APACRS EyeWorld
The news magazine of the Asia-Pacific Association of Cataract & Refractive Surgeons

New Developments in

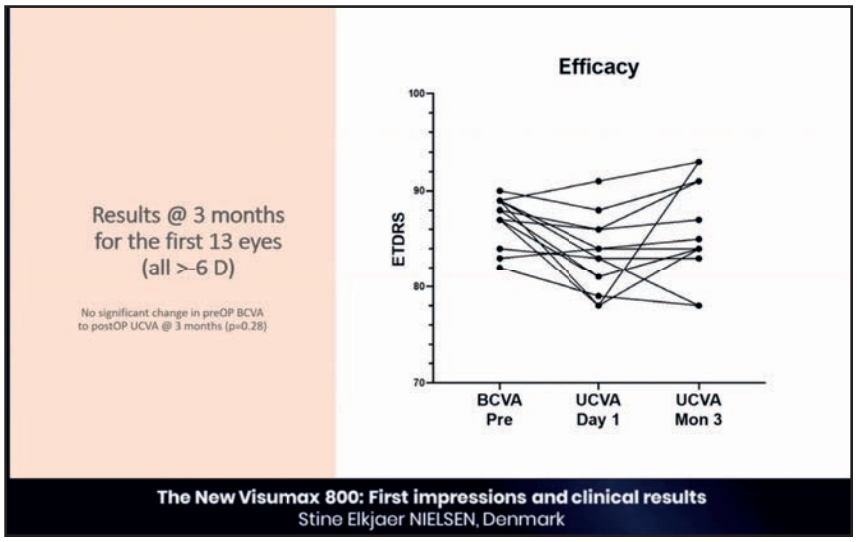
Supplement to EyeWorld Asia-Pacific March 2022

Key ophthalmic leaders gathered on December 16, 2021 for an APACRS webinar to discuss and review the latest developments in cataract and refractive surgery. Topics ranged from learning how to optimize patient outcomes with different lens implants to techniques on removing dense cataracts.

The New Visumax 800: First impressions and Clinical Results

Stine Elkjaer Nielsen, Denmark

At Aarhus University Hospital where Stine Elkjaer Nielsen, MD practices, she has been performing LASIK surgery on patients with high myopia higher than 6 diopters. Typically, Dr. Nielsen will see patients preoperatively as well as one day and 3 months after surgery. In June 2021, Dr. Nielsen's practice received the new VISUMAX® 800 in which the femtosecond laser provides a reduced laser time in comparison to its predecessors.



In Dr. Nielsen's clinic study of 13 eyes undergoing operation with the VISUMAX® 800, there was no significant change in preoperative BCVA to postoperative uncorrected visual acuity (UCVA) at 3 months (p = 0.28).

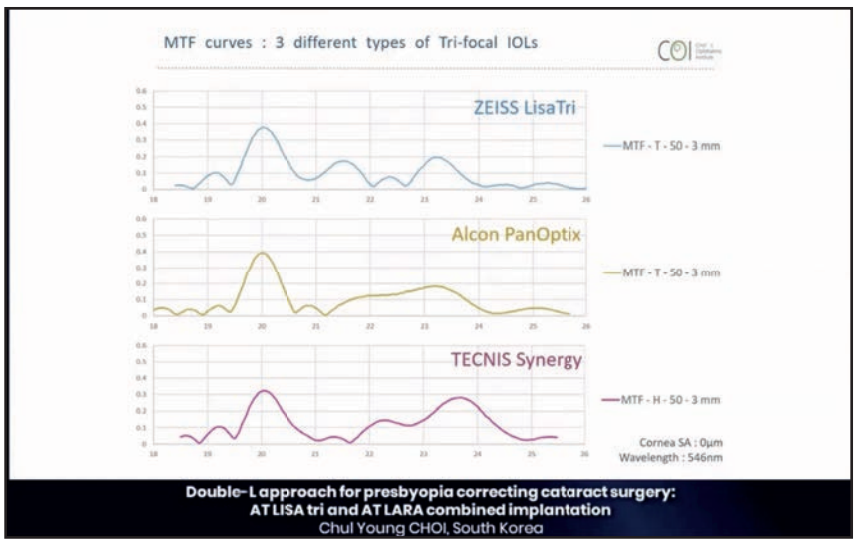
> *"Knowing exactly how dense your patient's cataract is helps a lot in thinking and planning for the surgery."*
>
> *Ronald Yeoh, MD, Singapore*

