

## Supplement to EyeWorld Asia-Pacific Winter 2019

**A** symposium at the 2018 APACRS Annual Meeting, sponsored by HOYA Surgical Optics, covered a variety of topics relating to IOL optics. The session was moderated by **Prin Rojanapongpun, MD**, Bangkok, Thailand, and **Ronald Yeoh, MD**, Singapore.

During the session, **Rupert Menapace, MD**, Vienna, Austria, spoke on “Defining and Assessing True Rotational Stability of Toric IOLs: A Comparative Clinical Study.” When discussing IOLs and rotational stability, he said there are several questions to be answered. What is the reported rotational stability of (T)IOLs in literature, and how valid are the methods used to determine it? How do you correctly assess true rotational stability? What is the true rotational stability of popular (T)IOLs?

Prof. Menapace discussed published data and said there are different baselines and methods used to determine position and stability of the lens. The earliest reference in time in publications is 1 hour after surgery, with the patient already sitting upright. Other reference points are 1–2 days postop, 1 week, and even longer, or simply the intended axis, which implies errors in primary positioning.

Prof. Menapace discussed studies on rotational stability, noting the

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Vienna IOL Study Group rotational study project. He highlighted the materials and methods: the monofocal IOL model implanted (to enhance recruitment, neutralize visual impact in case of misalignment/rotation), haptic junctions and emmisaria used as reference points, primary IOL axis orientation randomized, and meridional IOL position measured at the end of surgery and several postop times.

Prof. Menapace also spoke about certain surgical precautions met to minimize secondary rotation like using only cohesive OVD for IOL implantation and thorough OVD aspiration at the conclusion of surgery, 3 minutes of waiting time to allow full

unfolding of haptics in the bag and the chamber then slowly flattened and carefully reinflated to leave the eye normotonic. The Vivinex™ IOL from HOYA was compared to several different IOLs, and he noted its exceptional performance. It was the most stable IOL his team has yet tested and did not produce outliers associated with other market leading designs. In a set of 103 cases, 100% of all Vivinex™ IOLs had less than or equal to 5 degrees of rotation as measured from the end of surgery to 6 months.

Prof. Menapace said that the most frequent and significant rotations of toric IOLs occur during the first week; from 1 week to 1 month, the

incidence and amount significantly decrease; and after 1 month, significant rotation no longer occurs. Prof. Menapace noted that what counts is the positional change starting from the end of surgery, and not from 1 hour or 1 day, or even later, as well as considering the outliers and not only means, medians, and standard deviations.

**Hiroko Bissen-Miyajima, MD, PhD**, Tokyo, Japan, shared her experience in a presentation titled “Clinical Outcome of New Vivinex™ Toric IOL.”

Prof. Bissen-Miyajima highlighted the important qualities of the preloaded Vivinex™ IOL, such as the small incision required and the long-term stability in terms of glistening and PCO performance of the hydrophobic acrylic platform.

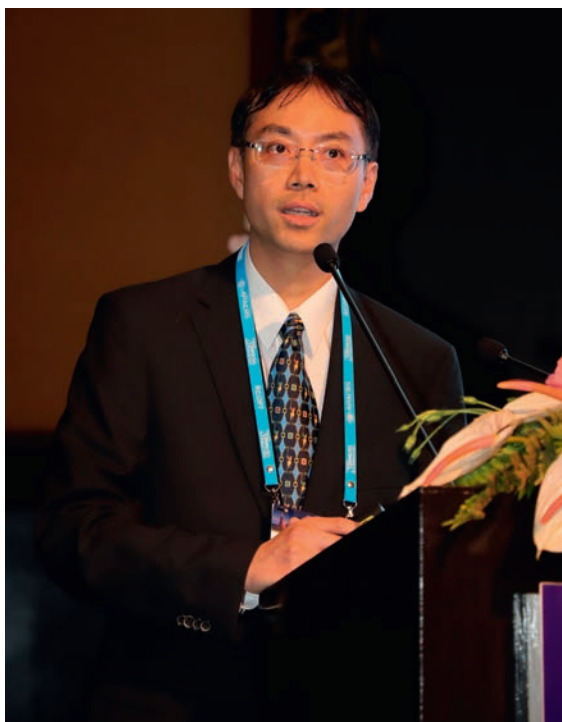
Prof. Bissen-Miyajima discussed her clinical investigations of the Vivinex™ Toric IOL, specifically results from preop to 3 months postop. In targeting emmetropia, Prof. Bissen-Miyajima said spherical equivalent results were good. When considering UCDVA, all eyes achieved 20/25 or better and were stable from 1 day to 3 months postop. Astigmatism decreased from preop and spectacle usage was minimal at distance (95% not using spectacles and 5% sometimes using spectacles). Patient satisfaction was good, with 40% of



Johnny Wu, MD, Rupert Menapace, MD, Susana Marcos, PhD, Hiroko Bissen-Miyajima, MD, PhD, Prin Rojanapongpun, MD, and Ronald Yeoh, MD



Rupert Menapace, MD



Johnny Wu, MD



Susana Marcos, PhD

patients “satisfied” and the remaining 60% “very satisfied.”

