractive cut creates the curve of the cornea. “This first cut is the most important cut of the whole surgery because this is the final curvature of the cornea,” he said. The second cut is done parallel to the front surface of the cornea, and when these two cuts are connected, it becomes the lenticule. A small entrance is created in order for the lenticule to be extracted. The refractive cut from this photo-disruption creates a better corneal curve when compared to the curve from the excimer laser. This difference in the quality of curvature is due to the excimer laser using photo-ablation to remove the tissue.

ZEISS Patented QUATTRA Pump: Synchronized Fluid-Exchange System



The QUATTRA Pump provides a paradigm shift in phacoemulsification fluid dynamics by synchronously controlling infusion and aspiration in real time.

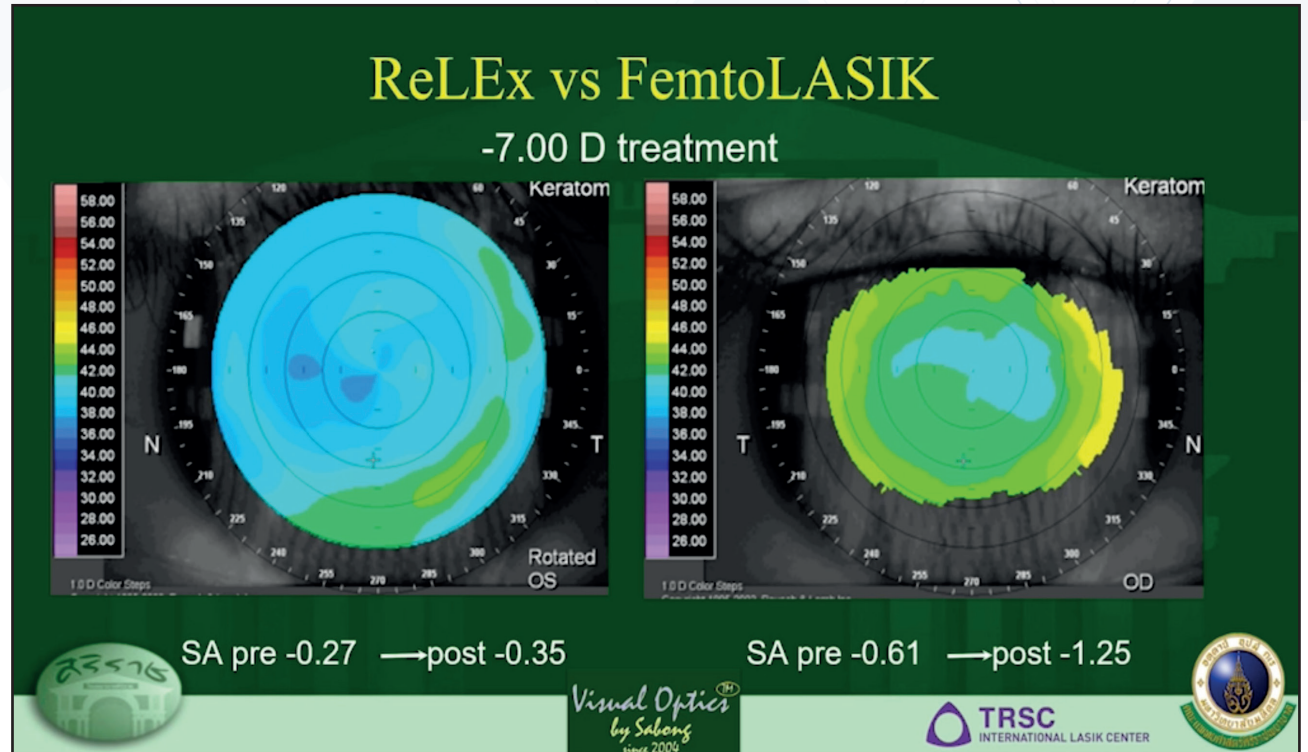
“The refractive outcomes were good [with the VISUMAX® 800] because the integrated technology helped me perform surgery more easily.” Sabong SRIVANNABOON, MD

In one study, Dr. Srivannaboon subjectively evaluated night vision in large pupil patients (pupil size of 7 mm to 8.5 mm) from two different groups: patients who underwent ReL-Ex SMILE and patients who underwent femtoLASIK.

Dr. Srivannaboon found that with lenticule extraction, very few patients reported worse night vision than before they underwent surgery. “Because of this, we are shifting more patients to lenticule extraction,” he said.

“If you look at my practice starting in 2011 until April this year, we have more and more cases of lenticule extraction. I’m doing less femtoLASIK procedures. 96% of my cases are now lenticule extraction.”

Recently, Dr. Srivannaboon received the new VISUMAX® 800, and, although he has limited experience with the device since he started to use it in May of this year, he has noticed a few improvements to the VISUMAX® 800 compared with the old VisuMax 500. The new VISUMAX® 800 device delivers a higher laser frequency, thus decreasing the time to cut the lenticule during surgery. Dr. Srivannaboon found it 11 seconds faster to perform lenticule cutting with the VISUMAX® 800 than the VisuMax 500. “This matters because of the patient’s eye movement during the lenticule



Comparing ReLEx vs FemtoLASIK: the left image shows the corneal topography of lenticule extraction, and the right image shows corneal topography of excimer laser ablation. The optics of the cornea is much better with lenticule extraction than excimer laser ablation.

cutting,” he said. Some patients are difficult or find the procedure uncomfortable, and a faster speed allows for the laser to be completed before the patient squeezes his or her eye.

Dr. Srivannaboon offered a few other benefits to the new device. The open sky ergonomics of the VISUMAX® 800 provides more space to the patient, thus allowing more comfort with this design. Rather than being an MRI-like tunnel machine that the VisuMax 500 is,

potentially causing patients to feel claustrophobic, the new VISUMAX® 800 has an arm that moves up and down, allowing patients to feel less restricted.

The centration guide on the VISUMAX® 800 also provides an upgraded experience to surgery as the surgeon now has lines and dots for guidance. With the old device, centration had to be done on its own.

Dr. Srivannaboon overall found positive results from performing SMILE Pro with the VISUMAX® 800. “The refractive outcomes were good because the integrated technology helped me perform surgery more easily,” he said.

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