# Clinical pearls on achieving high patient satisfaction with TECNIS Synergy™ Continuous-Range-of-Vision IOL

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On 27 November 2021, Johnson & Johnson Surgical Vision convened the *Expert Panel in Cataract Surgery (EPICS) TECNIS Synergy™ User Meeting* with 12 ophthalmologists from across Asia Pacific, moderated by Dr Fam Han Bor.

The experts shared best practices and experiences in patient selection, preoperative evaluation and counselling, as well as postoperative management to optimize patient outcomes with TECNIS Synergy™.

## Asian patients' unique near vision needs

A definition of patients' vision needs after cataract surgery is important when implanting presbyopia-correcting intraocular lenses (PCIOLs),[1] with distances of near vision varying according to the occupation and lifestyle of patients, and may include distances of 25, 30, 33, 35 or 40 cm.[1-3] While there is often a need to hunt for the sweet spot with existing trifocal IOLs, near visual acuity (VA) is typically measured at 40 cm.[4,5] However, visual performance at 33 cm is becoming increasingly important in meeting the near vision needs of Asian patients.[1,6]

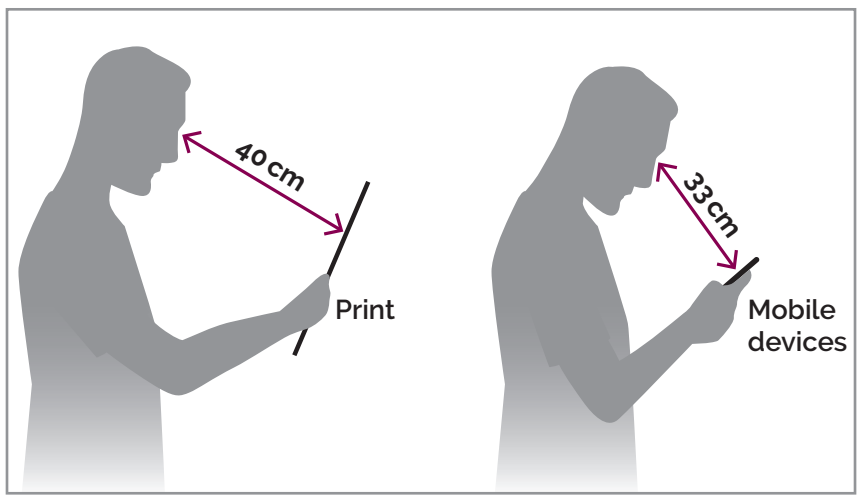
Various studies have shown that Asians generally view reading materials such as their handheld smartphones and books at a closer distance due to their shorter stature – thus, proportionately shorter arm lengths – compared with Europeans and Africans.[6,7] Furthermore, the more elaborate and intricate formation of Asian scripts, particularly Chinese scripts, require 1.5 times more VA than English characters.[8] Studies have shown that the functional mobile usage distance is at 33 cm (Figure 1), and smartphones are generally held at an average viewing distance of 33.95 cm among Asians.[1,6]

> **"For Asians, the functional mobile usage distance is at 33 cm, and smartphones are generally held at an average viewing distance of 33.95 cm."**

"Asians need strong near and good intermediate vision due to challenges in reading Asian scripts such as Chinese, Hangul, Thai, Arabic and Japanese," Dr Prin Rojanapongpun said. "Another consideration is the reading needs of patients, including tablet / book at distances of 30–35 cm and computer monitor at distances of 45–50 cm."

Speaking from experience in Taiwan, Dr Hsiao Yu-Chuan shared that such near vision needs are prominent among Taiwanese owing to the need for reading traditional Chinese script – which is more complex than simplified Chinese script.

