Clinical outcomes of a new extended range of vision intraocular lens: International Multicenter Concerto Study

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PURPOSE: To analyze the clinical outcomes after implantation of an extended range of vision intraocular lens (IOL), the Tecnis Symfony, in a routine clinical setting.

SETTING: Forty clinical sites in Finland, France, Germany, Norway, Spain, Sweden, and the United Kingdom.

DESIGN: Prospective case series.

METHODS: The study comprised 411 patients who had bilateral implantation of the extended range of vision IOL, with intended micro-monovision in 1 group (monovision group) and intended emmetropia in the other group (non-monovision group). Visual acuity, spectacle independence, patient and surgeon satisfaction, and photic phenomena were analyzed during the 4- to 6-month follow-up.

RESULTS: The monovision group comprised 112 patients and the non-monovision group, 299 patients. The mean decimal uncorrected distance (UDVA), intermediate (UIVA), and near (UNVA) visual acuities were 0.95, 0.81, and 0.69, respectively, 4 to 6 months postoperatively. Significantly better UIVA ($P = .003$) and UNVA ($P = .011$) were found in the monovision group than in the non-monovision group. Spectacle independence was high, with 14.4% of eyes requiring reading spectacles frequently. More than 90% of patients reported no or mild halos, glare, starbursts, or other photic phenomena. Patient satisfaction scores (median) for distance, intermediate, and near vision were 9.0, 10.0, and 8.0, respectively. The satisfaction score for near vision increased to 9.0 in the monovision group. More than 91% of patients said they would recommend the same procedure to their friends and family.

CONCLUSION: The extended range of vision IOL provided successful visual restoration across all distances after cataract surgery, with a minimal level of disturbing photic phenomena and high levels of patient satisfaction.

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A new-concept intraocular lens (IOL), the extended range of vision IOL, is based on new optical technology and is now commercially available. This technology uses a proprietary achromatic diffractive echelette design that corrects the corneal chromatic aberration for enhanced contrast sensitivity and generates an extended range of vision.[A]

The average eye has approximately 2.0 diopters (D) of chromatic aberration for wavelengths between 400 nm and 700 nm and 0.8 D for wavelengths between

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500 nm and 640 nm.[1] Significant levels of chromatic aberration have also been found in pseudophakic eyes with different types of IOLs.[2–5] Indeed, most pseudophakic longitudinal chromatic aberration arises from the chromatic dispersion of IOLs rather than from the cornea or other ocular media.[5] Ocular chromatic aberration causes blur and reductions in contrast vision.[3,6] The correction of this type of aberration using an achromatic IOL has been shown to improve the overall optical quality in eyes having cataract surgery.[7–10] Furthermore, the combination of this chromatic aberration correction with the correction of spherical aberration provides improved simulated retinal image quality over spherical and aspheric IOLs without sacrificing depth of field or tolerance to decentration.[7]

The aim of the current multicenter study was to evaluate the outcomes obtained with the extended range of vision Tecnis Symfony IOL (Abbott Medical Optics, Inc.) in terms of visual performance, spectacle independence, photic phenomena, and patient satisfaction. It is not possible to measure chromatic aberration in the daily routine of an ophthalmologic practice, and this parameter was not considered in the study.

PATIENTS AND METHODS

Patients

The study adhered to the tenets of the Declaration of Helsinki and was approved by the local ethics committee of each participating study site. All included patients signed a consent form. The Concerto is a prospective international multicenter study to evaluate the visual performance and patient satisfaction after cataract surgery with bilateral implantation of the Tecnis Symfony IOL. This study included patients from 40 active study sites in Finland, France, Germany, Norway, Spain, Sweden, and the United Kingdom.

