

Refractive Cataract Surgery:

Creating a new paradigm with extended-depth-of-focus IOL technology

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The opportunity to achieve patient satisfaction after cataract surgery with implantation of a presbyopia-correcting intraocular lens (IOL) has improved with innovations in IOL technology. Early-generation multifocal IOLs did not address patient needs for good uncorrected intermediate vision. These lenses also had significant potential to cause highly symptomatic photic phenomena in some patients, which meant that clinicians could end up spending a lot of chair time in postoperative patient management. As a consequence, interest was dampened in presbyopia-correcting IOL technology.

The TECNIS Symfony®/TECNIS Symfony® Toric extended-depth-of-focus IOLs represent a significant advance in the category of presbyopia-correcting IOLs. The TECNIS Symfony® IOL is distinguished from multifocal IOLs by its novel diffractive echelette design (Figure). Instead of providing two discrete foci as does a traditional multifocal IOL, the TECNIS Symfony® IOL optic elongates the focal point to deliver an extended range of functional vision.

In addition, the TECNIS Symfony® IOL optic uniquely corrects chromatic aberration and compensates for spherical aberration of an average natural human cornea.^{1,2} Because of these features, it provides good quality of vision.^{3,4} Results from the US pivotal clinical trial evaluating the TECNIS Symfony® IOL show that the difference in contrast sensitivity between TECNIS Symfony® IOL and monofocal is not clinically significant and a low

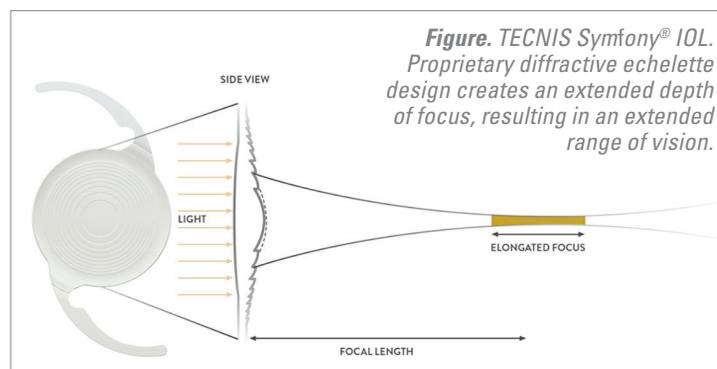
incidence of nighttime visual symptoms.³

In my experience, patients who have been implanted with the TECNIS Symfony® IOL are happy with their outcome and have been an excellent source of word-of-mouth referrals. Still, the optometrist plays an important role both preoperatively and postoperatively in optimizing success and satisfaction in these cases.

Preoperative counseling

As the primary eye care provider for many patients, optometrists often make the diagnosis of cataract and then initiate the preoperative evaluation and patient education process. Because of our role, it is incumbent on optometrists to be fully versed in the features of available IOL technologies so that we can give patients thorough and accurate information about their options for surgery and vision correction.

I tell patients there is no perfect IOL, but that I can confidently recommend the TECNIS Symfony® IOL for individuals whom I consider appropriate candidates. The TECNIS Symfony® IOL meets the needs of patients who want a full functional range of vision and, in particular, provides excellent visual acuity at far and intermediate distances. With people now spending so much time on their computers, reading from tablets, or looking at a cell phone, most patients today are especially motivated to achieve good uncorrected intermediate vision.



All patients considering the TECNIS Symfony® IOL are counseled preoperatively that they are likely to wear a very mild power of glasses for reading, especially if they will be reading something with small print or in dim light. Many patients I see who have been implanted with this lens report wearing glasses less often for near-vision tasks. Surgical strategies involving mini-monovision or a blended approach might be considered for patients who want not only clear vision at the intermediate and far range but also have a priority for good uncorrected near vision.

Although the incidence of nighttime dysphopsia in patients implanted with the TECNIS Symfony® IOL was low in the US pivotal clinical trial, because the potential exists, it is important preoperatively to try to identify individuals who may not tolerate these symptoms. Those with a "type A" personality or who consider themselves perfectionists may not be ideal candidates. Patients who are concerned they might be bothered by such symptoms, however, may be willing to accept the trade-off of photic phenomena if they have a strong desire for achieving a good range of functional vision after surgery.