In a video during her presentation, Dr. Nielsen showed her surgery process of centration, docking, cyclotorsion, adjustment, and treatment using the VISUMAX® 800. Dr. Nielsen stated that her first clinical impressions of using this new femtosecond laser was that the laser time was quite short at 10 seconds. She also stated that it was easy to digitally perform a cylinder adjustment after the docking step since the patient's head did not need to be rotated. Because the VISUMAX® 800 is a mobile device, Dr. Nielsen appreciated that one can move the device in and out of the operating room depending on usage. Finally, the patient bed is more comfortable compared to the previous VISUMAX®. As of December 2021, Dr. Nielsen had performed about 50 SMILE surgeries since May 2021 on both myopic and astigmatic patients and reported no complications and no suction loss.

To delve into Dr. Nielsen's experience in more detail, she provided results for the first 13 eyes, of which were all greater than -6 diopters, that had undergone surgery using the VISUMAX® 800 at 3-month follow-up. Dr. Nielsen saw significant improvement in best-corrected visual acuity (BCVA) from preoperative values to 3-month post-op values. In terms of efficacy, there was no significant change in preoperative BCVA to postoperative uncorrected visual acuity (UCVA) at 3 months (p = 0.28). Furthermore, there was no significant over- or under-correction at 3 months after surgery. Dr. Nielsen also stated that she was happy that 12 out of the 13 eyes were within +/- 0.5 diopters of cylinder correction. Dr. Nielsen concluded that switching from the VISUMAX® 500 to the VISUMAX® 800 was an easy transition, and she experienced no suction loss during surgery and no serious complications in her patients using the VISUMAX® 800. With today's technology, Dr. Nielsen recommends SMILE procedures to all ophthalmic surgeons.

Cataract and Refractive Surgery

The VISUMAX® 800 provides a cyclotorsion compensation aid that is activated after docking the eye.



Three different types of trifocal IOLs, though with similar optical properties, present different MTF curves: the ZEISS AT LISA® tri IOL shows good far, intermediate, and near distance while the PanOptix® and TECNIS Synergy™ show different peaks.

At the Forefront of Technology - How to Start with VISUMAX® 800 and Clinical Outcomes

Sri Ganesh, India

The VISUMAX® 800 has become the forefront of visual technology, and Sri Ganesh, MD has also experienced its advantages during his time in the operating room. On the surgeon's side, the VISUMAX® 800 has a graphic user interface that can be connected to other diagnostic devices. Additionally, treatment can be planned and exported directly to the VISUMAX® 800 and patient data can also be directly loaded onto the machine where treatment details can be verified and new details can be entered. Patient data can also be imported from other devices such as the IOLMaster. The VISUMAX® 800 has two swivel arms: one for the laser and one for the operating microscope. On the patient's side, the patient bed is completely separated from the VISUMAX® machine whereas the previous patient bed for the VISUMAX® 500 was connected to the machine.

Dr. Ganesh describes his workflow as such: after the patient has been draped, the treatment arm is moved down and the treatment can be selected on the VISUMAX® 800. The machine itself provides a top and side camera view that both assist in docking the eye. The VISUMAX® 800 also has a centration guide that helps in centering treatment. There is also a cyclotorsion compensation aid that is activated after docking the eye. "The laser treatment is extremely fast," says Dr. Ganesh, "and takes just 8 seconds to complete. I can perform surgery on 10 patients in one hour with the VISUMAX® 800." The laser arm then lifts up, and the operating microscope comes down into position automatically. Dr. Ganesh described a very comfortable experience with lenticule extraction as well as a smooth dissection process.

