

Dysphotopsia and Multifocal IOLs

Understanding the data on dysphotopsia is an important part of counseling patients and creating your own comfort zone with multifocal IOLs.

BY DOUGLAS A. KATSEV, MD

The latest generation of multifocal IOLs provides patients with a tremendous opportunity for independence from spectacles. Compared with their predecessors, these lenses satisfy more patients and have fewer disadvantages. Concerns remain, however, including the potential for glare, halos, and night vision problems. In my experience, these symptoms are usually mild and temporary, but it is important to address dysphotopsia proactively when selecting and counseling patients. Moreover, I recommend being a perfectionist with regard to achieving emmetropia and mitigating any pre- or postoperative factors that could contribute to glare and halos. Finally, surgeons must understand how glare and halo data are collected and reported in order to judge their relevance to patients.

If surgeons make sure they hit their refractive target and optimize the corneal surface, their patients will generally be so pleased with their vision at distance and near that they will tell their friends. This positive word of mouth is a practice's best advertising.

SETTING THE PATIENT UP FOR SUCCESS

Inquiring about a patient's hobbies and daily activities provides an important indication of his or her tolerance for nighttime dysphotopsia and facilitates the surgeon's recommendation of an IOL. Most of my patients' top priority when choosing a presbyopia-correcting IOL is spectacle-free near vision. For them, my lens of choice is the Tecnis Multifocal (Abbott Medical Optics, Inc.), because I find it provides reliable near vision as well as an excellent range of vision in different lighting conditions. For patients who are primarily concerned with performing tasks at an intermediate distance, however, I often recommend an accommodating lens. I am happy to implant the Crystalens (Bausch + Lomb) in these cases, but the patient must understand that he or she will not achieve the level of reading vision provided by a diffractive multifocal IOL.

Personality traits represent an important clue to a patient's ability to neuroadapt if he or she experiences

significant dysphotopsia. In the past, I used surveys to gather this type of information, but I currently rely on my interview of patients and my staff's comments; no method is 100% accurate. When a "picky" patient asks me a lot of questions and expresses concern about glare and halos, I may advise him or her against choosing a multifocal IOL. Sometimes, taking the option off the table crystallizes for the patient that he or she is, in fact, willing to risk a small loss of contrast sensitivity or temporary glare in exchange for a broader range of vision without glasses. I find that these patients generally do very well with multifocal lenses.

In my experience, the biggest contributors to night vision problems after the implantation of a multifocal IOL are residual refractive error and dry eye disease (DED). Surgeons should address corneal astigmatism and perform postoperative enhancements as needed. Preoperatively, I obtain corneal topographies for every patient who will receive a presbyopia-correcting lens. If I detect any signs of ocular dryness, I pretreat the eye with artificial tears, punctal plugs, and/or topical cyclosporine to increase the accuracy of IOL power calculations and increase the patient's postoperative quality of vision.

I am a big proponent of postoperative nonsteroidal anti-inflammatory drugs to prevent cystoid macular edema, a complication that reduces the "wow" factor. In my experience, patients find the newer agents more comfortable to use. Because these medications can also be dosed less frequently (I prefer once a day), they are a relatively easy addition to the postoperative drug regimen. Currently, I have patients use bromfenac ophthalmic solution 0.09% (Bromday; Ista Pharmaceuticals, Inc.).

DIGGING INTO THE DATA

The available data on glare and halos can be confusing. Photoc effects are tracked in all of the FDA clinical trials for multifocal IOLs, but the data are not necessarily gathered or analyzed in the same way across or even within different studies of a given IOL. The package insert for the Tecnis Multifocal 1-Piece IOL, for example, con-

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The surgeon has determined that a patient has an acceptably good prognosis for a multifocal IOL, including an adequately healthy cornea, macula, and optic nerve. The patient has decided that he or she desires a multifocal lens. A few additional considerations remain in the selection of an IOL.

BODY HABITUS

The focal length of multifocal lenses differs. Among the diffractive models, the Tecnis Multifocal IOL (ZMAOO and ZMBOO; Abbott Medical Optics Inc.) has an add power of +4.00 D. This may be a suitable and even desirable reading distance for a diminutive patient with short arms. A tall patient with long arms, however, can find this working distance uncomfortably close and will likely do better with a +3.00 D add, as is found with the AcrySof IQ Restor IOL +3.0 D (SN6AD1, MN6AD1; Alcon Laboratories, Inc.).

DAILY ACTIVITIES

Some presbyopic patients perform many intermediate-range tasks such as the use of computers and tablets, knitting, and cooking. These individuals are well suited to multifocal lenses with a +3.00 D add; the near point will be closer to their midrange, and thus, the summation that occurs between the two focal points will be higher and, consequently, superior for intermediate tasks than an IOL with a +4.00 D add. Some surgeons advocate using multifocal IOLs with a +4.00 D add for these patients and targeting slight hyperopia to compensate for an undesirably close near point. I strongly discourage this approach and find that patients are happiest with a plano distance result.

ENVIRONMENTAL ILLUMINATION

The diffractive steps of the Tecnis Multifocal IOL appear from its center to its periphery, and the steps are of equal height at all loci on the implant. This design distributes more light to the near add relative to the distance focal point compared with an apodized lens like the AcrySof Restor. The latter's diffractive steps decrease in height from the center outward, and they are confined to the central 3.7 mm of the IOL's optic. Accordingly, many surgeons feel that, as a group, patients who receive the Tecnis Multifocal lens perform better at near in dimly lit situations (eg, the candlelit restaurant to which Dr. Katsev alludes) than patients with the AcrySof Restor lens. For the same reason, patients with the Tecnis Multifocal may also tend to notice more halos at night around point sources of light against a dark background (eg, streetlights at night) than individuals with the AcrySof Restor.

