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## Choosing and using the AcrySof IQ ReSTOR IOL family

— Customized options for  
individual patients

*This is an Alcon sponsored supplement.*



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## Introduction

The AcrySof<sup>†</sup> IQ ReSTOR<sup>†</sup> +2.5 D and AcrySof IQ RESTOR +2.5 multifocal toric intraocular lenses (IOLs) are the newest additions to what manufacturer Alcon has termed its 'family' of ReSTOR IOLs. The lens (like its siblings, built on the proven hydrophobic AcrySof platform) is designed for patients with distant-dominant lifestyles who desire the opportunity for decreased spectacle dependence. Joining the existing offering of AcrySof IQ monofocal aspheric and ReSTOR +3.0 D and multifocal toric lenses, the ReSTOR +2.5 offers clinicians an additional option for customizing the IOL strategy to specific needs based on their patients' lifestyles, preferences and physiologies.

After its launch across Europe during the last meeting of the European Society of Cataract and Refractive Surgeons (ESCRS) in October 2012, Alcon hosted an event in April 2013 during which users of the ReSTOR +2.5 gathered together to evaluate the differences in the designs of the various ReSTOR family lenses, discuss patient selection and specific patient case studies, and consider how the growing ReSTOR family will affect the total number of multifocal candidates.

In this supplement, *Ophthalmology Times Europe* and Alcon will highlight the key discussions and conclusions that were drawn from this meeting.

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# Choose

Although it is built on the same established hydrophobic AcrySof platform as the other ReSTOR lenses, there are a number of differences in the design of the ReSTOR +2.5 (see Sidebar 1: ReSTOR family lens profiles). These differences give rise to additional options for meeting evolving patient needs in terms of refractive performance and whether the patients have predominantly distance- or intermediate-dominant lifestyles. With so much choice available, however, how do you decide which lens is most appropriate for each patient?

## Patient selection

To be able to select which lens is most suitable both for the eye and for the patient, it is first essential to assess the fellow eye. This enables a better understanding of the patient's overall needs. After these initial assessments are complete, determination of the patient's existing and long-term visual requirements can commence, which will in turn assist the decision on what type of lens will be best suited to the patient.

There are a number of different methods available to help you to stratify patients according to which lens would provide the best refractive outcome for their needs. The most common of these methods are questionnaires, using a third party to counsel the patient, and face-to-face discussions between the patient and the clinician.

Alcon provides a lifestyle questionnaire focusing on patient selection for multifocal lenses, which groups patient activities (such as 'looking at your watch', 'reading medicine labels', 'applying make-up' and 'night-time driving') into 'near', 'intermediate' or 'distant'. This allows clinicians to determine their patients' vision preferences and goals as well as assess which, if any, type of vision the patient uses predominantly in their day-to-day life.

The majority of the clinicians in attendance at the ReSTOR +2.5 users' meeting used this Alcon questionnaire in combination with patient counselling by a third party and patient-clinician face-to-face interactions, and blended the information to evaluate the patient's needs and determine their final recommendation. It is during these preoperative discussions — when the patient attends their initial cataract consultation, or after their preoperative evaluation — that most of the meeting participants commented they would first mention the possibility of multifocal lenses to eligible candidates.

To aid with these discussions, Alcon has recently launched a patient education video that discusses cataract surgery and the various lens options (the video can be obtained by contacting your Alcon sales representative). Alcon's downloadable visual simulator app, which illustrates to the patient and their caretakers the effects of different lens options, as well as the impact of correcting any astigmatism, has also recently been approved and is now available through the Apple Store to clinicians in selected markets.

The meeting participants agreed that these face-to-face discussions between a patient and clinician are invaluable for establishing what aspects of a patient's vision are most important to them, particularly in light of evolving patient needs.

"It's amazing how lifestyles are changing all across the globe, and in all areas of their lives it is convenience that people are now wanting. In terms of their vision, it is the flexibility to perform different activities that patients are demanding and expecting," said Dr Abhay Vasavada of Raghudeep Eye Clinic. "Providing 6/6 or 20/20

vision used to be a target for me a few years ago, but this is not good enough for patients anymore. I think we need to understand how important it is to people these days to have a good range of vision."

Dr Vasavada went on to explain that for the majority of patients he treats, multifocality is the logical choice. "It is of course important to customize the lens to the patient, but actually the good news is that all the ReSTOR lenses are built on a really great, proven platform and are very versatile," he noted. "But I would say that the +3.0 is for patients who want minimal dependence on spectacles for vision at all distances; in general, we know that multifocal lenses by design show some compromise in terms of contrast sensitivity, but for the patient that isn't really an issue. On the other hand, the +2.5 lens was designed to maintain the quality of distance vision offered by the IQ lens, with the additional advantage of even better intermediate vision, so for some patients that's the better option."

Although the panel discussed that there are a number of presbyopia correcting technologies entering the market today, including bifocal designs, trifocal designs and so on, they all have trade offs including hydrophillic material, lack of toric options available and visual disturbances. The panel felt that the AcrySof IQ ReSTOR Family seems to be the best offering to address all of those areas.

## The ideal +3.0 patient

The +3.0 lens is configured for distance and near vision: designed for the patient who partakes in a wide variety of activities over a broad range of distances. The versatile +3.0 lens offers good quality vision for most lifestyle needs that is flexible for most distances.

