

At the Zeiss Industry Symposium on Friday July 30, 2021 at the 33rd APACRS-SNEC 30th Anniversary virtual meeting, four key leaders in ophthalmology came together to share their experiences and insight on advancements in cataract and refractive surgery.

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Rohit Shetty, DNB, FRCS, PhD

Understanding Corneal Nerves and its impact on SMILE Surgery Outcomes

Rohit Shetty, DNB, FRCS, PhD, India

Rohit Shetty, DNB, FRCS, PhD, India began the symposium discussing corneal nerves and its impact on small incision lenticule extraction (SMILE) surgery outcomes. “We’re all aware of how delicate and how beautiful the whole plexus [of the eye] is. There’s a beautiful homeostasis in how the stroma connects to the epithelium,” says Dr. Shetty. Through confocal microscopy, one can see the difference between healthy nerves and unhealthy nerves. Specifically, one can see the fragile white dendrites

in unhealthy eyes, which are very important signs of inflammation resulting in changes in the nerve plexus.

Dr. Shetty’s NIRVANA study (Nerves, Impacting Refractive surgery, Vision, Aberrations, Neuro regeneration, & Adaptation) observed how healthy and unhealthy corneal nerves affect surgical outcomes. Once the epithelium starts showing signs of stress and inflammation, remodeling of the epithelium changes over time, experiencing, for example, loss of meibomian glands. In these unhealthy nerves, a different environment is created and nerve regeneration does not work as well as in healthy corneal nerves. It is important to note that a poor ocular surface and a poorly shaped meibomian gland can impact the kind of healing that occurs.

Comparing laser-assisted in situ keratomileusis (LASIK) and SMILE 6 months after surgery, surgeons can observe vision break up time (VBUT) and optical quality. With SMILE, one can see good quality VBUT, but with LASIK, VBUT experiences a break in quality. Again with the ocular scatter index, there is more scatter with a patient 6 months after LASIK compared to less scattering with SMILE. These are important parameters to observe because they can predict poor nerve regeneration which leads to poor wound healing, poor optics, glares and halos, and ultimately an uncomfortable feeling for the patient.

In a recent paper by Khamar et al. (2020, Exp Eye Res) titled “Early biological responses in ocular tissue after SMILE and LASIK surgery,” Dr. Shetty explains that corneal nerves are what maintain the health of the eye and how one’s epithelium heals. “If you’re able to preserve and create less damage,

you can make your patient more comfortable and increase visual outcomes,” he says.

There has also been a debate on whether to cut corneal nerves vertically or horizontally. However, from the panel discussion, Dr. Shetty says, “Personally, a horizontal or vertical cut doesn’t make a difference - once it’s cut, it’s cut.” Another question from the panel discussion was whether steroids make any difference in how corneal nerves heal. Dr. Shetty said, “When you have poor healing, nerve growth factor changes create a lot of change on the ocular surface and steroids do not help much. In these cases, we have to look beyond steroids.”

Cataract Tomography Made Easy

Han Bor Fam, MD, Singapore

The IOLMaster 700 is a very good biometer with telecentric keratometry and can provide helpful measurements such as Total Keratometry (TK). Together with its Central Topography, the IOLMaster 700 can provide anterior and total axial power maps of the cornea. The default power map provides 21 colors, which is sufficient for analyzing 90% of cases. In addition to the default map, there are also adaptive flat scales and extended scales.

Han Bor Fam, MD, Singapore presented clinical cases to showcase the abilities of the IOLMaster 700. In one patient, the cornea looked very flat from the Central Topography, which was suggestive of a post-LASIK cornea. Taking a proper patient history and using the intraocular lens (IOL) formula to calculate a proper power value allowed for the patient to be sat-

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ified with significantly improved vision.

