CHOOSING AN IOL

Balancing range versus quality of vision, regional practice patterns, and counseling to prevent postoperative regret.

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CRST Global: How do you choose the best IOL technology for each patient given today's breadth of options?

Jorge L. Alió, MD, PhD, FEBOphth: My choice of IOL technology is based on the patient's visual potential and comorbidities (especially maculopathies), their near and intermediate visual needs, and their goals.

Francesco Carones, MD: My basic concept is that each patient deserves the widest range of spectacle-free vision unless there are reasons not to attempt to reach this goal. In other words, I do not upgrade patients to presbyopia-correcting IOLs; instead, I downgrade those who have contraindications or who really do not care about wearing spectacles after cataract surgery or refractive lens exchange.

I personalize the IOL choice according to individual preferences related to lifestyle, hobbies, passions, and habits—everything that makes up the patient's daily life. I implant all available advanced technologies: enhanced monofocal (monofocal-plus) lenses, extended depth of focus (EDOF)/increased range of vision (IROV) IOLs, and full range of vision (FROV) IOLs.

My portfolio includes multiple options from each IOL category. They all have advantages and disadvantages, so the biggest task for my staff and me is tailoring the choice to the individual patient. Unfortunately, I do not think that this process can be simplified through a decision-tree approach. Surgeons must know their IOLs—their performance, defocus curves, and potential drawbacks—and must gain a clear understanding of their patients, including their personality, their lifestyle, and, most importantly, their expectations and what they are willing to give up to achieve them.

Arthur B. Cummings, MBChB, FCS(SA), MMed(Ophth), FRCSEd, FWCRS: Know the overall classification of IOLs. The American-European Congress of Ophthalmic Surgeons classification system works very well for me because my patients and my staff understand it almost as well as I do. Monofocal IOLs provide the best contrast sensitivity but the shortest range of focus. Increased range of focus (IROF) IOLs provide a broader range of focus that encompasses distance and intermediate or intermediate and near, depending on the refractive target. The dysphotopsia and contrast profiles of IROF IOLs are similar to those of monofocal IOLs. Full range of focus (FROF) IOLs offer the most comprehensive range of focus but are also associated with the highest incidence of dysphotopsias. Once you understand this, combinations of the three main categories can provide almost anything your patient wants with minimal compromise.

Stefanie Schmickler, MD: I implant only hydrophobic IOLs. I also favor IOLs with C-loop or double C-loop haptics because they can be explanted more readily if anything does not go well. IOLs with plate haptics or four-point haptics are difficult to explant.

CRST Global: What is your go-to presbyopia strategy for cataract patients, and what is the one trade-off about which you are the most explicit?

Dr. Alió: I try in every case to target pseudophakic presbyopia. EDOF and multifocal lenses compose about 60% of my practice. I think that achieving intermediate (70 cm) and, if possible, near vision (40 cm) is a must today in cataract and refractive lens surgery.

Dr. Carones: I usually explain things to patients using the same words I use when teaching at congresses and meetings. The IOL to be implanted holds the real value of the procedure, and results are almost totally dependent on the choice we make. The value is related to the benefits-over-costs ratio, where *benefits* are the advantages related to the unaided range of vision, and *costs* are both the extra price and the slight trade-offs associated with the specific optics of the chosen IOL or combination of IOLs.

My standard conversation strategy tends to highlight the trade-offs and see if the patient is willing to accept them to reap the benefits of a wider range of unaided vision. I emphasize that a partial range of unaided vision may be managed with spectacles, whereas the compromises associated with nighttime dysphotopsias and reduced contrast sensitivity cannot be managed.

Basically, I help patients understand that the choice of IOL involves range and quality of vision and that, whereas the range can be extended with visual aids, the quality cannot be improved. Those who show interest in a full range of vision and are willing to accept a compromise in quality of vision receive a FROV IOL. Those who are unwilling to compromise on quality of vision receive an EDOF or IROV IOL.

Dr. Cummings: The key phrase, as coined by Gerd U. Auffarth, MD, FEBO, FWCRS, is that *there is no free lunch in optics*. If you opt for the highest contrast, you get the shortest range of focus. If you opt for the broadest range of focus, you get the most dysphotopsias. Once patients understand that all options involve a compromise, I find they will work with me to find the compromise best suited to their lifestyle, anatomy, and neural adaptation ability.

Dr. Schmickler: Patients have to ask for multifocal IOLs; I never persuade them. I have the impression that monovision is not popular in Germany, where I practice, among patients seeking spectacle independence. Therefore, I tend to recommend multifocal, EDOF, or monofocal plus IOLs to these patients. Because patients who receive EDOF IOLs often require reading glasses and can experience side effects such as halos and glare, I often favor monofocal plus IOLs such as the Vivinex Impress (Hoya Surgical Optics) with a target of slight myopia (-0.50 to -0.75 D) in one eye. Many of my patients treated with this strategy do not need glasses, but I do not promise spectacle independence before surgery.