"The +3.0 is my first choice for patients who seek true performance at all distances from multifocal capabilities: those who desire a broad range of vision, with decreased spectacle-dependence for near, intermediate and distance activities," commented Dr Vasavada. "In general, I would recommend this lens for patients who are easy-going and cosmetically driven, because there are trade-offs with this lens, and those that are relevant, such as the possibility of halos, should be discussed with the patient."

In Dr Francesco Carones' (Carones Ophthalmology Center) opinion, the best candidate for the +3.0 lens is a patient that is older in age, because this kind of patient tends to be less likely to drive significantly at night, and is more likely to take part in activities that require greater near vision, like reading or playing cards. "These are patients who are not detail-oriented, because we know that the only downside with the +3.0 implanted bilaterally is that there's slightly more chance that the patient will experience halos and night vision problems," he added.

"Another important thing to bear in mind is the height of the patient," emphasized Dr Mehmet Söyler, of Batıgöz Eye Center. "Shorter patients have shorter arms, and so their reading distance will be, for instance, around 40 cm instead of 50 cm. At this distance, with the +2.5 lens, the patient would likely need an additional reading aid, and so I would tend to use +3.0 lenses in general in my shorter patients."

## The ideal +2.5 patient

"The ideal candidate for a bilateral +2.5 is a young man interested in spectacle independence for distance but also for intermediate tasks

# Sidebar 1: ReSTOR family lens profiles

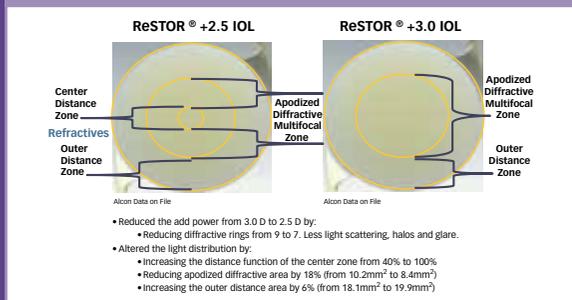
The new +2.5 multifocal lens has been designed for patients with distance-dominant lifestyles, whose primary visual needs are for distance and intermediate, who are not willing to compromise the quality of the distance visual acuity and who desire more range of vision than the monofocal offers, in combination with less visual disturbance than traditional multifocal lenses.

These design features influence the behaviour of the lenses. The light distribution through the distance-focused area is close to 90% with the +2.5 whereas it is less than 40% with the +3.0 lens; this leads to greater light-scattering, halos and glare with the +3.0 compared with the +2.5.

Aside from the light distribution, the add power, the reduced number of steps and the reduction in the apodized diffractive area, a key feature of the +2.5 lens is the asphericity, which gives better mesopic contrast sensitivity and better quality of vision for distance. This is because the +2.5 is designed for patients with distant-dominant lifestyles; its large, flat central refractive (rather than diffractive) zone and its asphericity (which is identical to that of the IQ) means the +2.5 lens behaves more like a monofocal than a multifocal.

"The modulation transfer function (see Figure 2) gives an idea of the quality of the image when it passes through the IOL at a special frequency of 58 line pairs per mm, which is equivalent to 20/40 vision through a 3 mm pupil," noted Dr Suárez. "The quality of vision of the +2.5 is much better for distance and up to about 50 cm than with the +3.0. For distance, with both 3 mm and 5 mm pupil diameters, the quality of the vision with the +2.5 is better at any frequency;

**Figure 1:** Design of the +2.5 and +3.0 lenses.<sup>1</sup>



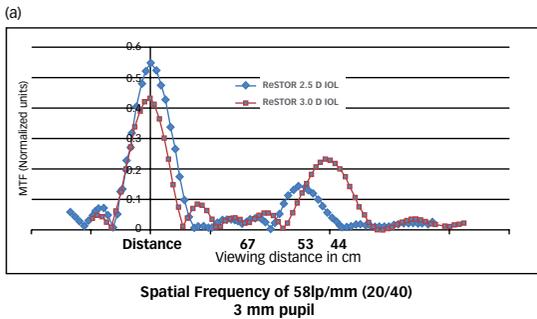
The design features of the +3.0 and the +2.5 lenses (see Figure 1) are summarized in Table 1, below.

**Table 1:** Design features of the ReSTOR +3.0 and +2.5 multifocal intraocular lenses.<sup>1</sup>

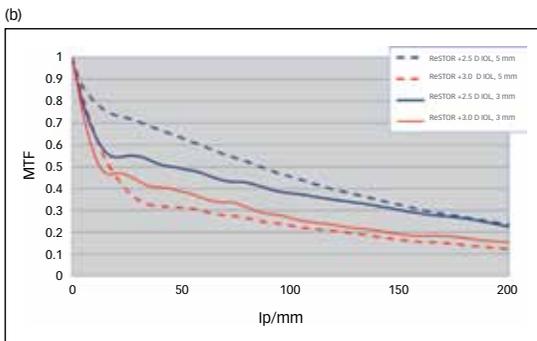
Model number	+2.5						+3.0					
	SV25T0	SV25T2	SV25T3	SV25T4	SV25T5	SV25T6	SN6AD1	SND1T2	SND1T3	SND1T4	SND1T5	SND1T6
Add-power	2.5 D						3.0 D					
Add-power (spectacle plane)	2.0 D						2.5 D					
Number of diffractive steps	7						9					
Central zone diameter	0.938 mm						0.86 mm					
Central zone optic	Refractive						Diffractive					
Central zone focus	Distance						Intermediate					
Distance function of the centre zone	100%						40%					
Apodized diffractive area	8.4 mm <sup>2</sup>						10.2 mm <sup>2</sup>					
Outer distance area	19.9 mm <sup>2</sup>						18.1 mm <sup>2</sup>					
Spherical aberration (SA) factor	-0.2 microns						-0.1 microns					
Optic diameter	6.0 mm						6.0 mm					
Inner diffractive structure	3.4 mm						3.6 mm					
Outer refractive structure	2.6 mm						2.4 mm					
A-constant	119.1 (optical biometry)						118.9 (immersion)					
Light distribution at 3 mm IOL plane												
Distance	69.4%						58.9%					
Near	18.0%						25.5%					
Total	87.4%						84.4%					