Although the IOLMaster is a powerful tool, there may be cases that present dissimilarity in topography. In another case study, a 60 year-old female patient came in for cataract surgery with no previous procedures done. Dr. Fam compared imaging from the IOLMaster with the CSO topographer. He stated that one can see irregularities in the center of the corneal map and that the IOLMaster 700 is less sensitive to changes in the very center of the cornea. However, the periphery of the central and paracentral cornea show similar pattern in both systems.

In summary, Dr. Fam believes that the IOLMaster 700 is a very functional system. It may be less detailed than others but the maps that are generally similar to central and paracentral of a full topography. For cataract surgery, Dr. Fam says “the IOLMaster 700 should be more than adequate for the majority of the cornea in cataract practice. However, he cautions - if there is a flat, gentle, or vague pattern within the cornea, you may want to explore about the possibilities of post-LASIK surgery or some other abnormalities.” Overall, though, the IOLMaster provides very good biometry, IOL power calculations, IOL toric power calculations, and IOL toric power alignment. This system also provides basic cornea screening and indirect dry eye assessment, which are important assessments to perform during preoperative screening. From the panel discussion, Florian Kretz, MD, FEBO, Germany said, “I do believe the IOLMaster 700 brings a big benefit for toric IOLs. It makes the process simple and handy.”

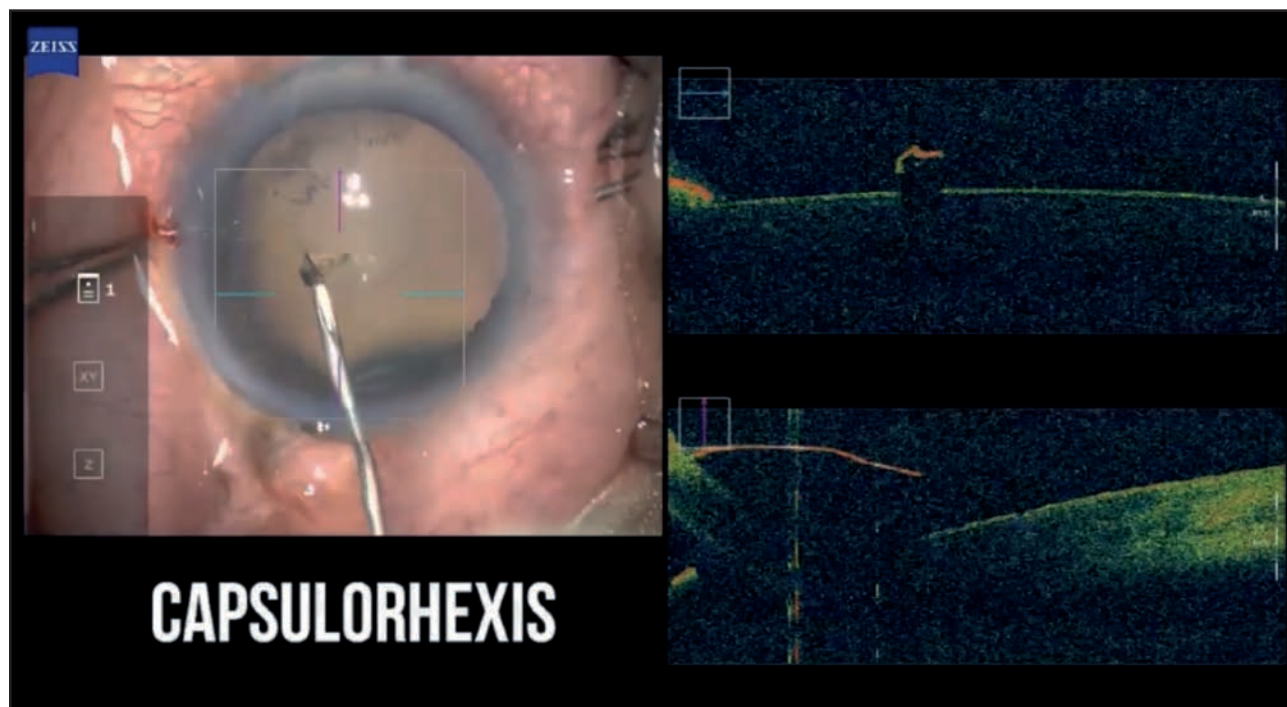


Figure 1. Dr. Sharma shows how intraoperative OCT (I-OCT) helps with rhexis flap simplification in which the flap is elevated and can be seen on the nucleus through the I-OCT.