Preparing for surgery

Optometrists who have been a patient's long-standing eye care provider are not only familiar with that patient's vision goals but also with existing conditions that may affect the choice of a pseudophakic IOL. Therefore, optometrists play a valuable role in providing a good patient history that will help cataract surgeons with their surgical decision making.

For all patients who are undergoing cataract surgery, it is important to identify and treat existing ocular surface disease because it can affect preoperative biometry and postoperative vision.

A smooth course postoperatively

From my perspective, postoperative management for patients implanted with the TECNIS Symfony® IOL seems simple and straightforward. Typically, I see these patients at their planned postoperative visits 1 day, 1 week, and 1 month after surgery.

The follow-up visit for patients with the TECNIS Symfony® IOL involves slightly more chair time compared with patients who have a monofocal IOL. The difference, however, is minimal, and I think it is a good clinical pearl and customer service tip to spend more time with premium IOL patients and to give a little more TLC. Patients who have invested in a premium technology have heightened expectations. With that said, the TECNIS Symfony® IOL delivers

See indications and important safety information on page 2.

good outcomes. So, patients seem happy having their expectations met.

It is important to remind TECNIS Symfony® IOL patients that the lens is a different optical system and the brain needs to get used to it. I explain that after the second eye is operated on, the eyes will start to work well together as a team and their vision will improve. In addition, I tell patients that while the TECNIS Symfony® IOL allows a functional range of vision with great distance and intermediate vision, they are likely to need glasses to read small print or up close.

I make it a point to ask patients with a TECNIS Symfony® IOL how their near and intermediate vision is doing. I ask if they are enjoying their new vision after surgery and wearing glasses less often. I make this a fun conversation, having them tell me about the positives.

In addition to the excellent range of vision patients report with the TECNIS Symfony® IOL, they often tell me how much brighter and more vibrant colors are after their cataract surgery. This is something I do not often hear from my monofocal patients.

Some patients implanted with the TECNIS Symfony® IOL may comment initially that colors appear different, but these reports are expressed as an observation rather than a complaint or concern. Patients who describe a change in color perception tend to mention it only in the early postoperative follow-up period, at 1 day or 1 week after surgery, because it seems to become less noticeable over time. I believe that the phenomenon may be related to the IOL's achromatic technology, which I explain to patients.

In my experience, patients implanted with the TECNIS Symfony® IOL have generally voiced limited complaints about glare and halos. They might acknowledge experiencing nighttime symptoms if asked about them specifically, but even counting those patients, the incidence of dysphotopsia seems low.

Obtaining an accurate refraction

Refractive error should be considered in the workup for any patient with a TECNIS Symfony® IOL who raises concerns about their vision, and it is part

of the standard evaluation after cataract surgery. In obtaining the measurement, however, it is important to use manifest refraction techniques unique to the IOL's echelette technology to avoid over-minus endpoints. To achieve a true reading, examiners should perform a "push plus" technique and watch for the "refractive plateau." Refraction should be done in each eye, beginning by fogging the patient with +0.50 D over the anticipated refraction, pushing plus to avoid over-minusing these patients. Do not rely on an autorefractor, because many of these devices use infrared light that has chromatic aberration correction and therefore generates a falsely myopic result for an eye implanted with achromatic technology.

Conclusion

To best serve patients, optometrists should identify and recommend surgery for a cataract once it becomes symptomatic. Then, optometrists need to stay progressive and keep abreast of the latest advances in IOL technology so that we can fully educate patients about their surgical options and match patients with an IOL that will meet their vision goals and expectations.

In July 2016, the FDA approved the TECNIS Symfony® IOL as the first IOL that provides cataract patients with an extended depth of focus.⁵ Over the past 2 years, I have found it to be a valuable option for patients who want to wear glasses less often for a variety of activities. With the availability of the TECNIS Symfony® IOL, I am comfortable recommending a presbyopia-correcting IOL to a broader pool of patients and gratified by their overall satisfaction.