For a complete listing of cylinder powers by model available in your market, please contact your local Alcon Representative or refer to the Directions for Use by model.

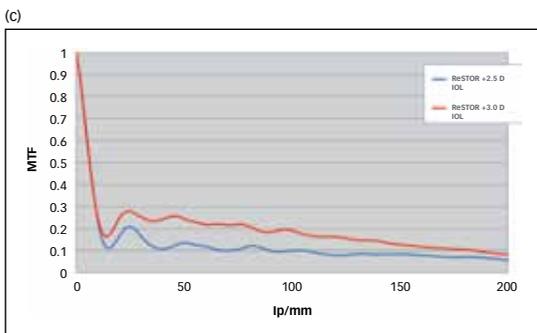
**Figure 2:** (a) Through focus modulation transfer function (MTF) comparison: +2.5 versus +3.0.<sup>2</sup> (b) Modulation transfer function (MTF) comparison for +2.5 and +3.0 lenses at distance, with 3 mm and 5 mm pupils.<sup>3</sup> (c) Modulation transfer function (MTF) comparison for +2.5 and +3.0 lenses at near, with a 3 mm pupil.<sup>4</sup>



Alcon Data on File Notebook: 16826 p 98



Alcon Data on File TDOC-0014917.



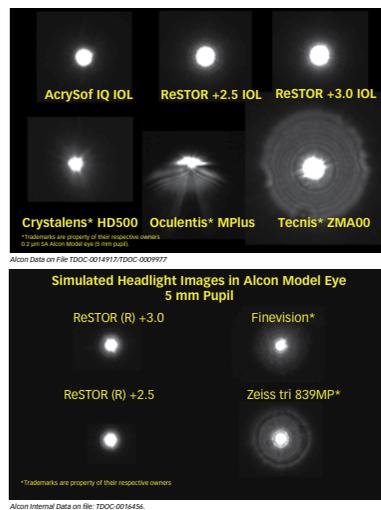
Alcon Data on File TDOC-10714.

for near (with a 3 mm pupil diameter), it's the opposite: the +3.0 lens evokes a better quality of vision than the +2.5 from 40 cm to a closer range of vision."

The quality of vision available with the lenses can be shown using a bench headlight image simulation (see Figure 3) and through the virtual eye model Badal System (see Figure 4). The contrast sensitivity (Figure 5) and binocular defocus curves (Figure 6) between the two lenses also differ.

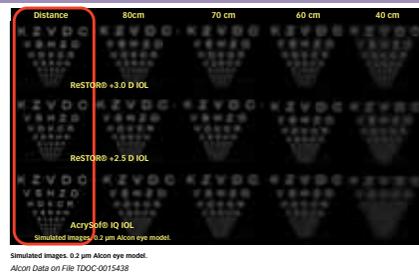
"As can be seen from the comparison of the different design features and the different outcomes, the +2.5 and +3.0 are different lenses built on the same proven hydrophobic AcrySof platform, rather than a single lens with different amounts of add-power," Dr Carones concluded.

**Figure 3:** Bench headlight image simulations.<sup>3,5,6</sup>



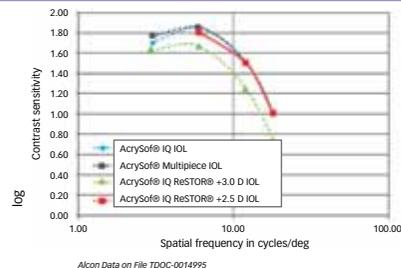
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**Figure 4:** Contrast and sharpness of distance vision, demonstrated through the Badal virtual eye system, 3 mm pupil at IOL plane (3.6 mm apparent pupil).<sup>7</sup>



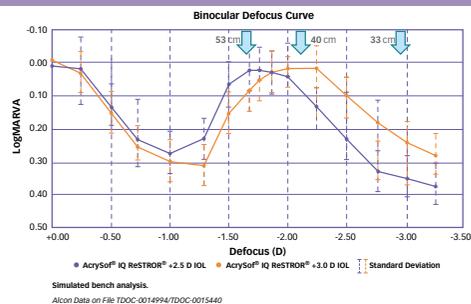
Alcon Data on File: TDOC-0015438

**Figure 5:** Simulated contrast sensitivities of different IOLs.<sup>8</sup>



Alcon Data on File: TDOC-0014995

**Figure 6:** Binocular defocus curves of the +2.5 versus the +3.0 lenses.<sup>9,10</sup>



Alcon Data on File: TDOC-0014994/TDOC-0015440

like computer usage, video editing; anything that has to be done at 50–60 cm,” explained Dr Carones.