Inclusion criteria were visually significant bilateral cataract surgery with implantation of the new extended range of vision IOL, age of 18 years or older, postoperative corneal astigmatism of 0.75 D or less, and availability to attend the follow-up visits. Patients were excluded from the study when the following conditions were present: potential visual acuity worse than 0.6 decimal (0.2 logMAR) in each eye caused by ocular pathological processes, systemic or ocular medication that could affect vision, chronic or acute pathology that could alter the result, previous ocular surgery, amblyopia, strabismus, forme fruste or clinical keratoconus, pupil abnormalities, capsule or zonular fiber abnormalities with the potential of inducing IOL decentration or tilting, and participation in another clinical study.

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Clinical Protocol

This study was performed as a retrospective and prospective study. Patients were enrolled consecutively after bilateral implantation of the new extended range of vision IOL. The last preoperative patient visit and the surgery were documented retrospectively, and the 4- to 8-week and 4- to 6-month follow-up visits were documented prospectively. Surgery and follow-up examinations followed the routine procedures in each clinic in this observational study.

A complete preoperative ophthalmologic examination was documented in all cases and included measurement of uncorrected (UDVA) and corrected (CDVA) distance visual acuity, manifest refraction, Goldmann tonometry, slitlamp anterior segment examination, optical biometry, keratometry, and retina evaluation under pupil dilation. At the 2 postoperative visits, the following parameters were evaluated: binocular UDVA and CDVA, binocular uncorrected near visual acuity (UNVA) measured at 40 cm, and binocular uncorrected intermediate visual acuity (UIVA) measured at 70 cm.

Also, patients were asked about their spectacle use after surgery; that is, How often do you need spectacles to see at far/intermediate/near distances? The answer was categorized by 0%, 25%, 50%, 75%, and 100% of time. With regard to photic phenomena, patients were asked the undirected question, Do you experience any problems with your vision? The patient responses were categorized by glare, halos, starburst, and other phenomena, which had to be specified. Each category was graded as mild, moderate, or severe. Patients were also asked about their satisfaction with the outcome as follows: How satisfied are you with your spectacle-free vision at far/intermediate/near distance? The answer choices ranged from 0 (not at all satisfied) to 10 (very satisfied). They were also asked 2 yes or no questions: Would you choose the same lens again? and Would you recommend this lens to your relatives and friends?

Finally, surgeons were asked to assess their level of overall satisfaction with the surgical procedure and outcomes as well as their satisfaction with the IOL implantation procedure, achievement of target refraction, and visual performance provided.

Surgical Technique

All cataract surgeries were performed by experienced surgeons from the Concerto Study Group using a standard phacoemulsification technique or a femtosecond laser–assisted technique. The IOLs were implanted in the capsular bag through the main incision using the Unfolder Platinum 1 series screw-style inserter (Abbott Laboratories, Inc.). The study sites used their routine protocols for postoperative care.

Extended Range of Vision Intraocular Lens

The Tecnis Symfony is an extended range of vision IOL based on diffractive achromatic technology (Figure 1). The IOL has an achromatic diffractive pattern that elongates the focus and compensates for the chromatic aberration of the cornea. With multifocal IOLs, 1 image is in focus while the out-of-focus image is suppressed (simultaneous vision), and this out-of-focus image generates halos.[11] According to the manufacturer, halos are not expected with this IOL because it provides an elongated focal area rather than 1 or various individual focal points.

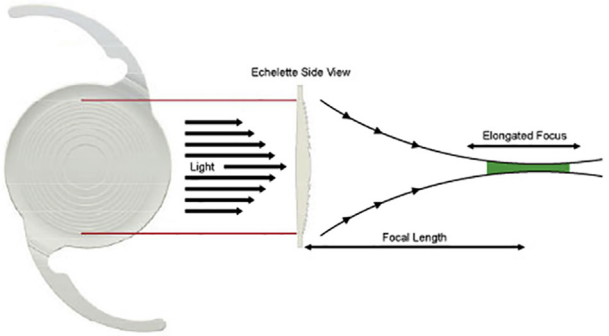

Figure 1. Design and mechanism of action of the extended range of vision IOL.