REFERENCES

1. DOF2015CT0023_Chromatic aberration of the TECNIS Symfony® IOL.
2. DOF2015CT0018_Chromatic aberration of the TECNIS Symfony® IOL.
3. TECNIS Symfony® IOL DFU.
4. DOF2015CT0020_Symfony®_MT_ versus_competition.
5. US Food & Drug Administration. FDA approves first intraocular lens with extended range of vision for cataract patients. July 15, 2016. <https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm511446.htm>. Accessed September 6, 2018.

INDICATIONS and IMPORTANT SAFETY INFORMATION for TECNIS SYMFONY and TECNIS SYMFONY TORIC EXTENDED RANGE OF VISION IOLs

Rx Only

INDICATIONS FOR USE

The TECNIS Symfony Extended Range of Vision IOL, Model ZXR00, is indicated for primary implantation for the visual correction of aphakia, in adult patients with less than 1 diopter of pre-existing corneal astigmatism, in whom a cataractous lens has been removed. The lens mitigates the effects of presbyopia by providing an extended depth of focus. Compared to an aspheric monofocal IOL, the lens provides improved intermediate and near visual acuity, while maintaining comparable distance visual acuity. The Model ZXR00 IOL is intended for capsular bag placement only. The TECNIS Symfony Toric Extended Range of Vision IOLs, Models ZXT150, ZXT225, ZXT300, and ZXT375, are indicated for primary implantation for the visual correction of aphakia and for reduction of residual refractive astigmatism in adult patients with greater than or equal to 1 diopter of preoperative corneal astigmatism, in whom a cataractous lens has been removed. The lens mitigates the effects of presbyopia by providing an extended depth of focus. Compared to an aspheric monofocal IOL, the lens provides improved intermediate and near visual acuity, while maintaining comparable distance visual acuity. The Model Series ZXT IOLs are intended for capsular bag placement only.

WARNINGS Patients with any of the conditions described in the Directions for Use may not be suitable candidates for an intraocular lens because the lens may exacerbate an existing condition, may interfere with diagnosis or treatment of a condition, or may pose an unreasonable risk to the patient's eyesight. Lenses should not be placed in the ciliary sulcus. May cause a reduction in contrast sensitivity under certain conditions, compared to an aspheric monofocal IOL; fully inform the patient of this risk before implanting the lens. Special consideration should be made in patients with macular disease, amblyopia, corneal irregularities, or other ocular disease. Inform patients to exercise special caution when driving at night or in poor visibility conditions. Some visual effects may be expected due to the lens design, including: a perception of halos, glare, or starbursts around lights under nighttime conditions. These will be bothersome or very bothersome in some people, particularly in low-illumination conditions, and on rare occasions, may be significant enough that the patient may request removal of the IOL.

Rotation of the TECNIS Symfony Toric IOLs away from their intended axis can reduce their astigmatic correction, and misalignment >30° may increase postoperative refractive cylinder. If necessary, lens repositioning should occur as early as possible prior to lens encapsulation.

PRECAUTIONS Interpret results with caution when refracting using autorefractors or wavefront aberrometers that utilize infrared light, or when performing a duochrome test. Confirmation of refraction with maximum plus manifest refraction technique is recommended. The ability to perform some eye treatments (e.g. retinal photocoagulation) may be affected by the optical design. Target emmetropia for optimum visual performance. Care should be taken to achieve IOL centration, as lens decentration may result in a patient experiencing visual disturbances under certain lighting conditions. For the TECNIS Symfony Toric IOL, variability in any preoperative surgical parameters (e.g. keratometric cylinder, incision location, surgeon's estimated surgically induced astigmatism and biometry) can influence patient outcomes. Carefully remove all viscoelastic and do not over-inflate the capsular bag at the end of the case to prevent lens rotation.

SERIOUS ADVERSE EVENTS The most frequently reported serious adverse events that occurred during the clinical trial of the TECNIS Symfony lens were cystoid macular edema (2 eyes, 0.7%) and surgical reintervention (treatment injections for cystoid macular edema and endophthalmitis, 2 eyes, 0.7%). No lens-related adverse events occurred during the trial.

ATTENTION: Reference the Directions for Use for a complete listing of Indications and Important Safety Information.