Intra-operative OCT Phacoemulsification

Namrata Sharma, MD, India

Namrata Sharma, MD, India presented a series of demonstrative videos to show the value of intraoperative-optical coherence tomography (I-OCT) guided phacoemulsification surgery and how it has refined her practice. Through a variety of examples, Dr. Sharma showed and described how surgeons can view the depth of a side port being made through I-OCT, how one can make out the incision of the main port, and how one can see the capsulorhexis flap being lifted. The I-OCT proves useful for the capsulorhexis flap when corneal haze is present because, if the flap is lost, the surgeon is able to identify it.

Surgeons are also able to view, through I-OCT, hydrodissection,

sculpting, the cortical plate, and posterior capsule bulge. Additionally, IOL insertion can be made easier with I-OCT imaging, and the IOL-capsular gap can be seen after the insertion of the IOL. Wound hydration is made easier by allowing surgeons to see the spindle that has formed on the OCT and thus can address hydration needs accordingly.

In situations when the white cataract is so dense that it is completely full of fluid, the I-OCT is useful for surgeons to view, assess, and continue their procedures. Another useful situation is in capsular distension syndrome in which surgeons can see the increased lenticular capsular gap. With corneal haze, I-OCT can help guide surgeons to relocate the edge of the capsulorhexis when it becomes hidden.

Dr. Sharma discussed one pediatric case in which various steps

were performed. After irrigation and aspiration was performed post-hydromaneuvers, there was a breach in the posterior capsule. Dr. Sharma was able to perform anterior vitrectomy following the posterior capsulorhexis being finished. From the I-OCT, one can see the edges of the anterior rhexis and the foldable IOL being placed. Furthermore, the forming spindle can be seen as well as the anterior capsule rim and the IOL.

In a different case of diabetic cataract, I-OCT helps in rhexis flap simplification. Dr. Sharma showed that the flap can be elevated and seen on the nucleus through the I-OCT. Then, the nucleus is rocked to decompress the bag and the miLOOP is loaded and introduced. The loop is then passed under the rhexis margin and progressively opened and rotated. “As you go underneath the rhexis, you can see the miLOOP

going beneath the nucleus and above the posterior capsule. This can be appreciated on the I-OCT,” says Dr. Sharma. The loop then negotiates the space between the posterior chamber and the lens matter. The loop is closed and the leathery nucleus is divided into two separate pieces before bisection. When the loop is opened, the nucleus can be rotated and cleaved into four pieces. “I-OCT can really help fine tune your surgeries,” says Dr. Sharma.

The question of whether this new technology is worth the extra money was raised during the panel discussion. Dr. Sharma responded saying, “I-OCT is more for complex patient cases, especially for posterior polar cataracts and white cataracts, so this technology is here to stay. Additionally, I-OCT is helpful for training because residents are

able to watch your surgeries.” Dr. Shetty agreed, saying “I-OCT is going to be the future.”

Mastering Cataract Refractive Surgery with AT LISA tri and AT LARA IOL

Florian Kretz, MD, FEBO,
Germany

Florian Kretz, MD, FEBO from Germany discussed the uses of and circumstances in which the trifocal IOL AT LISA tri and the Extended Depth of Focus (EDOF) IOL AT LARA are appropriate for patients. Before selecting any IOL, it is important to have the right measurements and choose the appropriate IOL calculator. Dr. Kretz provided additional tips for selecting an IOL. Surgeons should be aware of ocular surface dis-

ease. Preoperative, perioperative, and postoperative care of these diseases will greatly enhance patients’ outcomes. One also must consider the possibility of laser refractive procedures in clear lens cases. Of course, surgeons must also counsel their patients well and ask them whether there is a true need for spectacle independence or whether seeing other distances is important to them.