The IOL has a biconvex wavefront-designed anterior aspheric surface and a posterior achromatic diffractive surface. The total diameter of the IOL is 13.0 mm, and the optic zone diameter is 6.0 mm. It is an ultraviolet–filtering hydrophobic acrylic material with a refractive index of 1.47 at 35°C. At present, the IOL is available in powers from +5.0 D to +34.0 D in 0.5 D increments. The toric version of this IOL was not used in this multicenter study because it was not available when the study was initiated.

The IOL power calculations were performed considering an A-constant of 119.3. In 1 data subset of patients (monovision group), a micro-monovision approach was used and a minimum residual myopia was targeted in the nondominant eye (≈0.50 D). In all other cases, emmetropia was considered as the target in IOL power calculations (non-monovision group). The SRK/T formula[12] was used for IOL power calculations in all cases.

Statistical Analysis

Only uneventful surgeries were included. The mean values of binocular UDVA, UIVA, and UNVA were obtained with their corresponding standard deviation values. The percentages corresponding to each answer to questions on patient satisfaction, spectacle independence, and photic phenomena were calculated. These analyses were performed using SPSS for Windows software (version 15.0, International Business Machine Corp.).

RESULTS

The analysis comprised 411 patients who completed the 4- to 6-month follow-up. The results for the 4- to 6-month timeline were stratified based on the available patients in this cohort as well as patients with intended micro-monovision (monovision group) and patients with an emmetropic target in both eyes (non-monovision group). The monovision group included only patients who had been targeted for micro-monovision between 0.50 D and 0.75 D. Table 1 summarizes the demographic and refractive data of the entire cohort and the 2 subgroups.

Visual Outcomes and Spectacle Independence

Table 2 shows the binocular visual and refractive data 4 to 6 months after surgery in the entire cohort and in the monovision and non-monovision groups. The mean binocular decimal UDVA was comparable in the entire cohort, the monovision group, and the non-monovision group (P = .485). The monovision group had significantly better UIVA and UNVA (P = .003 and P = .011, respectively) than the non-monovision group. Corresponding to these visual outcomes, the level of spectacle independence reported by patients was high, with most eyes not requiring spectacles for distance-vision, intermediate-vision, or near-vision activity (Table 3). Spectacle independence for near activities was better in the monovision group (Table 3).

Table 1. Demographic and preoperative and postoperative refractive data.

Variable	Monovision Group	Non-monovision Group	All Patients
Patients (n)	112	299	411
Mean age (y) ± SD	67.5 ± 11.3	66.1 ± 10.7	66.5 ± 10.9
Sex (%)			
Female	56.1	60.9	59.9
Male	43.9	39.1	40.1
Mean preop SE (D) ± SD	−0.03 ± 3.07	0.43 ± 2.84	0.32 ± 1.31
Mean postop SE (D) ± SD			
Emmetropic target	−0.21 ± 0.38	−0.30 ± 1.13	−0.35 ± 1.01
Myopic target	−0.75 ± 0.52	—	—

SE = spherical equivalent

Photic Phenomena

More than 90% (368 patients) reported no or mild halos, glare, starbursts, and other types of photic phenomena (Table 4). At the 4- to 6-month postoperative assessment, severe visual symptoms were reported by few patients in all groups (Table 4).

Patient and Surgeon Satisfaction

The median patient satisfaction scores for distance, intermediate, and near vision were 9.0, 10.0, and 8.0, respectively, in the entire cohort; 9.0, 9.0, and 9.0, respectively, in the monovision group; and 9.0, 10.0, and 8.0, respectively, in the non-monovision group. One hundred two patients (91.1%) and 283 patients (94.6%) in the monovision and non-monovision groups, respectively, said they would recommend the same procedure to their friends and family. Also, 103 patients (92.0%) in the monovision group and

Table 2. Postoperative binocular visual data 4 to 6 months after surgery.