**Figure 1. Optimal reading distances among Asians**



## TECNIS Synergy™ represents a new "continous-range-of-vision" category of PCIOL

With the evolving needs of modern-day patients, visual tasks including reading, viewing mobile phones, working on computers, walking up the stairs and travelling are becoming increasingly important – and these encompass near, intermediate and distance vision. The ideal IOL should offer good distance through near vision with acceptable glares and halos. However, while most multifocal IOLs deliver good near and distance vision, there remains a gap in intermediate vision.[9]

Johnson & Johnson Vision has a long history of providing high-quality IOLs. In 2014, Johnson & Johnson Vision pioneered the extended depth of focus (EDOF) technology and introduced the first EDOF lens, TECNIS Symfony™ – providing patients with high-quality contrast vision from distance through to functional near vision. Subsequently, Johnson & Johnson Vision succeeded in combining the multifocal and EDOF technologies to deliver continuous high-contrast vision of 0.1 logMAR or better, across distance to even up close at 33 cm.[1,6] The TECNIS Synergy™ IOL is patient-centric, allowing patients to experience a range of uninterrupted vision.

TECNIS Synergy™ has been shown to offer a wider range of continuous vision with better near, maintaining 20/25 or better VA from -3.0 D to infinity (Figure 2).[10] Furthermore, TECNIS Synergy™ gained an additional line of VA at -3.0D and beyond and achieved higher VA at all distances compared with other trifocal lenses.

Most experts agreed that TECNIS Synergy™ IOL is a hybrid PCIOL utilizing various technologies and falls under a new "continuous-range-of-vision" category. Dr Masayuki Ouchi noted that TECNIS Synergy™ is able to provide good vision across distance, intermediate and near to his patients.

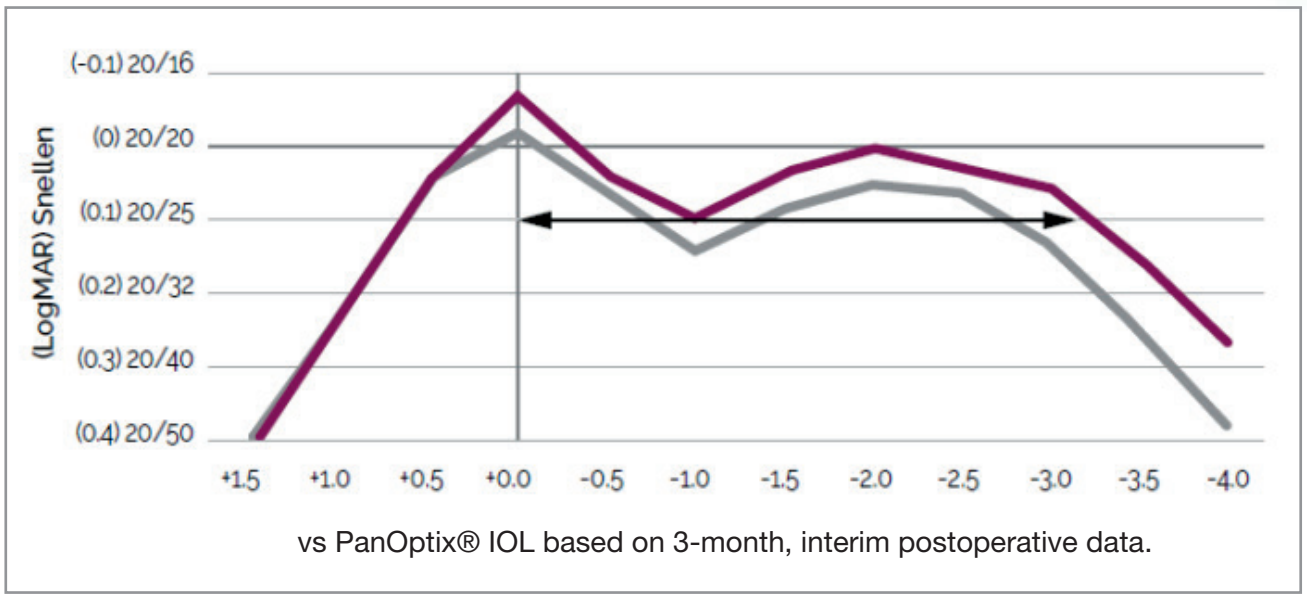
"TECNIS Synergy™ fills the gaps of troughs created by other trifocal IOLs on the defocus curves and provides a continuous range of vision. There is no need to hunt for a reading spot," said Dr Rojanapongpun.