“The strength of the +2.5 lens is the crispness of distance vision it offers, with improved intermediate vision compared with the +3.0 lens,” agreed Dr Vasavada. “I also don’t have any patients who have reported glare or halos after implantation with the +2.5, so it’s ideal for people who drive a lot at night, as well as for active professionals, golfers and so on, who don’t mind possibly using reading aids or increased light for near vision.”

Dr Vasavada explained how he would recommend this lens to patients who are already accustomed to using spectacles because these patients would not consider selective use of additional visual aids after implantation to be a negative outcome.

Alternatively, patients could use an extra light source in place of reading aids — Dr Stephen Lane of Associated Eye Care suggested that clinicians could recommend patients install a flashlight app on their smartphones to decrease their dependence on spectacles, because (as long as they had their mobile phone) the patient would always have an extra light source available to them and would, therefore, have no need for additional visual aids.

Patients who have residual refractive error of around –1.0 D for distance after a previous monofocal lens implantation are good candidates for the +2.5 lens in the fellow eye, noted Dr Lajja Shastri, a colleague of Dr Vasavada’s. This is because these patients are already accustomed to using visual aids and are unlikely to be satisfied with the distance vision add needed.

“As I look at it, it makes a lot more sense to implant a +2.5 lens than to use an IQ and ‘over-minus’ the patient, because I think in that way you’d lose too much distance vision,” Dr Lane advised. “The real beauty of the +2.5 is the crispness and the clarity of the distance vision that you’re going to gain, and to lose that for a little bit of improvement in the near hasn’t been something, in my experience, that patients are very happy about.”

“With the +2.5, we can dare to offer optimal vision to almost anybody who is deemed a multifocal candidate medically — even precision-oriented or visually demanding personality types,” Dr Vasavada agreed. “This means we can now move to an era not just of meeting patient expectations about refractive outcomes but actually upgrading them, in a way that wasn’t possible with only the previous models of IOL that were available.”

### **The opportunities of ‘blended vision’**

“For patients requiring the best range of vision, especially with regard to near, we can implant the +3.0 lens bilaterally; for patients in whom we want to target the quality of vision and enhance the intermediate, we’d implant the +2.5 bilaterally,” commented Dr Carones. “Alternatively, we can blend the two technologies to try and optimize the refractive outcomes, by implanting the +2.5 in the dominant eye and the +3.0 in the non-dominant eye, in a ‘mix and match’ fashion.”

Dr Lane suggested that, rather than using the term ‘mix and match’ (which he thought had connotations of combining refractive and diffractive optics), it would be preferable to use the name ‘blended vision’.

Most of the panellists were already blending the two technologies in a certain subset of patients, and reported that the range of comfort was the best in these contralaterally implanted patients, who were also less aware of the visual disturbances (such as halos) that could accompany the +3.0 lens. Some

panellists also blended the +2.5 lens with other lenses, such as the IQ.

### **How the growing ReSTOR family is affecting the number of multifocal candidates**

Having not only an extensive range of lenses but also a wide variety of options for implantation combinations has broadened clinicians’ options and increased the number of multifocal candidates, as patients who desire a range of vision and less dependence on spectacles that are unable to tolerate visual disturbances or compromise quality of distance vision would previously have been offered a monofocal lens are now eligible for the +2.5.

“Historically, we did not have a multifocal option for patients who desired a range of vision and less dependence on spectacles, but who required monofocal quality distance vision. Patients we would once have implanted with the IQ are now happy to be using the +2.5 instead, because they don’t mind having to use a little additional reading aid, and their intermediate vision is much better,” Dr Vasavada commented. “This additional option is allowing us to expand our practice.”

When the audience was polled, the majority responded that the availability of the +2.5 lens (and the additional options it entails) had increased the number of multifocal candidates in their practices by more than 10%; the panellists reported unanimously that the number of multifocal candidates in their practices had increased by more than 20% since the introduction of the +2.5 lens.

“I think a reason for this increase is not just because of the performance of these lenses but also because of the increased confidence we have now in being able to provide more individually tailored results for our patients,” commented Dr Lane.

This desire to provide tailored results for patients was illustrated by the proportion of +2.5 versus +3.0 lenses users are currently implanting (or planning to implant), in which no clear preference for either lens was shown.

“We as a group are really considering the ReSTOR platform as a family and not as standalone products; there is nobody saying ‘I will only implant the +3.0’, just as there is also nobody saying, ‘I’m done with the +3.0, I want to have the +2.5 only,’” commented Dr Carones. “I think it’s reasonable that the two IOLs will be implanted equally frequently, either for blended vision or for individual cases, because the two technologies perform differently and offer different advantages to the patient, and so they will both be needed in different scenarios. However, since we started implanting the +2.5 routinely in my clinical practice, the percentage of multifocal and multifocal toric lenses we’ve implanted has increased, and is continuing to grow. This is a reversal of the trend of the previous year, when we had a decrease in the percentage of multifocal lenses we were implanting.

“Personally, I don’t have a preferred lens — I have my preferred approach, which is trying to fit a patient’s needs and expectations, and this brings me to implant almost the same percentage of +2.5 and +3.0. But the reasons my percentage of ReSTOR implants expanded when the +2.5 became available are that I have much more confidence in terms of maintaining quality of vision because of the sharpness and less noticeable halos, and because now I have many more options for customizing the results according to the patients’ needs,” Dr Carones concluded.