Parameter	Monovision Group	Non-monovision Group	All Patients	*P* Value*
UDVA				.485
Decimal				
Mean ± SD	0.94 ± 0.23	0.95 ± 0.19	0.95 ± 0.20	
Median	1.00	1.00	1.00	
Range	0.40, 2.00	0.33, 1.50	0.33, 2.00	
LogMAR				
Mean ± SD	0.04 ± 0.11	0.03 ± 0.09	0.03 ± 0.10	
Median	0.00	0.00	0.00	
Range	−0.30, 0.40	−0.18, 0.48	−0.30, 0.48	
CDVA				.853
Decimal				
Mean ± SD	1.06 ± 0.20	1.05 ± 0.16	1.05 ± 0.18	
Median	1.00	1.00	1.00	
Range	0.63, 2.00	0.50, 2.00	0.50, 2.00	
LogMAR				
Mean ± SD	−0.02 ± 0.08	−0.02 ± 0.07	−0.02 ± 0.07	
Median	0.00	0.00	0.00	
Range	−0.30, 0.20	−0.30, 0.30	−0.30, 0.30	
UNVA				.011
Decimal				
Mean ± SD	0.74 ± 0.26	0.67 ± 0.24	0.69 ± 0.25	
Median	0.80	0.63	0.63	
Range	0.20, 1.25	0.16, 1.25	0.16, 1.25	
LogMAR				
Mean ± SD	0.17 ± 0.18	0.21 ± 0.16	0.19 ± 0.17	
Median	0.10	0.20	0.20	
Range	−0.10, 0.70	−0.10, 0.80	−0.10, 0.80	
UIVA				
Decimal				
Mean ± SD	0.88 ± 0.29	0.79 ± 0.26	0.82 ± 0.27	.003
Median	1.00	0.80	0.80	
Range	0.33, 1.58	0.10, 2.00	0.10, 2.00	
LogMAR				
Mean ± SD	0.09 ± 0.17	0.13 ± 0.16	0.12 ± 0.16	
Median	0.00	0.10	0.10	
Range	−0.20, 0.48	−0.30, 1.00	−0.30, 1.00	

CDVA = corrected distance visual acuity; SE = spherical equivalent; UDVA = uncorrected distance visual acuity; UIVA = uncorrected intermediate visual acuity; UNVA = uncorrected near visual acuity
*Monovision versus non-monovision

285 patients (95.3%) in the non-monovision group said they would choose the same IOL again. In the entire cohort, 385 patients (93.7%) would recommend the surgery and 388 patients (94.4%) would choose the same IOL.

Surgeon satisfaction with regard to handling the IOL and the performance of the IOL (median score 9.0) was high in the entire cohort and in the 2 subgroups analyzed. The median scores for surgeon satisfaction with IOL implantation, achievement of target refraction, and visual performance were 10.0, 9.0, and 9.0 in all 3 groups.

Complications

Thirty-six eyes (4.4%) developed posterior capsule opacification requiring neodymium:YAG capsulotomy. A laser enhancement to correct residual refractive errors was performed in 9 eyes (1.1%). Intraocular lens decentration was present in 8 eyes (1.0%). None of these complications required explantation of the IOL.

DISCUSSION

Distance visual outcomes were excellent in the entire cohort and in both subgroups of eyes, with mean

Table 3. Postoperative spectacle independence data 4 to 6 months after surgery.

Level of Spectacle Dependence	Monovision Group	Non-monovision Group	All Patients
Distance (%)			
Never/occasionally	89.3	92.1	91.4
50% of time	5.4	2.7	3.4
Frequently	5.4	5.2	5.2
Intermediate (%)			
Never/occasionally	88.0	92.8	91.5
50% of time	6.3	2.8	3.8
Frequently	5.8	4.4	4.7
Near (%)			
Never/occasionally	80.8	72.1	74.5
50% of time	10.3	11.5	11.2
Frequently	8.9	16.4	14.4

Table 4. Incidence and level of photic phenomena 4 to 6 months after surgery.