## What users think of TECNIS Synergy™

Dr D Ramamurthy noted that with TECNIS Synergy™, mix-and-match implantation of IOLs and micro-monovision are no longer necessary. "Tweaking of the power of the lenses is not required with the use of newer generation formulas for my patients with bilateral implantation of TECNIS Synergy™, and they are able to function at all distances," he added.

Dr Santaro Noguchi performed a study comparing Alcon's PanOptix® (n>300) and TECNIS Synergy™ (n=60). Patients receiving TECNIS Synergy™ achieved better distance VA outcomes both with and without correction compared with those receiving PanOptix®. Patients receiving TECNIS Synergy™ also reported higher spectacle independence across all distances compared with patients receiving PanOptix® (97.92% versus 93.43% for far vision; 98.96% versus 95.34% for intermediate vision; and 89.58% versus 75.99% for near vision). There was significantly greater visual comfort in viewing mobile phones, viewing under dim light conditions, and for near work in patients receiving TECNIS Synergy™ compared with those receiving PanOptix®. Glare and halos were comparable for TECNIS Synergy™ and PanOptix® when measured three-month postoperatively. Although present, glare and halos did not affect

**Figure 2. Binocular distance-corrected defocus curves from head-to-head clinical study[10]***




vs PanOptix® IOL based on 3-month, interim postoperative data.



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patients' daily activities, including driving at night.

In a prospective case series study, all patients who underwent bilateral TECNIS Synergy™ implantation achieved complete spectacle freedom for distance vision, with only 3.7% requiring glasses for intermediate or near vision tasks.[11] Although 52.4% of patients reported experiencing halos under low-light conditions, 19% of them only experienced halos occasionally whereas 77.3% of the patients had never or occasionally experienced glare.[11] The findings of the study also substantiated the outstanding continuous range of vision covering 33 cm and beyond.

"Personally, I find that other trifocals do not provide near vision enough. TECNIS Synergy™, on the other hand, delivers very good near vision compared with most other trifocals," said Dr Fam Han Bor. In his practice, patients are often more concerned about near vision than dysphotopsia. "While my patients who were implanted with TECNIS Synergy™ have had good near vision, they also experienced glare and halos. However, they often think that the 'trade-off' is worth it and are satisfied with the near vision outcomes as they can get use to glare and halos over time."

"The visual performance of TECNIS Synergy™ is similar to other trifocals that cover 40 cm and beyond, except that bilateral TECNIS Synergy™ implantation gives good near vision even at 30–35 cm, especially under dim lighting conditions. My patients are quite comfortable with the glare and halos, although I have had one patient with underlying posterior polar cataract who is unable to tolerate glare and halos," Dr Ramamurthy recounted. He advised surgeons to approach or counsel patients fitting TECNIS Synergy™ in a similar way as they would with other trifocals.

**"Achieving spectacle independence outweighs the issues patients may face with glare and halos, given that glare and halos can be easily managed."**

The right patients for IOLs are often those who seek spectacle independence.[3] "Our current cataract patients never wish to wear glasses, considering their capabilities to multitask and their modern lifestyle," said Dr Rojanapongpun. Generation B and Generation X females who have strong desire for spectacle independence and near vision are Dr Rojanapongpun's ideal patients for TECNIS Synergy™. "Indeed, Asian patients need strong near vision as they tend to hold their reading materials at a closer distance due to proportionally shorter arms," he added.