I avoid multifocal IOLs for patients who are unwilling to compromise, those with irregular astigmatism (I always check the corneal topography/tomography maps and do not rely solely on the measured data), and those with any pathology of the cornea, vitreous, or retina. For patients who have at least 0.75 D of regular astigmatism, I find that toric multifocal IOLs are the best choice.

CRST Global: Mix-and-match, mini-monovision, adjustability—Which strategies are you employing?

Dr. Alió: I do not use the Light Adjustable Lens (LAL; RxSight). In my opinion, the precision of modern IOL calculations makes it unnecessary to use this technology, which I find to be cumbersome and expensive and to significantly delay the patient's final outcome. Neither do I favor a mix-and-match strategy; in my experience, the brain functions better when it has symmetrical inputs in terms of optical performance. I therefore always implant either EDOF or multifocal IOLs in both eyes.

I do employ a mini-monovision strategy with some EDOF lenses, type 5A in my classification—those that are the most simple—such as Tecnis Eyhance (Johnson & Johnson Vision) and enVista (Bausch + Lomb). This works well as long as more than -0.75 D of sphere is not taken as the final refraction. In any case, I try to address astigmatism either with a toric lens or the creation of opposite clear corneal incisions at the time of cataract surgery.

Dr. Carones: The LAL is not currently available in Europe, where I practice. I am using a mini-monovision strategy with EDOF/IROV and enhanced monofocal IOLs in the way I described earlier to further extend the range of vision. I believe this is an elegant way to mitigate presbyopia in patients who are not candidates for presbyopia-correcting IOLs and those who are concerned about nighttime dysphotopsias and other drawbacks related to multifocal optics. As with all presbyopia solutions, success comes down to how expectations are discussed and set.

Mix-and-match is not a strategy that I apply routinely. There are two approaches to mix-and-match. The first plans which IOLs to implant before

surgery on the first eye. The second uses the result of the first eye to guide the IOL choice for the second eye. Most of the surgeries I perform are sequential, performed either on the same day or 1 day apart, so I am unlikely to adopt the second mix-and-match approach. Implanting different optics in the two eyes carries advantages and disadvantages; for example, the combination of a FROV and an IROV IOL might mitigate night dysphotopsias but also reduce near reading ability.

I tell my patients that, if they want to read easily at near under all lighting conditions, they should consider night dysphotopsia to be a consequence rather than a complication of the wide range of vision they gain with bilateral implantation of an FROV IOL.

Dr. Cummings: I prefer the term *custom match* to *mix-and-match*, which sounds a little haphazard and unplanned. The goal of a custom match approach is to achieve the broadest range of focus while preserving the integrity of night vision for driving. I ask patients which they value more: being able to drive at night or having the most comprehensive range of focus. If a patient wants the most complete range of focus, an FROF IOL is implanted in the nondominant eye. One week later, they decide between an FROF and an IROF lens for their dominant eye.

This is the epitome of participatory medicine: the patient makes a decision after having lived with an FROF IOL for 1 week. If their experience has been positive, with minimal to no bothersome dysphotopsias, they receive an FROF IOL in the dominant eye. If the dysphotopsias have been annoying, the patient opts for an IROF IOL in the dominant eye. They can then enjoy either a full range of focus or the ability to drive comfortably at night—whichever option they ultimately choose.

In my experience, 90% of patients opt for an FROF IOL in the dominant eye, resulting in bilateral FROF IOLs. For the patient whose primary objective is good night driving vision, I also offer custom match but in reverse. An IROF IOL is implanted in the dominant eye. One week later, if the level of reading vision in their operated eye is excellent, they select an IROF for the second eye with a target of emmetropia (as with the first eye). If their reading is good but they want slightly more, an IROF IOL is implanted in the nondominant eye with a target of -0.50 to -0.75 D. If the reading vision in the first eye is poor, an FROF IOL is implanted in the nondominant eye.

I find that a custom match approach provides patients with their desired outcome—the broadest range of focus and an ability to drive at night—and provides me with an excellent exit strategy.

Dr. Schmickler: There are different mix-and-match concepts, such as a trifocal IOL in one eye and an EDOF IOL in the other. In the past, I might place a diffractive IOL in one eye and a refractive IOL in the other, but I abandoned this strategy. I no longer see the need for mixing. Most of my patients receive either a trifocal or a monofocal plus IOL in both eyes.

I like mini-monovision. In my hands, this strategy involves a refractive target of plano in one eye and -0.50 to -0.75 D in the other. This provides a wide range of focus and, in many situations, independence from glasses. As someone who has experienced presbyopia myself, I understand the need for some minus in one eye (mostly the nondominant eye).