	Percentage		
Photic Phenomenon	Monovision Group	Non-monovision Group	All Patients
Halos			
No/Mild	87.0	91.6	90.3
Moderate	9.4	5.6	6.6
Severe	3.6	2.9	3.1
Glare			
No/Mild	96.0	91.9	93.0
Moderate	3.1	5.7	5.0
Severe	0.9	2.4	2.0
Starburst			
No/Mild	96.4	97.6	97.3
Moderate	2.7	1.7	2.0
Severe	0.9	0.7	0.7
Other			
No/Mild	95.5	98.3	97.6
Moderate	4.0	1.7	2.3
Severe	0.4	0.0	0.1

binocular decimal UDVA values of 0.95 in the entire cohort and in the non-monovision group and of 0.94 in the monovision group (corresponding to 0.03 logMAR and 0.04 logMAR), respectively. This confirms the ability of the Tecnis Symfony extended range of vision IOL to successfully restore distance visual function, which has been reported for other models of multifocal IOLs.[13–29] In a study by Law et al.,[17] the mean monocular UDVA was 0.05 ± 0.07 logMAR in a case series of 30 patients who had bilateral implantation of a trifocal IOL that combined a bifocal pattern and trifocal diffractive pattern. Kohnen et al.[28] found a mean binocular UDVA of −0.06 ± 0.10 logMAR in patients with the same IOL model. Similarly, Schmickler et al.[20] reported a mean UDVA of 0.02 ± 0.10 logMAR in a sample of eyes with a specific model of bifocal diffractive IOL, which decreased only slightly (0.07 ± 0.10 logMAR) under mesopic conditions. In contrast, worse mean UDVA values than those obtained in our series have been also reported with multifocal IOLs; these worse values might be attributable to limited predictability of the refractive correction caused by several factors (eg, inaccurate A-constant, corneal incision, surgical procedure) or by degradation of visual acuity from the induction of significant amounts of higher-order aberrations.[24,26] With a trifocal IOL based on the combination of 2 bifocal patterns, the mean monocular 2-month and 6-month postoperative logMAR UDVA values of 0.19 ± 0.09 and 0.18 ± 0.13 were reported by Sheppard et al.[22] and Alió et al.,[21] respectively. In contrast, Jonker et al.[29] found binocular UDVA values of 0.01 ± 0.11 logMAR after bilateral implantation of the same trifocal IOL model.

In our series, binocular intermediate distance was excellent, with a mean decimal UIVA of 0.82, 0.79, and 0.88 (corresponding to 0.12, 0.13, and 0.09 logMAR) in the entire cohort, the non-monovision group, and the monovision group, respectively. The postoperative UIVA in our series was significantly better in eyes with intended micro-monovision (monovision group) than in eyes with a bilateral emmetropic target (non-monovision group). Therefore, the micro-monovision approach with the Tecnis Symfony extended range of vision IOL improved the intermediate visual function. Our UIVA mean values are similar to or better than those obtained for different types of multifocal IOLs, including diffractive bifocal and trifocal IOLs.[13–23,25–30] Mean UIVA values of 0.08 ± 0.10 logMAR (measured at 66 cm) and 0.03 ± 0.08 logMAR (measured at 80 cm) were reported by Mojzis et al.[18,19] in 2 case series that evaluated the visual performance of a trifocal IOL combining a bifocal and trifocal diffractive pattern. Kohnen et al.[28] found binocular UIVA values of 0.00 ± 0.12 with the same IOL model. With a trifocal IOL combining 2 bifocal diffractive patterns, mean UIVA values of 0.08 ± 0.12 logMAR (measured at 65 cm) and 0.05 ± 0.19 logMAR (measured at 70 cm) were reported by Cochener et al,[16] and Vryghem and Heireman,[23] respectively. In contrast, mean UIVA values of 0.20 ± 0.11 logMAR (measured at 80 cm) and 0.32 ± 0.15 logMAR (measured at 70 cm) were obtained in 2 other studies that evaluated the same