# Use

“An ideal IOL should have good intraocular behaviour and a good refractive performance,” noted Dr Vasavada. “For surgeons on the table, the most desirable qualities of an IOL are: compatible with small incisions; ease of insertion and handling; slow, controlled unfolding; and, reliable stability. A lot of lenses would fit into that, but not many would meet clinicians’ criteria: namely, excellent biocompatibility; favourable ACO rates; favourable PCO rate; and, a time-tested performance. So the lens platform that we offer really does not change the management we’re offering to patients. But it is the refractive performance that the patients’ expectations rest on, and so the way we are moving forward in this area is what we’re interested in.”

In situations in which you have selected the +2.5 lens for your patient, there are a number of ways to achieve optimal refractive outcomes and to increase the ease of implantation. These include preoperative consideration of potential complications (including elimination of contra-indicated patients) as well as upgrading surgical techniques and instrumentation for the highest degree of precision.

## Preoperative considerations

An important aspect of the perioperative assessment when selecting an appropriate IOL is the macular OCT, which is essential in patients considering multifocals. This is because light-scattering, which is associated with multifocal lenses, is worse in eyes with drusen than in eyes without, and therefore multifocals should be avoided in such eyes. Another important consideration for multifocal lens implantation is pre-existing ocular surface conditions, such as meibomian gland dysfunction (MGD) or anterior base membrane dystrophy.

***“It’s reasonable that the +2.5 and the +3.0 will be implanted equally frequently, either for blended vision or for individual cases, because the two technologies perform differently and offer different advantages to the patient.” — Francesco Carones***

“Probably the greatest frustration of my patients who are unhappy with their postoperative clinical result are those who suffer ocular surface problems, which is a real problem in patients with multifocality, so I would avoid implanting multifocal lenses in eyes in which this is already known to be an issue,” cautioned Dr Lane.

Dr Carones also noted that he would be reluctant to implant a multifocal lens in a highly hyperopic eye. “The reason I don’t like to implant highly hyperopic patients on a routine basis is because we know that they have a wider kappa angle and that lens centration may be an issue,” he said. “If you find any more than 0.25 mm of kappa angle in your pre-operative topography, you would have to at least discuss with

the patient about the possibility of there being halos and a reduction of contrast sensitivity after implantation.”

However, according to Dr Vasavada, the principal consideration when assessing a patient’s suitability for the +2.5 lens is total astigmatism, which consists of both pre-existing corneal astigmatism and surgically induced astigmatism. “The amount, magnitude and type of total corneal astigmatism are the clinchers for choice of IOL,” he claimed.

***Although it is built on the same established hydrophobic AcrySof platform as the other ReSTOR lenses, there are a number of differences in the design of the ReSTOR +2.5.***

His recommendations for appropriate lenses based on total astigmatism (plus residual spherical equivalent) are as follows:

- Eyes with total astigmatism of up to 0.5 D should be implanted with an IQ +3 or +2.5;
- In ‘borderline’ eyes (those with 0.75–1.0 D of total astigmatism), Dr Vasavada recommends a ReSTOR toric lens over multifocal lenses with limbal relaxing incisions (LRIs)
- In eyes with greater than 1.0 D of total astigmatism, he would recommend a ReSTOR toric lens; however, in patients who would prefer not to use a multifocal lens or who have some other contraindication, he recommends the IQ Toric with post-surgical correction of any residual astigmatism.

“Eyes implanted with a combination of multifocal lenses that have even as little as 0.75 D of astigmatism might present a significant enough visual challenge to require postoperative correction,” added Dr Vasavada. “I measured reading speed in high resolution and low-contrast sensitivity settings and both were better if even 0.5 D of astigmatism was corrected versus not corrected, so it makes sense to me to correct this astigmatism wherever possible.”

“When determining refractive targets for our IOL candidates, we tried to overcorrect slightly for ‘against the rule’ astigmatism and under-correct for ‘with the rule’ astigmatism, especially with multifocal lenses,” noted Dr Enrique Suárez of Centro Medico Docente La Trinidad. “The toric multifocals are an excellent alternative to get the best refractive result: especially in young patients with ‘against the rule’ astigmatism, maybe you have to overcorrect a little more than you would in older patients.”

Once patients have been stratified according to their desired visual outcomes, an appropriate lens has been selected and the physical assessments are complete, the final essential aspect of the preoperative preparation should be to manage patients’ expectations of the anticipated postoperative outcomes.

“I tell the patients undergoing a ReSTOR +2.5 bilateral

implant that they will certainly experience reduced spectacle dependence according to the needs that they explained, but they still may need to use glasses for some specific tasks — reading at close distance and maybe when the light is not really bright,” said Dr Carones. “But I tell them that their quality of vision will at least be uncompromised in terms of quality.

“When blending the two technologies, I tell the patients something different. What I focus on is the fact that they will experience a difference between the two IOLs, with the dominant eye more focused at distance and the non-dominant eye more focused at near but potentially more prone to visual disturbances. It’s worth telling the patients that this difference is intentional and is not an unintended side effect of the lenses or the surgery itself.”

### **Hitting the refractive target: achieving and maintaining lens centration**

When the time to implant the patient has arrived, the preoperative biometric calculation criteria are essential to achieving good refractive outcomes and reducing the amount of visual disturbance a patient may experience. This will influence how satisfied the patient will be with the procedure. As the +2.5 lens is built on the proven hydrophobic ReSTOR platform, it has a time-tested performance even though it is a newly available lens.