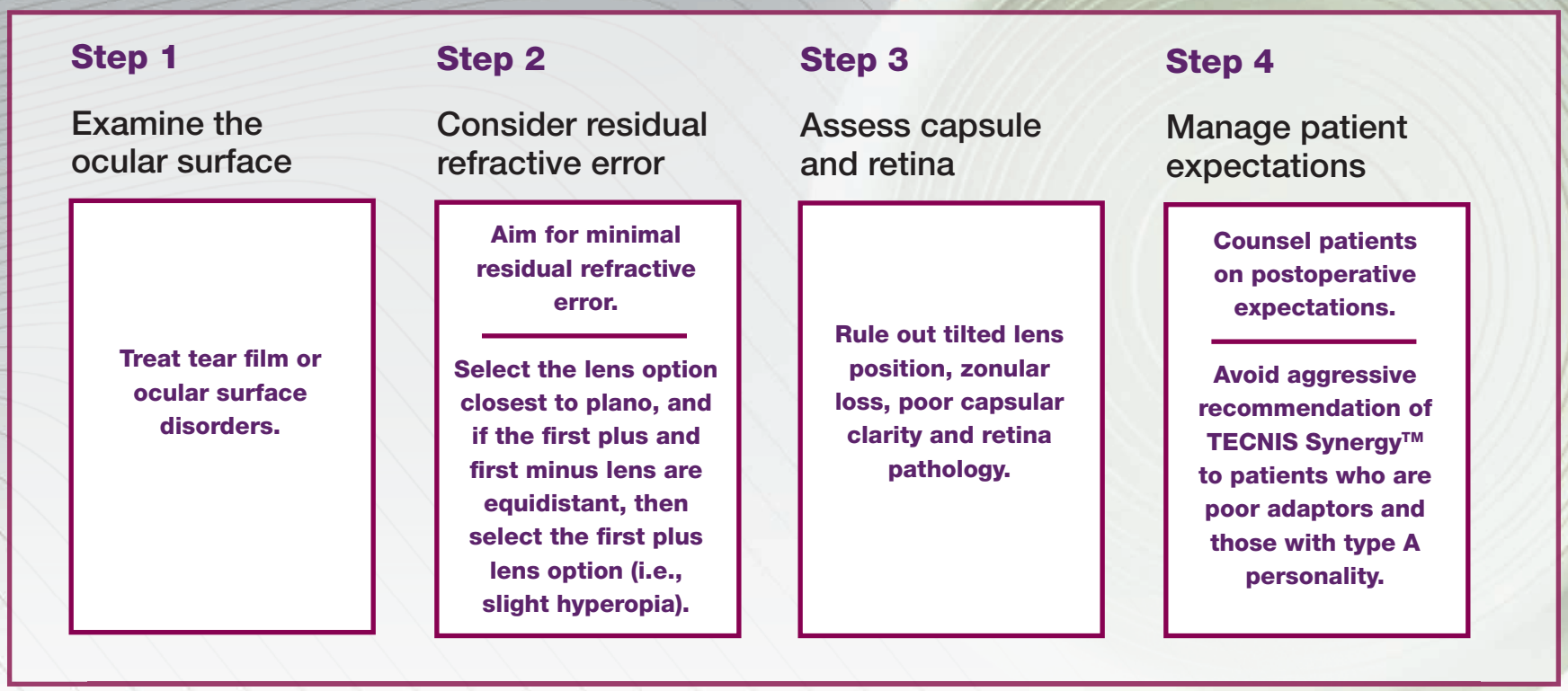
The experts attributed their preference for TECNIS Synergy™ over other trifocals to its continuous range of vision and outstanding near vision. "I do like both PanOptix® and TECNIS Synergy™, but the reading vision with TECNIS Synergy™ far exceeds that of PanOptix®. I find that there is a gap between the vision for reading and viewing computer with PanOptix®. However, the continuous range of vision with TECNIS Synergy™ helps my patients cope better with close visual tasks," said Dr Robert Paul.

"Another issue that concerns me with PanOptix® is glistening – many of my patients undergo lensectomy and clear lens extractions for cosmetic reasons and I do not wish to implant a lens that will potentially give glistening. This will affect the quality of vision in 10–15 years and resulting in the need for lens removal. Having said that, TECNIS Synergy™ is my preferred IOL for the better quality of vision and its near vision performance," Dr Paul continued.

Sharing his personal experience in implanting TECNIS Synergy™, Dr Paul also advised surgeons to address postoperative residual astigmatism to maximize patients' distance vision as it is less forgiving compared with other trifocals. Some patients may experience reduced quality of distance vision during the early postoperative period, he noted, but they eventually gained 6/6 or 6/5 vision with little to no refractive error.