type of trifocal IOL.[21,29] Our intermediate visual results with the extended range of vision IOL were better than those reported for bifocal diffractive IOLs.[13–15,20,26] The reported results were in accordance with those obtained with a trifocal IOL in a study comparing this IOL with a bifocal IOL based on the same diffractive platform (bifocal 0.24 ± 0.16 versus trifocal 0.03 ± 0.08; 80 cm; $P < .01$).[19] Likewise, our results were better than those obtained with apodized diffractive IOLs[27,28] or rotationally asymmetric refractive multifocal IOLs.[24,25] Alfonso et al.[27] reported a mean corrected intermediate visual acuity of 0.16 ± 0.16 logMAR (measured binocularly at 60 cm) in eyes with an apodized diffractive IOL.

The mean UNVA values of 0.67 (corresponding to 0.21 logMAR) and 0.74 (corresponding to 0.17 logMAR) were found in the monovision group and non-monovision group, respectively. Therefore, the micro-monovision approach provided an average benefit of almost 1 line logMAR binocular UNVA compared with eyes targeted for emmetropia. This difference in UNVA between groups was statistically significant. Mini-monovision approaches have been suggested as an alternative to multifocal IOLs.[31] Our UNVA outcomes are similar to those reported for some models of multifocal IOLs, including refractive IOLs,[24,25] and diffractive IOLs.[17–19,21–23] Law et al.[17] found a mean binocular UNVA value of 0.16 ± 0.07 logRAD (measured at 40 cm) in eyes with a trifocal diffractive IOL combining bifocal and trifocal diffractive patterns; Kohnen et al.[28] reported bilateral UNVA values of 0.04 ± 0.10 with this IOL model. With the same type of trifocal IOL, the mean monocular UNVA was 0.20 ± 0.12 logMAR (measured at 33 cm) in a study by Mojzis et al.[18] Alió et al.[21] reported a mean monocular UNVA of 0.26 ± 0.15 (measured at 40 cm), and Jonker et al.[29] reported a mean binocular UNVA of 0.15 ± 0.13 logMAR with another type of trifocal IOL combining 2 bifocal diffractive patterns. In contrast, other authors have reported slightly better near-vision outcomes with trifocal diffractive IOLs than those obtained in the current series with the Tecnis Symfony extended range of vision IOL. Mean logMAR UNVA values of 0.11 ± 0.12 (measured at 35 cm) and 0.01 ± 0.06 (measured at 35 cm) were reported by Vryghem and Heireman[23] and Cochener et al.[16] A similar trend was observed when our results were compared with those obtained with apodized diffractive IOLs[27,28] and bifocal diffractive IOLs,[13,15,20,26] with some studies reporting UNVA data similar to ours and others reporting slightly better visual outcomes. In comparison with rotationally asymmetric refractive multifocal IOLs,[24,25] the extended range of vision IOL provided better near-vision outcomes.

In our study, the excellent visual outcomes at all distances were consistent with the high levels of spectacle independence. In the entire cohort, more than 91% of the patients reported no need or only an occasional need for spectacles for performing distance and intermediate visual activities. For near vision, micro-monovision provided an additional benefit compared with the non-monovision group, with only 8.9% requiring spectacles frequently in the monovision group versus 16.4% in the non-monovision group. These levels of spectacle independence are comparable to those reported for different models of multifocal IOLs.[17,22] Law et al.[17] used a self-developed questionnaire to evaluate the level of difficulty in performing some vision-related tasks after cataract surgery with implantation of a trifocal IOL based on the combination of a bifocal and trifocal diffractive pattern. They found a limited percentage of patients had some difficulties performing near and intermediate visual tasks, such as reading the newspaper or working with the computer.[17] In a study of the same IOL model, Kohnen et al.[28] found 100% of the patients were independent of spectacles for distance vision and intermediate vision and 12% required occasional near-vision correction. With another type of trifocal IOL combining 2 bifocal diffractive patterns, Jonker et al.[29] found that 80% of patients were spectacle independent.