Additional factors to consider include diabetes and glaucoma. In mild diabetes cases or patients with small drusen, “if their disease is well controlled, there is only a small risk for progression,” Dr. Kretz explains. If glaucoma patients are also well controlled, glaucoma is not an exclusion for presbyopia correction. Surgeons can still implant trifocal IOLs if the damage is minor. Additionally, FDA and CE trials do not exclude

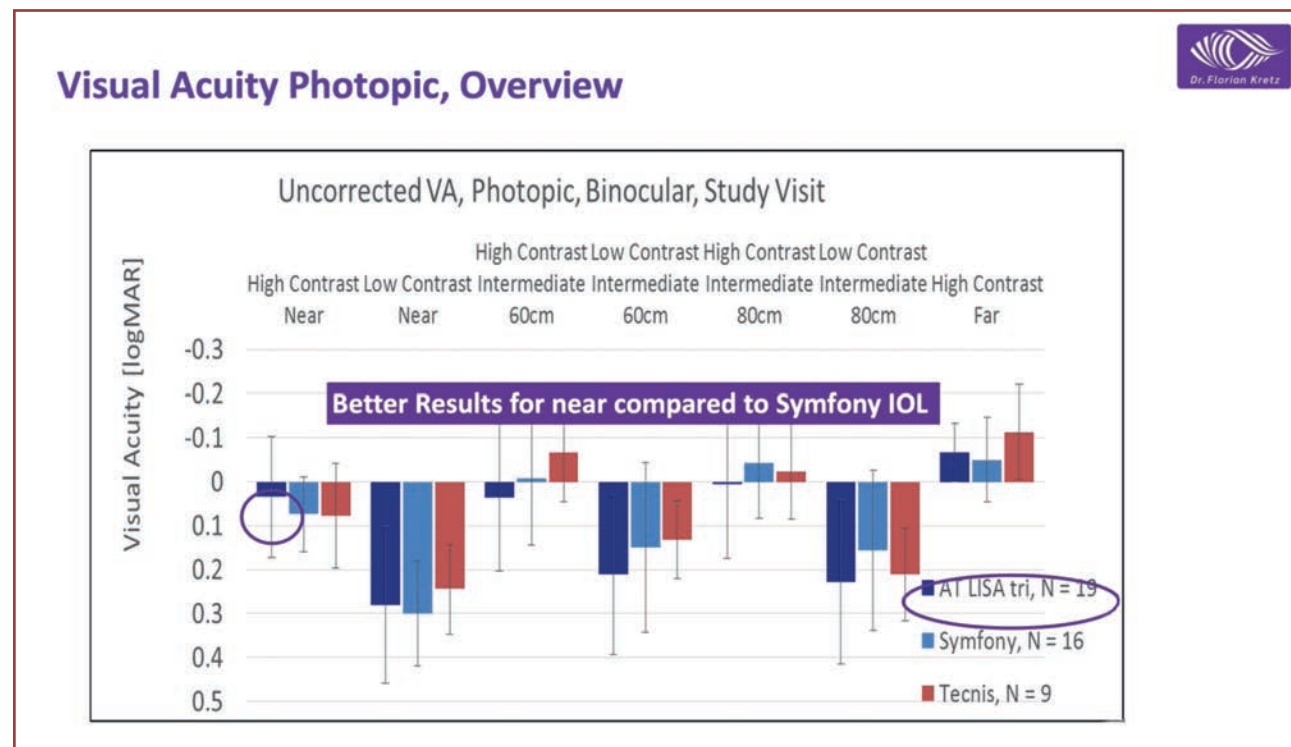


Figure 2. In studies comparing the AT LISA trifocal IOL to the TECNIS Symphony™ and the TECNIS multifocal IOL, AT LISA tri had better visual acuity results and higher contrast values especially in the near visual range.