Dr. Ganesh studied early clinical outcomes following Small Incision Lenticule Extraction (SMILE) using the VISUMAX® 800. The results of his study on 45 eyes (23 patients) showed that, after 15 days, 53% of eyes remained unchanged for corrected distance visual acuity (CDVA), 38% of eyes gained 1 line of CDVA, 2% of eyes gained 2 lines, and 7% of eyes lost 1 line. Regarding preoperative CDVA and postoperative UDVA, Dr. Ganesh reported 100% of eyes were 20/32 or better, 96% were 20/20 or better, and 82% were 20/16 or better at 15 days post-surgery. As for refractive astigmatism, "91% of eyes were within a quarter of a diopter (cylinder) and 9% of eyes were within a half diopter (cylinder)," says Dr. Ganesh.

Dr. Ganesh concluded his experience with the VISUMAX® 800 stating that immediate postoperative results with this new technology demonstrated excellent correction and good visual acuity in terms of efficacy. No eyes had two or more lines of loss of CDVA, demonstrating a good safety profile. Finally, the quality of vision and the interface clarity of the VISUMAX® 800 was excellent with a minimal increase in scatter. "The advantage with the VISUMAX® 800," Dr. Ganesh says, "is the cyclotorsion compensation. With SMILE, if the surgeon gets the nomogram right, the results are even better than LASIK because the long-term stability of the cylinder correction is better."

'Double-L approach' for Presbyopia Correcting Cataract Surgery: AT LISA® tri and AT LARA® Combined Implantation

Chul Young Choi, South Korea

Chul Young Choi, MD of South Korea presented the findings from both his laboratory and clinical tests on the AT LISA® tri and AT LARA® intraocular lens (IOL). From an optical bench test studying the modulation transfer function (MTF) curves of IOLs, Dr. Choi tested the following 20 diopter IOLs for comparison: AT LISA® tri, AT LARA®, PanOptix®, and TECNIS Synergy™ and Symfony™. Two different model eyes were used with 0 μm and +0.28 μm spherical aberration. The aperture sizes (pupil sizes) used were 2, 3, and 4.5 mm, and the wavelength Dr. Choi selected was 546 nm (green light).

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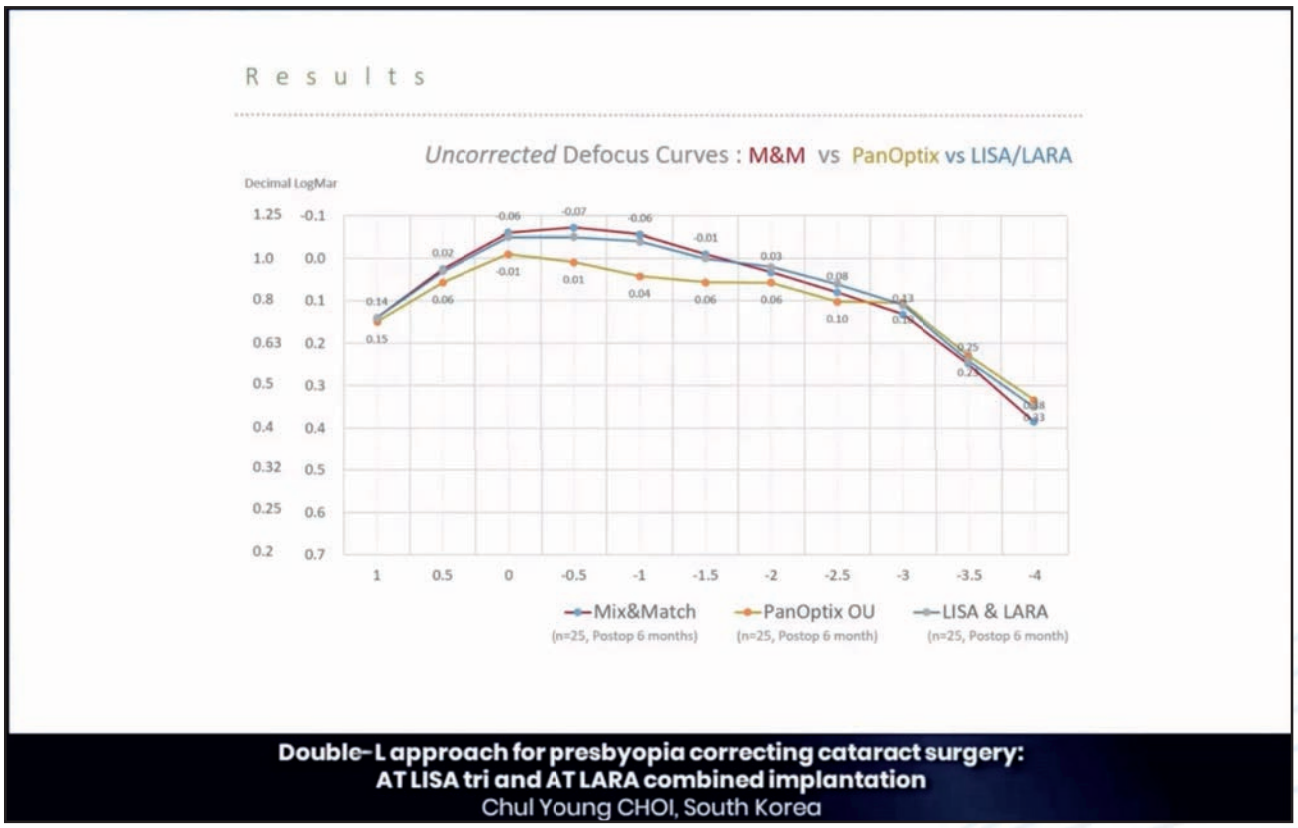
In comparing the different trifocal IOLs while maintaining similar optical properties at a 3 mm pupil size, Dr. Choi found that the ZEISS AT LISA® tri IOL showed good far, intermediate, and near distance peaks while the PanOptix® IOL and TECNIS Synergy™ IOL showed different peaks. The TECNIS Synergy™ showed high far and near peaks but no peak for intermediate distance. Dr. Choi also compared the MTF curves of the IOLs at a 2 mm pupil size. "The AT LISA® tri IOL preserves, very nicely, its peak at 20 diopters independent of pupil size," says Dr. Choi.