Because of this time-tested platform, most of the clinicians in attendance were confident that they had refined the surgical technique to achieve optimal outcomes, in terms of, for example, performing rhexis and putting the lens into position; therefore, the innovations the panel discussed were related mainly to the synergistic use of biometric calculation machines to measure the cornea preoperatively.

### ***Preoperative biometric calculation criteria are essential to achieving good refractive outcomes and reducing the amount of visual disturbance a patient may experience.***

Dr Vasavada noted that he considered preoperative (and ideally intraoperative) aberrometry to be essential to performing a good implantation, irrespective of whether multifocal, toric or IQ lenses are to be implanted. At his practice, aberrometry is performed in the mesopic undilated pupil, and multifocals are avoided in eyes with high aberrations and wide mesopic pupils (although his colleague Dr Samaresh Srivastava noted that, in India, it is rare to discover a mesopic pupil of >5 mm and so patients in their clinic are rarely excluded on this basis). The aberrometer also reports angle alpha and angle kappa values, and Dr Vasavada’s team would also avoid multifocals in eyes with >0.4 angle alpha, for fear of decentration. An audience member noted that, in patients with a posterior cornea elevation of  $\geq 15$  micron (the threshold for forme fruste keratoconus), topography should be ordered in addition to aberrometry as part of the preoperative assessment.

To get as close as possible to achieving emmetropia, it is crucial to customize the a-constant, both for different lenses and for different eyes (whether hypermetropic, myopic and so on).

“In my experience, the 119.1 does not lead to my estimated outcome and my first cases were slightly hyperopic,” commented Dr Carones. “My actual A-constant for optical coherence biometry with the +2.5 lens is 119.37. I would suggest every clinician reviews his personal a-constant adjustment, because the appropriate figure to use will vary between individuals.”

### ***Face-to-face discussions between a patient and clinician are invaluable for establishing what aspects of a patient’s vision are most important to him.***

The panel and audience discussed whether it was possible to rely on one specific machine for the calculations, particularly in cases where machines differed in terms of the recommendations. Dr Lane commented that he relied more upon aberrometry and found that it generally produced a reliable result, while Dr Carones offered some alternative rules of thumb.

“For the assessment of the amount of astigmatism, I like the Lenstar the most. For the axis, I like topography the most. For axial length measurements, I like the IOLMaster the most. If Scheimpflug shows that the posterior corneal curvature is not going to bring that 0.25 D reduction in the total amount of astigmatism we are expecting in normal eyes, that is another factor that you have to take into consideration,” he noted.

Panellist Dr Richard Potvin of Science in Vision, however, commented that he had analysed different topography and keratometry devices for a number of clinicians to determine which produced the most reliable results. In general the surgeons were amalgamating the outputs and including their own best judgment, and this method was found to be more reliable than any individual device.

In terms of the surgical technique itself, it was widely agreed that minor decentration of the lens does not have a significant impact on the patient’s visual outcomes, but nevertheless the panel still agreed it was wise to avoid decentration as much as possible. To achieve the greatest degree of centration, the participants agreed that the lens should be centred on the purkinje image.

“Centring on the purkinje image is certainly the most common way and that’s the way you can probably stay out of trouble,” stated Dr Lane. “The material used in the +2.5 has a long enough track record that we know the lens will stay pretty much where you leave it, although it might move depending on the size of the bag.”

Dr Vasavada added that, if he was not satisfied with the purkinje image on the table, he would rotate the lens and use vertical, rather than horizontal, placement. With hydrophobic lenses it is also important to ensure that both haptics are

<sup>†</sup>Trademarks are the property of Alcon

# Sidebar 2: Case studies: quiz

During the meeting, Dr Söyler and Dr Carones presented case studies and asked the audience to vote on and discuss what IOL strategy they would have recommended, before revealing what lenses they implanted and presenting the outcomes. The case studies are presented here, and the lens options are as follows:

- A. IQ
- B. Bilateral +3.0
- C. Bilateral +2.5
- D. Contralateral +2.5 and +3.0

## Case study 1

*The patient:* A 46 year-old tall male gynaecologist with bilateral cataract and best-corrected visual acuity (BCVA) of 0.2 (OD) and 0.3 (OS), without ocular pathology.

*Visual priorities:* The patient does not wish to wear spectacles, particularly when he is performing surgery.

## Case study 2

*The patient:* A 63 year-old short male retired bank accountant with bilateral cataracts.

*Visual priorities:* The patient enjoys reading, driving at night and is a chorister. He does not want to use spectacles after the surgery.

## Case study 3

*The patient:* An 80 year-old female with bilateral cataracts who has used spectacles to correct myopia (−3.0 D in both eyes) for the past 65 years.

*Visual priorities:* The patient lives alone and has an active life. She is a member of a bridge club and loves to drive but not at nights. As a long-term spectacle user, she does not want to use glasses again 'for the rest of her life'.

## Case study 4

*The patient:* A 44 year-old male judge with unilateral cataract

and BCVA of 20/200 in the cataractous eye, with −0.75 D of myopia and paracentral post-sub-capsular opacities that do not affect vision in the fellow eye.

*Visual priorities:* The patient was referred by another ophthalmologist and demanded no postoperative complications. He does not want his fellow eye to be operated on, and would prefer not to have to use spectacles after surgery, if possible.