The LAL is an interesting concept. Because patients have to return to the clinic and because a special device is required for the light adjustments, however, the LAL is not a reasonable offering for my clinic, which many patients travel long distances to visit.

CRST Global: EDOF versus trifocal versus monofocal-plus: Where are you drawing the line today and why?

Dr. Alió: EDOF IOLs often take the place of monofocal IOLs. I select monofocal IOLs primarily in patients with comorbidities, especially macular problems, because they will not benefit from EDOF technology. If the patient's demands for near vision are not high, I choose an EDOF type 5B lens (one with a central optical artifact in my classification).[1] If patients prioritize crisp near vision, I recommend a multifocal IOL.

Dr. Carones: Drawing the line between monofocal-plus, EDOF/IROV, and FROV IOLs is becoming increasingly difficult. The bilateral implantation of enhanced monofocals using a mini-monovision strategy can extend the patient's range of unaided vision. This strategy can be effective for patients with clinical contraindications to presbyopia-correcting IOLs but cannot provide the same level of spectacle independence. I recommend it only to patients who are truly concerned about night dysphotopsias and quality of vision.

The latest nondiffractive and optimized diffractive FROV IOLs have significantly reduced quality of vision trade-offs, and the latest EDOF/IROV IOLs provide a wider range of vision than earlier designs. That said, I still find EDOF/IROV lenses to be more forgiving than FROV lenses, which is why I recommend the former to demanding patients who desire high-contrast visual acuity and would not tolerate nighttime dysphotopsias. I find that EDOF/IROV IOLs, when implanted bilaterally with a micro-monovision strategy (< -0.50 D in the nondominant eye), can provide a wide enough range of vision to

give patients satisfactory spectacle independence without compromising their distance vision. They may need to wear +1.00 D readers that patients use to view small print or for close working distances.

Dr. Cummings: In my experience, monofocal-plus IOLs offer no greater range of focus than a Clareon Monofocal lens (Alcon). IROF IOLs provide better intermediate and near vision than monofocal IOLs, so the cutoffs between monofocal, IROF, and FROF IOLs are quite clear.

Dr. Schmickler: I find that trifocal IOLs are good for patients who previously wore multifocal glasses, do not want to wear any glasses, and are willing to accept visual side effects such as halos and glare. Before surgery, they must sign a document stating they understand that they may require a touch-up laser procedure postoperatively to correct residual ametropia. Only then will I proceed with trifocal IOLs, provided they have no ocular pathology other than cataract.

Because EDOF IOLs offer a limited range of focus, can cause halos and glare, and cost almost as much as trifocal IOLs, I am not fully convinced of their value. I implant them, but I clearly inform patients that they will likely require reading glasses after surgery.

To avoid halos and glare, my favorite monofocal-plus IOL at the moment is the Vivinex Impress. As already mentioned, I start with the nondominant eye, choose a slightly myopic refractive target, and perform surgery with a plano target on the second eye 1 week later. Many of these patients have not needed glasses postoperatively.

CRST Global: What do you say before surgery that prevents regret afterward?

Dr. Alió: I tell patients receiving EDOF or multifocal lenses to expect a period of neural adaptation, during which they may experience visual phenomena such as halos (multifocals), starbursts (EDOF), or an uncomfortable feeling about their vision. When I am using a mini-monovision strategy, I clearly explain the refractive targets and how they work.

Dr. Carones: What I currently tell patients differs from what I said a few years ago. The improved performance of the most recent generation of presbyopia-correcting IOLs has made the conversation easier, and I have learned that symptoms related to neural adaptation are greatly influenced by the way patients are counseled preoperatively. In the past, I emphasized neural adaptation; I told patients that negative symptoms related to nighttime dysphotopsias would fade with time. Now, I say that these symptoms are caused by the optics that provide the range of vision they want and may never decrease or fade.

I find patients are more accepting of their postoperative vision when they are not waiting for an improvement that has not occurred. As the brain adapts after surgery, most patients' early visual concerns decrease over time, and they become even happier because of an improvement they were not necessarily expecting. The mantra *underpromise and overdeliver* remains key to successful presbyopia-correcting IOL management.

Dr. Cummings: Every presbyopia solution is a compromise. I tell each patient that it is my job as the ophthalmologist to find the best compromise for their lifestyle, anatomy, and physiology. Once a choice has been made, I say, it is their job to decide whether this compromise is better than their current one (reading glasses, varifocals, multifocal contact lenses, etc).

Dr. Schmickler: You never know before surgery which patient will experience dysphotopsia and which will not. In my opinion, 95% of patients forget what you told them about dysphotopsia before surgery. Therefore, after surgery, you have to talk to patients, explain dysphotopsia to them, and reassure them that symptoms often diminish over months. After surgery, patients need support from the doctor to accept dysphotopsia and to know that it will get better with time. ■

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