Dr. Choi also performed an optical bench test to evaluate the effect of decentration on the optical performance of two different types of IOLS: trifocal IOLs (IQ PanOptix® and AT LISA® tri) and extended depth of focus (EDOF) IOLs (TECNIS Symfony™ and AT LARA®). At far distance, Dr. Choi explained that one can expect much better outcomes with the AT LISA® tri and the AT LARA® IOLs, but all four IOLs still showed good outcomes.

Clinical performance was also measured using a double-implantation technique. In a prospective bilateral consecutive study[1], Dr. Choi and his colleagues measured visual acuities and refraction of patients. He also measured the uncorrected defocus curve and contrast sensitivity in patients while testing their digital reading speed (Korean) and giving questionnaires to patients regarding subjective satisfaction and visual functioning. The results showed that the AT LISA® tri IOL nicely preserved vision at far, intermediate, and near distances. The AT LARA® IOL showed good vision at far and intermediate distances.

However, the combined implantation of an EDOF IOL and a trifocal IOL (AT LARA® and AT LISA® tri) showed superior outcomes at far, intermediate, and near distances compared to any other studies Dr. Choi has done. In the uncorrected defocus curve, double-L implantation also showed superior visual acuity at all distances.

In summary, Dr. Choi explained that the strategy of double-L implantation with AT LARA® and AT LISA® tri IOLs is an effective option for improving near visual outcomes with excellent far and intermediate vision. Not only did visual outcomes improve for far, intermediate, and near distances, but reading speed, contrast sensitivity, and spectacle independence also improved when the double-L implantation technique was utilized.



Mean monocular and binocular defocus curves of eyes implanted with AT LARA®, AT LISA® tri, and double-L implantation (AT LARA® and AT LISA® tri).