IOL options: Monolateral IQ; monolateral +3.0; monolateral +2.5.

## Case study 5

*The patient:* A 54 year-old male with bilateral grade II cortical cataract, with UCVA of 20/32 and BCVA of 20/25 in both eyes, and +1.25 D and +1.00 D of sphere (OD and OS, respectively). He currently requires +1.00 D of additional correction.

*Visual priorities:* The patient is a video-editing technician for a television network and will be working for a minimum of 11 more years; he needs good quality vision and spectacle independence for his work.

## Case study 6

*The patient:* A 63 year-old female with bilateral grade I cortical cataract. She has 20/32 UCVA, 20/25 BCVA and +1.50 D of sphere (OD) and 20/32 UCVA, 20/20 BCVA and +1.50 D of sphere (OS), and is using +2.00 D correction for reading.

*Visual priorities:* The patient works as a marketing manager, is a golf player and has an active social life. She would prefer spectacle independence in all conditions, but particularly when working.

See Sidebar 3 for the panellists' and audience's IOL strategy recommendations, actual case histories and refractive outcomes.

within the bag and fully opened; using capsular tension rings also helps to maintain centration and avoid posterior capsule folds. Dr Suárez reported that, in his practice, it had been noted that the refractive results produced by the LenSx<sup>†</sup> femtosecond laser are better than with a manual technique.

## Preliminary experience

Dr Söyler reported that, in his preliminary experience, around 60–70% of his patients implanted with the +2.5 lens required an additional +1.00 D of correction for reading; Dr Suárez noted that, after bilateral +2.5 implantation, his patients had commented that they were happy with the quality of distance vision, with no complaints about visual disturbances.

Dr Söyler also reported that his patients who were implanted contralaterally had the greatest distance comfort for reading from 40 cm to 75–80 cm under well lit conditions. The panellists agreed that, while patients notice a

***“The +3.0 is my first choice for patients who seek true performance at all distances from multifocal capabilities: those who desire a broad range of vision, with decreased spectacle-dependence for near, intermediate and distance activities.” — Abhay Vasavada.***

difference in vision between eyes, this was rarely a cause for complaint (particularly in cases when patients were briefed preoperatively to expect a difference).

Commenting on his results, Dr Carones noted: “For the eyes implanted with the +2.5 (in either the dominant eye or in both

# Sidebar 3: Case study outcomes\*

The outcomes of the case studies presented in Sidebar 2 are listed below.

## Case study 1

*IOL strategy:* C: Bilateral +2.5.

*Discussion:* Although in the past it is likely that this patient would have been implanted with an IQ lens, the majority of the audience voted for bilateral +2.5, which was the strategy employed by Dr Söyler, whose principle consideration for this patient was to preserve the intermediate vision.

*Patient outcomes:* The patient's postoperative vision was 20/20 for distance and J1 at 55 cm for near. He no longer needs to use spectacles, although +1.00 D of correction does improve his vision. He reads easily without any need for additional light.

## Case study 2

*IOL strategy:* B: Bilateral +3.0.

*Discussion:* This case divided the voters, with Dr Carones recommending contralateral +2.5 and +3.0 implantation, Dr Suárez opting for bilateral +3.0, Dr Vasavada preferring to use the +3.0 in at least one eye, and the audience split evenly across the various multifocal options. Dr Söyler's choice — to implant the +3.0 bilaterally — was based on the patient's desire for spectacle independence coupled with his need to read musical notes in potentially low-light conditions as a chorister. Dr Söyler felt that, because of his height, the patient's arms were not long enough to make a +2.5 lens a viable option.

*Patient outcomes:* The contrast sensitivity was in the normal and upper ranges with and without glare, respectively, and the patient no longer requires spectacles.

## Case study 3

*IOL strategy:* D: Contralateral +2.5 and +3.0.

*Discussion:* The panel's preference was for either bilateral +3.0 or blended vision. Dr Söyler opted for contralateral implantation to preserve the intermediate vision and allow the patient to continue playing cards. Dr Srivastava suggested it would have been possible to implant the +2.5 in one eye and a monofocal IQ in the fellow eye to give a range of vision without the possibility of difficulties in low-light situations, though this would sacrifice any potential gains in the distance vision.

*Patient outcomes:* The patient is able to continue playing bridge, and no longer requires spectacles for reading.

## Case study 4

*IOL strategy:* Monolateral +2.5.

*Discussion:* The audience agreed that the +2.5 would be the best option for the patient, though it seemed unlikely that the patient, who was in his 40s, would remain spectacle independent indefinitely. The +2.5 was chosen by the audience and by Dr Söyler because it was felt that this lens would offer the most options and greatest flexibility for treating the fellow eye in the future.

*Patient outcomes:* The patient reported excellent near and distance vision; he experienced no glare or halos, and considered his distance vision to be better than in the fellow eye. He commented that he was also very satisfied with the procedure.

## Case study 5

*IOL strategy:* C: Bilateral +2.5.

*Discussion:* Dr Carones prioritized the patient's desires and determined that spectacle independence and good intermediate vision were the chief considerations — although a monofocal would have satisfied some of the patient's requirements and the +3.0 and the +2.5 scored equally highly for each of the anticipated outcomes, the +2.5 was selected because it offered better prospects in terms of intermediate vision coupled with likely spectacle independence. An alternative strategy would have been contralateral implantation.