Prof. Bissen-Miyajima discussed the implantation of the Vivinex™ IOL, using the Vivinex™ iSert® preloaded injector. The outer diameter of its precision tip is 1.7 mm and the inner diameter is 1.5 mm, and the Vivinex™ IOL can be implanted through a 2 mm incision. She shared that the final incision size was the smallest compared to other IOLs, which allows for stable postoperative refraction.

Finally, Prof. Bissen-Miyajima touched on long-term stability with the Vivinex™ material. Glistenings are reduced in eyes with Vivinex™, and there is a new approach to reduce PCO with Vivinex™. The IOL surface is modified to increase the adhesion to the posterior capsule. Prof. Bissen-Miyajima showed study data that demonstrated that the Vivinex™ had a lower rate of PCO than the control group.

**Johnny Wu, MD**, Perth, Australia, presented “Practical Pearls for Optimizing Outcomes using the HOYA Vivinex Toric IOLs.”

Dr. Wu discussed published data on cataract surgery and astigmatism. He said that there is preoperative corneal astigmatism in 40% of cataract surgery patients, of which 60% are low range (0.75 to 1.0 D). Residual refractive astigmatism and dependence on spectacles still persist today but are reduced by toric IOLs in meta-analy-

sis, Dr. Wu said. Postoperative residual astigmatism significantly degrades visual acuity at all contrast levels.

Dr. Wu presented some of the theoretical effects of IOL rotation on astigmatism correction, noting that this is worse with higher cylinder powers. Five degrees of rotation results in 16% undercorrection of astigmatism, 10 degrees of rotation results in 33% undercorrection of astigmatism, and 16 degrees of rotation results in 50% undercorrection of astigmatism. At a rotation greater than 30 degrees, this annuls the benefit of the toric lens, he said, adding that the greatest rotation occurs in the early postoperative period, with little rotation after 1 week.

Dr. Wu described his own prospective, single-arm study in Australia using the Vivinex™ Toric T2 IOL. The study included 20 consecutive patients with corneal astigmatism ranging from 0.75 to 1.5 D who underwent cataract surgery with the Vivinex T2 Toric IOL. The target cylinder was less than 0.5 D. Preoperative and 4-week postop measurements were taken. Dr. Wu also highlighted the use of the Vivinex™ iSert® preloaded injector for the Vivinex™ Toric, which he said offers unidirectional slider advancement, a transparent cartridge, and a screw design where the injector length remains constant during IOL insertion.

In the study, Dr. Wu said there were no surgery complications, no postop retinal tear/uveitis/macular edema, the distance spectacle independence was 100%, and there was a reduction in postoperative refractive astigmatism to 0.53 D +/-0.36 D, and clear benefits when comparing pre- and postop spherical equivalent results. From the study, Dr. Wu concluded that the use of Vivinex™ T2 IOL is a safe and reasonably predictable choice, which provides effective correction of spherical and astigmatic errors. It can minimize mean postop astigmatism and spherical equivalent and optimize distance spectacle independence. Better visual and refractive results are reported to be associated with greater perception of visual quality and greater quality of life, Dr. Wu said, adding that more multicenter prospective trials could be helpful.

**Susana Marcos, PhD**, Madrid, Spain, wrapped up the session by presenting “New Dynamic Optical Bench Tests: Influence of IOL Aspheric Profile and Decentration on Image Quality.”

She first discussed asphericity of the IOL surfaces and IOL decentration and how these two factors contribute to image quality. As lenses become more sophisticated, there is a concern that while correcting for spherical aberration of the cornea, aspheric IOLs would on the other hand increase coma.

Dr. Marcos presented data from one of her studies, which showed that aspheric IOLs not only compensated for spherical aberration, but coma was lower in eyes implanted with aspheric than spherical IOLs.

She also shared a study looking at the impact of decentration on different state-of-the-art IOLs, including aspheric lenses from Alcon (Fort Worth, Texas) and Johnson & Johnson Vision (Santa Ana, California), and the Vivinex™ IOL. The IOLs were mounted in an artificial eye model, with a realistic cornea and a micrometer stage, which allowed introducing known amounts of decentration.

In the study, it was found that for the same magnitude of decentration, the amount of induced astigmatism and coma was less for the Vivinex™ IOL than the other IOLs. Dr. Marcos said that these findings are significant for clinicians because decentration from the optical axis naturally occurs in every eye, and the specific design of Vivinex™ IOL makes it more immune to decentration than other aspheric IOLs. Reduced aberrations and therefore increased image quality is associated with better visual quality.

Dr. Marcos suggested that a similar study could be done in the future on toric IOLs to look at decentration.