Strategies for Dense Cataracts

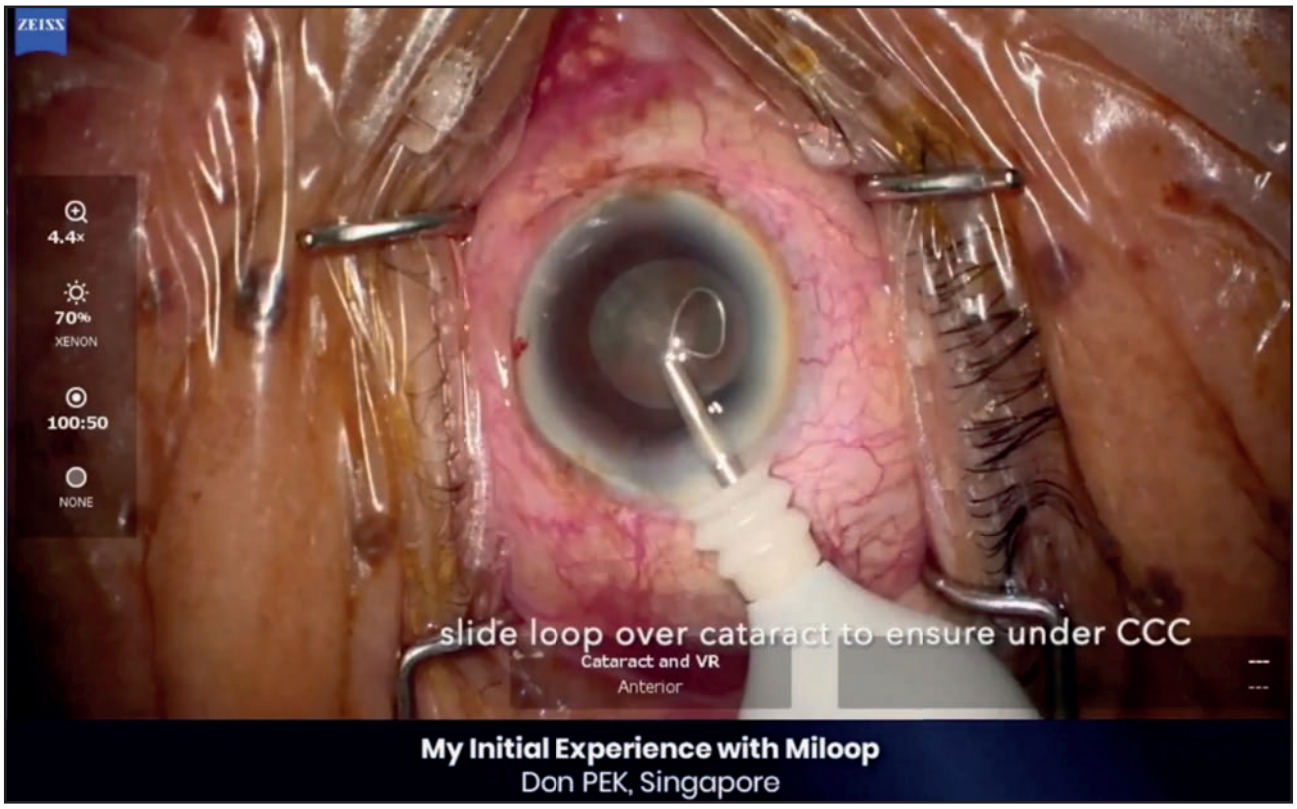
Ronald Yeoh, Singapore

There can be many challenges with cataracts, and Ronald Yeoh, MD provided strategies on how to handle such challenges, especially with rock hard cataracts. Dr. Yeoh explained that surgeons should first categorize the hardness of a patient's cataract. It is necessary to know how dense the cataract is because there may be a diverse range of cataracts that present in the operating room. "Knowing exactly how dense your patient's cataract is helps a lot in thinking and planning for the surgery," says Dr. Yeoh.

Dr. Yeoh says that nuclear sclerotic (NS) 2 to 3+ cataracts are ideal as they are very soft when handling. When cataracts are hard, surgeons may need to modify their surgical technique. The challenges of hard cataracts include endothelial damage, posterior capsular rupture (PCR), and zonular weakness (as there is the risk of damaging zonules). However, there are ways to reduce the risk of such complications in hard cataract surgery. Dr. Yeoh discussed the different techniques that can be used to perform surgery on hard cataracts which include the direct chop, Akahoshi counter prechop with nucleus sustainer, femtosecond-laser-assisted cataract surgery (FLACS), extracapsular cataract extraction (ECCE), manual small-incision cataract surgery (MSICS), and the use of miLOOP®. The miLOOP® is a type of snare device that allows the surgeon to divide the nuclei, and it is helpful in that it allows for a safe surgery, does not utilize the prechop technique, and avoids the complications of FLACS.