*Patient outcomes:* At 3 months of follow-up, the patient was plano in both eyes with UCVA of 20/12 (OD) and 20/15 (OS), with J5 at 35 cm (OD and OS) and J3 at 65 cm (OD and OS), with no quality of vision problems. The patient is still wearing spectacles every now and then in dim light conditions and for reading at very close distances, but is happy, because his expectations were met.

## Case study 6

*IOL strategy:* D: Contralateral +2.5 and +3.0.

*Discussion:* The patient's principle desire was for spectacle independence across a range of distances, leading Dr Carones to implant in a blended fashion.

*Patient outcomes:* One month after surgery, the patient had good performances at all distances, with 20/12 UCVA for distance bilaterally, and bilateral UCVA for near of J1 without direct light and J1+ with additional direct light. Her range of distance for reading was J2 or better at 35–65 cm and 30–75 cm without and with additional light, respectively. The patient perceived the difference between her eyes, found her reading distance to be comfortable and had no light dependence or night vision problems; she was satisfied with this outcome.

\*Outcomes presented reflect actual patient results. Individual patient results may vary.

eyes), the distance vision in terms of BSCVA was extremely satisfactory.

Dr Carones gave his patients subjective questionnaires rating spectacle independence, light dependence for reading, quality of vision, visual disturbances and overall satisfaction.

Although there were differences in the results regarding the specific elements tested, all patients reported that they were satisfied with their outcomes, regardless of the implantation strategy used.

### How physicians are using the ReSTOR family

The clinicians attending the meeting, both panellists and audience members, all reported that, since the addition on the +2.5 lens, they were also continuing to use the +3.0 lens.

"I'm still implanting the +3.0 lens on a routine basis," confirmed Dr Carones. "When assessing the eye dominance is difficult (especially for previously myopic patients) or if a patient is seeking spectacle-free performance at near, I stick with a bilateral +3.0, because we know this performs well. My indications for bilateral +2.5 are patients who are really concerned about their postoperative quality of vision but are still seeking some spectacle independence, patients with significant activities at intermediate distances, younger patients and so on. For patients with monocular cataract who are not willing or are not able to undergo implantation in the fellow eye, I think it's very safe to implant a +2.5. Additionally, I find myself implanting about 40% of my cases in a blended fashion."

Dr Carones explained that he uses a variety of implantation strategies for his different patients because he considers the +2.5 to be an entirely different approach to the +3.0 lens, rather than a replacement with a different add-power. This different approach has allowed him, he noted, to convert some patients who were previously not eligible into candidates for multifocality. This represents a change from his early usage of lenses from the ReSTOR family, Dr Carones commented.

***"The ReSTOR family represents a very powerful and complete platform for customizing the surgical experience for our patients according to their individual needs and expectations." — Francesco Carones***

## Conclusions

"Although we have had a variety of lenses available to us for a long time, the lens options we have had in the past have not covered all the needs that patients have," said Dr Suárez. "On one hand, we had the AcrySof IQ aspheric lens, which gives excellent distance vision, but the patients complain they need reading glasses for near and intermediate. On the other hand we had the +3.0 multifocal lens, which gives a broader range of vision for near, intermediate and distance with high degree of spectacle-independence but some patients complain of visual disturbances. Therefore, the possibility of having a portfolio of different IOLs and solutions may enable us to better customize the IOL experience and meet patients' needs by fitting the refractive outcome exactly to the expectations of the patients have."

"Essentially, the +2.5 lens is not a 'one size fits all' kind of concept," summarized Dr Lane. "It's not that this individual lens will solve all our patients' problems, but the exciting thing about this lens is that it gives us another tool in our chest that we can use to try and make our patients as happy as possible."

***"With the +2.5, we can dare to offer optimal vision to almost anybody — even precision-oriented or visually demanding personality types. This means we can now move to an era not just of meeting patient expectations but actually upgrading them." — Abhay Vasavada***

"When I started implanting ReSTOR lenses in 2003, I had enhancement rates of around 10%, whereas now my enhancement rate is around 0.5%," he said. "This is in part because the +3.0 and +2.5 lenses are much more tolerant to residual refractive error than the +4.0 lens was, but also because in those 10 years I've learnt the importance of maintaining a spreadsheet that I can easily update with results to get a consistent outcome in terms of constants that I'm using or surgically induced astigmatism that I'm routinely making, which has also helped me to improve my accuracy."

In addition to discussing their use of the lenses and how this has helped them to improve patient outcomes, the participants at the meeting were also enthusiastic about the toric versions, with Dr Lane commenting, "There are so many patients who have astigmatism and not fully correcting the cylinder when you're doing cataract surgery, especially with a multifocal lens, leaves that patient at a significant disadvantage. The experience around the world has been that toric IOLs have gained wider and broader acceptance than multifocal lenses because of the ability to be able to get better results that patients are happy with. I think that the +2.5 helps to bridge that gap between monofocal and multifocal, which has the potential to greatly expand the marketplace for these lenses. ReSTOR toric is going to be a really valuable addition to our armamentarium as surgeons."

"To my understanding, the ReSTOR +2.5 is a really different lens from the +3.0, and is not just a different add power," added Dr Carones in conclusion. "This lens allows the number of patients that will benefit from multifocality to be expanded. The ReSTOR family, therefore, represents a very powerful and complete platform for customizing the surgical experience for our patients according to their individual needs and expectations."

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