In this study, the incidence of disturbing subjective photic phenomena with the Tecnis Symfony IOL were minimal compared with the dissatisfaction rates and patient complaints caused by these phenomena observed with other types of presbyopia-correcting IOLs.[32] Lubinski et al.[15] found that a low level of halo perception was reported by 75% of patients in a study evaluating a diffractive bifocal IOL. Law et al.[17] evaluated the incidence of photic phenomena in a group of eyes implanted with a trifocal IOL combining a bifocal and trifocal diffractive pattern and found that 80% of patients reported difficulties associated with halo perception 1 month postoperatively. Postoperatively, this percentage decreased to 40% at 6 months. These authors also confirmed a reduction in the difficulties associated with glare perception over time, with the percentage decreasing from 73.3% at 1 month to 13.3% 6 months postoperatively. In another study with the same IOL model,[28] halos were the most common optical phenomenon (reported by 60% of patients) followed by glare (28% of patients) and starburst (8% of patients). Kamiya et al.[33] found that significant disturbances from photic phenomena was 1 of the main causes for multifocal IOL explantation in a retrospective study evaluating 50 eyes of 37 patients who had

multifocal IOL explantation. The method of assessing photic phenomena in IOL studies is not standardized. Different types of questions might influence the percentage of reported symptoms. In this study, an indirect question (Do you experience any problems with your vision?) was used to assess the occurrence of photic phenomena. The intention of using undirected questions was to avoid suggestive triggering of patient answers.

As explained, the Tecnis Symfony IOL provides an elongated focal area and not multiple foci, as with multifocal IOLs. Therefore, no distinct out-of-focus images generating halos are present. This might explain the low incidence of photic phenomena in our study. Further research is necessary to assess the effect of the extended range of vision IOL design on the size and intensity of halos and other photic phenomena.

The level of satisfaction reported by the patients was very high. More than 91% of patients would recommend the same procedure to their friends and family, and up to 94% would choose the same IOL again. Although overall patient satisfaction was similarly high in both patient groups, the improvement in UNVA and near spectacle independence was associated with a higher level of satisfaction by patients in the monovision group. Finally, scores for surgeon satisfaction with IOL implantation, the achievement of target refraction, and the visual performance of the patients were high. Specifically, the levels of surgeon satisfaction found in our study are consistent with those reported for some multifocal IOLs.[34]

In conclusion, the new Tecnis Symfony extended range of vision IOL provided successful visual restoration after cataract surgery with excellent visual outcomes across all distances. The visual results were associated with a minimal level of disturbing photic phenomena and high levels of spectacle independence as well as postoperative patient satisfaction. This IOL also provides better intermediate vision results than different types of multifocal IOLs that are currently available. In addition, targeting for micro-monovision (≈0.50 to 0.75 D of residual myopia in the nondominant eye) seemed to improve UDVA and spectacle independence as well as patient satisfaction with near vision. The Tecnis Symfony extended range of vision IOL can be considered a promising option for providing complete visual rehabilitation in patients having cataract surgery, with an additional benefit for near vision if the micro-monovision approach is applied.

WHAT WAS KNOWN

- Ocular chromatic aberration causes blur and a reduction in contrast vision.
- The correction of this type of aberration improves the optical image quality.
- The combination of chromatic and spherical aberration correction in an IOL provides an improved simulated retinal image quality over spherical and aspheric IOLs, without sacrificing depth of field or tolerance to decentration.

WHAT THIS PAPER ADDS

- The correction of primary corneal spherical aberration and an achromatic diffractive echelette design provided successful visual restoration with functional visual outcomes across all distances, generating extended range of vision.
- The visual restoration provided by this type of IOL was associated with a minimal level of disturbing photic phenomena and high levels of spectacle independence as well as postoperative patient satisfaction.
- Targeting for micro-monovision in the nondominant eye with this new IOL modality might further improve UNVA.

A full list of the Concerto Study Group is available as Appendix A and is available at http://jcrsjournal.org.

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