My Initial Experience with miLOOP®

Don Pek, Singapore



In a demonstration video, Dr. Pek shows how the miLOOP® slides over the cataract to ensure it is under the capsulorhexis.

With today's advancing technology, Don Pek, MD is able to improve his surgical process with the miLOOP®. The lens fragmentation device itself consists of a micro-thin super-elastic snare that self-expands, using nitinol filament technology. Studies have been conducted on the efficacy and performance of the device. In one particular study that Dr. Pek presented,[2] 101 eyes of 101 subjects with grade 3 to 4+ nuclear cataracts were randomised to phacoemulsification alone or phacoemulsification using the miLOOP®. The results of this study showed that phacoemulsification with the miLOOP® was as safe as phacoemulsification alone. At one month after surgery, BCVA averaged 20/27 Snellen in phacoemulsification with miLOOP® eyes and 20/24 in controls. Endothelial cell loss after surgery was low and similar between the two groups. There was also a significant reduction in ultrasound energy (cumulative dispersed energy (CDE) units) in eyes that received phacoemulsification with miLOOP® compared with controls. Additionally, no direct complications were caused by the miLOOP®.

Dr. Pek continued his presentation with a case presentation, showing his technique with a video. In one patient with relatively soft cataracts and a large pupil, Dr. Pek was able to start off with the conventional phacoemulsification steps. He then performed hydrodissection and gently rotated the lens. At first, entering the lens with the miLOOP® was a challenge, but Dr. Pek was able to complete the procedure successfully. Dr. Pek tilted the loop of the device down to gently touch the lens with the slide below the capsulorhexis. In the video, webinar participants were able to see Dr. Pek's index finger pushing the slide in order to deploy the snare of the miLOOP®. The next steps are rotating, reversing, and then retracting the slider, which resulted in a beautiful cut. Dr. Pek then lifted the loop up. After implantation of the IOL, Dr. Pek stated that he felt good about the procedure and that it is "a lot easier than it looks. After a few cases, I was very happy and gained confidence." Dr. Pek was able to perform his first 9 cases with no complications.

Dr. Pek provided specific steps and advice on how to successfully use the miLOOP® device. First, it is important to check the device and hold the miLOOP® with the dominant hand like a pen. The surgeon should push the slider and check the wire loop before continuing. When entering the wound, Dr. Pek explained that the surgeon should turn the device body away from oneself to align the loop with the wound. The surgeon should then enter with the loop through the wound until the bellows touch the wound. Then, the device body should be turned back towards the surgeon to rest on the dominant hand. Deploying the loop involves pushing the slider to expand the loop while keeping the cannula centered on the cataract. Dr. Pek stated that it is important to ensure the loop is inferior to the capsulorhexis. The loop can then be expanded completely while keeping the cannula centered. The next step involves sweeping by pronating the wrist to sweep the loop from the lens equator to past the posterior pole. Then, the surgeon must reverse the rotation in order to align the two ends of the loop. While performing the cutting step, the surgeon should watch that the capsulorhexis does not move; the slider can then be retracted completely and the loop lifted out of the lens.

Additionally, Dr. Pek advised that this technique should not be used on posterior polar cataracts, for cutting IOLs, nor on uncooperative patients or patients with movement disorders. With a gentle learning curve, miLOOP® provides less phacoemulsification energy, protects the endothelium, and conserves the zonules. With all the advantages miLOOP® offers, Dr. Pek believes that this device affords predictable surgical complexity and time, making the surgical process easier for cataract surgeons and providing surgical benefit to patients on the receiving end.

References:

1. Song JE et al. J Ophthalmol. 2021
2. Ianchulev, T et al. Br J Ophthalmol. 2019

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