Most experts agreed that TECNIS Synergy™ can offer the best near vision needs for Asian patients amongst other PCIOLs. Achieving spectacle independence outweighs the issues patients may face with glare and halos, given that glare and halos can be easily manage. All experts also agreed that TECNIS Synergy™ allows greater ability to read fine print and at closer reading distances compared with other trifocals. Most importantly, TECNIS Synergy™ can fulfil the unique vision needs of Asian patients, whose reading distance is typically at 33 cm.[1,6]

Figure 3. Stepwise approach of preoperative assessment




## Clinical pearls for TECNIS Synergy™: Patient selection and preoperative counselling

The experts noted that most patients adapt well with mild and non-disruptive glare and halos following TECNIS Synergy™ implantation. However, surgeons may encounter a patient who reports less than perfect distance vision and experiences glare and halos. Therefore, Dr Fam believed that good preoperative informed consent and managing patient expectations are crucial.

Dr Rojanapongpun advocated patient counselling on their visual goals i.e., perfect clarity versus spectacle independence and prioritization of visual tasks i.e., high contrast versus high comfort. "Patients should be allowed time to discuss with their family and make clear decisions based on their visual task priority," said Dr Rojanapongpun. Surgeons should understand patients' expectations and different visual requirements depending on their lifestyle and work.[3] According to Dr Rojanapongpun, patient satisfaction equals outcome minus expectations.

"To achieve high patient satisfaction and ensure positive postoperative outcomes, assessment of ocular pathology of the cornea, macula and optic nerve head is important," added Dr Rojanapongpun. He explained that an evaluation of whether the surgery can offer valuable changes to the patient is the key – "if the cataract is too mild, I would recommend my patient to defer the surgery."

A detailed preoperative ocular evaluation can help patients achieve positive outcomes as successful presbyopia-corrections are often based on eye health.[3] To achieve best refractive outcomes, surgeons should minimize postoperative residual astigmatic error to ≤0.75 D and consider posterior corneal astigmatism (PCA) as well as surgically induced astigmatism (SIA) in surgical planning.[14] Ocular surface conditions such as dry eye disease should also be managed as part of the preoperative assessment. Surgeons should also ensure that patients are aware of the trade-offs associated with various IOLs. It is important to educate patients on the "give and take" of IOL implantation and that there is always a compromise between multifocality and spectacle independence.



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Dr Mahipal Sachdev explained that he would follow a stepwise approach of preoperative assessment (Figure 2). "Preoperative exclusion criteria such as preoperative dry eye, corneal scarring, pupil size of <2.5 mm and monofocal implant in the first eye are important in managing postoperative challenges," he clarified.

Accurate and reliable ocular biometry is essential for IOL power calculation.[3,12] Dr Sachdev advised surgeons to analyze the posterior cornea using IOLMaster® 700 (ZEISS) and consider matching the residual cylinder with total keratometry and corneal topography. "Residual cylinder is detrimental to the patient and compromises the outcome any IOL implantations," added Dr Ramamurthy.

"Make sure you have accurate biometry and exclude all contraindications to any multifocals," advised Dr Paul.

Dr Fam shared that the target refraction for TECNIS Synergy™ should be emmetropia- or hyperopia-targeted and not myopia-targeted since TECNIS Synergy™ delivers good near vision. "By targeting myopia, the dysphotopsia will worsen and make the patient more unhappy," cautioned Dr Fam.

Dr Kim Myoung Joon shared that he uses an easy to remember ABC stepwise approach of preoperative assessments for all his PCIOL cases - Astigmatism control, Biometry, and, Corneal status.

Large angle kappa plays a role in the decentration of multifocal IOLs and may result in glare and halos, although angle alpha better predicts photic phenomena with multifocal IOLs.[3] As such, extremely large angle kappa and angle alpha should be avoided. Patients' postoperative expectations should be adequately managed and be informed of the need to wear glasses for some activities as well as the possibility of visual disturbances such as glare and halos, especially at night.[12]

Clear communication such as showing patients various photic phenomena images during preoperative counselling is helpful in managing patient expectations. However, with neuroadaptation, photic phenomena will be tolerated and will not be too bothersome for patients. Furthermore, while glares and halos are common across all trifocals, patients receiving TECNIS Synergy™ who have been counselled can generally accommodate and tolerate them well.