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patients with glaucoma in these presbyopic cases.

In Dr. Kretz's experience, the easiest patients to work with are presbyopic hyperopes as they are always good candidates for these types of IOLs. In cases of emmetropes, patients will need careful counseling, and myopic patients should be considered for a slight minus target in their near dominant eye.

Careful consideration must be taken for certain patients, and Dr. Kretz explains the exclusion criterias for trifocal IOLs. Patients with other diseases that may limit a positive outcome may not be good candidates for trifocal IOLs and should be assessed thoroughly. Patients with high expectations need to discuss their goals with their doctor so as not to be disappointed. Patients who drive an extensive amount during the night, including truck and taxi drivers, may not be the best fit for trifocal IOLs. "You really have to manage expectation and reality," says Dr. Kretz.

When talking to patients, they often have high expectations of presbyopia correction. Many hope for no compromises in distance vision, no loss of contrast sensitivity, good intermediate and near vision, and no loss of long-term stability of optical properties and function, and they hope for no glares, halos, and nighttime driving issues. "In Germany, we call this the eierlegende Wollmilchsau - an all-in-one solution suitable for every purpose. But, this is not possible for patients," says Dr. Kretz. Surgeons need to find a compromise and set the right expectations.

When setting expectations, surgeons must consider different patient circumstances. In cataract

“Managing cataract and refractive surgery in patients with a multitude of factors and expectations does not have to be a difficult task as both the AT LISA tri IOL and the AT LARA IOL provide beneficial outcomes.”

Dr. Florian Kretz, MD, FEBO

patients who undergo surgery, vision will improve, but it will not be perfect vision. Glares that patients might perceive prior to surgery during nighttime driving will be replaced by halos after IOL implantation, but halos are better compensated by one's brain than a glare. Astigmatic patients, in general, may see starbursts around light sources, and this will change to a distinct halo that one's brain can more easily adapt to after surgery. Dr. Kretz also counsels patients to use additional light sources, such as a smartphone flashlight, if it is too dark for reading. "Patients need time to become comfortable with their new vision," he says.

The most important questions to ask patients are how much spectacle independence they want and how accepting they will be to dysphotopsia. One also needs to consider the primary distances they require in their work and daily life as well as their night light circumstances and hobbies.

Near focus patients are usually simple to treat, and Dr. Kretz prefers to use the AT LISA tri IOL

which not only provides long-term stability but also results in happy patients. In studies comparing the AT LISA tri IOL to the TECNIS Symfony™ and the TECNIS multifocal IOL, AT LISA tri had better visual acuity results and higher contrast values especially in the near visual range. AT LISA tri also showed less glare and halo perception than the Symfony™ IOL.

With the next generation EDOF IOLs coming into play, AT LARA IOLs offer a perfect balance for patients seeking spectacle independence for an active lifestyle with less side effects. AT LARA provides a wide range of focus and less visual side effects than multifocal IOLs. In a questionnaire conducted by Dr. Kretz, he found that many patients were independent of spectacles in the end. If looking at halo and glare assessment, one can really see that AT LARA IOL glare and halo values are lower than other IOLs.

Combining the trifocal AT LARA and AT LISA tri IOLs is also possible. This is because AT LISA tri corrects for spherical aberrations of the cornea and gives

distinct focal points and AT LARA enhances depth of focus with neutral spherical aberration.

Dr. Kretz's take home message is that the AT LISA tri IOL is his first choice for true binocular near vision and good overall vision. For patients who want a wide range of focus from distance to near vision yet also want to focus on intermediate tasks, mixing AT LARA and AT LISA tri may be a possibility. Finally, the AT LARA IOLs may be a good choice for patients who wish for a low rate of photopic phenomena with stable visual acuity. Managing cataract and refractive surgery in patients with a multitude of factors and expectations does not have to be a difficult task as both the AT LISA tri IOL and the AT LARA IOL provide beneficial outcomes.