## Clinical pearls for TECNIS Synergy™: Postoperative management and neuroadaptation

Visual neuroadaptation plays an important role in determining the final visual outcomes after IOL implantation.[13] PCIOLs may require 4–8 weeks for visual adaptation to attain excellent outcomes.[12] Early postoperative neuroadaptation has been observed in patients with multifocal IOL implantation. In patients receiving multifocal IOL implantation, adaptation suppression was observed in the early postoperative stage, resulting in visual disturbances. However, these visual disturbances greatly improved following visual neuroadaptation by 3 months postoperation.[13] "Neuroadaptation is very important, can be multifactorial, and may be attributable to personality," said Dr Fam.

All other factors such as dry eye and refractive error should be addressed before neuroadaptation. It is also helpful to consider patients' age and ocular history. "I believe younger patients neuroadapt quicker than older patients," noted Dr Ramamurthy.

To speed up neuroadaptation, Dr Boonchai Wangsupadilok would give his patients some visual tasks to perform at home postoperatively. "I would get my patients to watch television for an hour a day and have them explain how they feel during the first week follow-up. Generally, my patients can adjust within 2–4 weeks," said Dr Wangsupadilok.

For Dr Rojanapongpun, he would consider intervening if neuroadaptation failed 3–6 months postoperatively in patients with dysphotopsia. "Personally, I have had no issues with lens exchange within 6–12 months, if the surgery was performed well," he noted.

Glare and halos are more common among patients with large pupils.[3] Before going to neuroadaptation, Dr Noguchi pointed out that it is important to focus on factors such as patient's age and pupil size or position.

Posterior vitreous detachment (PVD) is common after cataract surgery with IOL implantation.[14] Although it is considered a complication of low clinical relevance, its occurrence suggests the impact of cataract surgery on the architecture of the ocular globe. However, PVD does not directly threaten vision. Dr Robert Paul explained that when patients complain of blurring or waxy vision, surgeons should not attribute all complaints to the optics of the lenses, but to rule out other factors.

## The importance of TECNIS Synergy™ Toric II for presbyopia correction

Experts have expressed great interest for TECNIS Synergy™ Toric II and agreed that more patients will benefit from its availability. "TECNIS Synergy™ Toric II is highly necessary, as multifocal IOLs do not tolerate residual astigmatism well – any residual astigmatism of >0.75 D will impair both distance and near vision," shared Dr Ramamurthy and Dr Chuah.

The squared and frosted haptic design of TECNIS Synergy™ Toric II IOL provides resistance to rotation.[15] Its engineered design features an outstanding mean rotational stability of 0.87°.[15]

"We have seen amazing results in our first few patients with the recent launch of TECNIS Synergy™ Toric II in Hong Kong," said Dr Yau Kin. "Patients with mild astigmatism have shown accurate and stable outcomes with TECNIS Synergy™ Toric II – with 20/20 distance vision and near vision of J1 post-operation."

While TECNIS Synergy™ Toric II was only available in selected markets – including Australia, Hong Kong, Japan, and South Korea – at the point of the *EPICS TECNIS Synergy™ User Meeting*, it would be launched in other Asia Pacific markets in the first half of 2022.

## Conclusion

TECNIS Synergy™ is the lens of choice for a continuous range of vision, especially in fulfilling Asian patients' unique vision needs, necessitated by their shorter stature and thus shorter arm length compared with non-Asian patients; challenges faced in reading complex Asian scripts; as well as near reading needs at a distance of 33 cm and under dim lighting conditions. All experts agreed that full access to TECNIS Synergy™ and TECNIS Synergy™ Toric II IOLs can provide a complete visual range for patients and fulfil patients' vision needs. Surgeons are strongly advised to counsel patients and manage their expectations to optimize patient outcomes.

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