PUPILLARY SIZE

The refractive ReZoom IOL (Abbot Medical Optics Inc.) has a large central zone that is distance only. I have seen some patients who have no near or intermediate benefit with this lens when their pupil is at rest but who perform well at near when it is pharmacologically dilated. Obviously, this is an untenable and unhappy result for both the patient and the physician. My colleagues and I rarely use the ReZoom in our practice, because we have found that diffractive multifocal IOLs perform better.

Interestingly, the initial FDA data on the ReZoom demonstrated a similar incidence of halos, by percentages, as for the diffractive multifocal IOLs, yet in my experience, the vehemence of the patients' complaints about this phenomenon was unmistakably greater with the refractive lens. Studies of the clinical incidence of glare with multifocal lenses are difficult to interpret, due to highly inconsistent rates of implantation among the different multifocal lenses. Knowing the rates of unhappy patients with these IOLs in a referral practice is only useful if one also knows the differing frequency of implantation for each style of lens in that community.



Figure. A three-piece PCIOL in this megal anterior segment is centered with the haptics in the ciliary sulcus and the optic prolapsed through both the continuous curvilinear capsulorhexis and a primary posterior continuous curvilinear capsulorhexis. The fixation elements of a Cionni Ring for Sclera Fixation and two Ahmed Capsular Tension Segments (both devices from Morcher GmbH, distributed in the United States by FCI Ophthalmics, Inc.) are visible, oriented with each 120° apart. The patient sees 20/20 uncorrected at distance and J1+ at near.

LOCATION OF THE IOL

If fixation in the sulcus becomes necessary, the available three-piece multifocal IOLs perform similarly to surgeons' expectations, especially if their optics can be captured in the capsulorhexis and the capsule covers the margin of the IOL's anterior edge (Figure). Surgeons should avoid implanting single-piece PCIOLs in the sulcus, because this placement increases the risk of pigment dispersion or a condition resembling uveitis, glaucoma, hyphema syndrome.¹ For passive sulcus fixation in which capture with the capsulorhexis is not possible, a round-edged PCIOL is a better choice, and of course, the IOL's power will need to be reduced relative to that calculated for the lens' placement in the bag.

CONCLUSION

Multifocal IOLs are a wonderful option for presbyopic patients who desire increased independence from spectacles. Surgeons should carefully weigh each option on a patient-by-patient basis in order to recommend the IOL most likely to suit his or her desires, lifestyle, and ocular anatomy.

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1. Kohnen T, Kook D. Solving intraocular lens-related pigment dispersion syndrome with repositioning of primary sulcus implanted single-piece IOL in the capsular bag. *J Cataract Refract Surg.* 2009;35(8):1459-1463.

tains some surprising statistics. Thirty-seven percent of the multifocal group had moderate difficulty with halos, and 18% had severe difficulty at 1 year. Elsewhere in the same document, however, rates of 6% (moderate halos) and 5% (severe halos) are given.¹ The latter numbers are more in line with my personal experience, but why are there two different reports? Minor changes in the way a question is posed can make results look very different.

As with any survey, it is easy to bias the responses, intentionally or not, through the phrasing of the question. When investigators asked a broad question (are you having any difficulties with your eyes or vision?), relatively few patients mentioned more than mild difficulty with glare, halos, or nighttime vision. In a third-party telephone survey that directly questioned patients about each symptom (how much difficulty do you have with halos at night?), the number of them reporting the problem was much higher. Curiously, the patients with monofocal lenses in the directed-question survey also reported high rates of photic phenomena, with 28% reporting moderate to severe difficulty with glare and 20% reporting moderate to severe difficulty with halos.¹ Those rates do not match my experience at all. Plus, patients' overall satisfaction in the FDA trial was very high, with 92% saying they would choose a Tecnis Multifocal lens again.¹ That finding, plus the high rate of difficulty in the monofocal group, tells me that "directed" responses may not accurately represent results.

In my practice, about 5% to 10% of patients who receive multifocal IOLs experience enough glare and halos to complain about them during the early postoperative period. After 1 year, however, those complaints largely disappear.

In terms of the nondirected responses in the Tecnis' package insert, the proportion of patients with severe photic phenomena (glare, starbursts, or halos) is 12% 4 to 6 months after the implantation of the Tecnis Multifocal IOL and 7% at 1 year. These statistics more closely match my clinical experience and are comparable to, or in some cases better than, what has been reported for other multifocal IOLs.²

CONSIDERING REAL-WORLD SYMPTOMS

In addition to developing a good understanding of clinical trial data, ophthalmologists should consider post-approval data, which better reflect how IOLs perform in the real world. The incidence of glare and halos is typically higher in FDA clinical trials, because participating surgeons may not be permitted to perform limbal relaxing incisions or enhancements or to make nomogram adjustments. DED also may not be addressed consistently.

In a recently published review of 76 eyes of 49 patients who were dissatisfied after receiving multifocal IOLs, photic phenomena were reported for 29 eyes (38.2%).³

THE SMILEY FACE STRATEGY

Patients' postoperative visual acuity is usually a strong indicator of their satisfaction. Sometimes, however, their level of satisfaction does not correlate with their UCVA, and the last thing you want to do is to congratulate an angry patient on his or her "great" vision. Avoid this gaffe by asking your staff to highlight anomalies for you. In my practice, we use a simple sticker system:

- A smiley face means the patient may see 20/30, but he or she is thrilled.
- A sad face tells me the patient is unhappy despite a 20/20 and J1 result.
- No sticker means my staff thinks the patient's satisfaction level is about where I would expect given the visual result.

This sticker system gives me a valuable heads-up for the tone I take during my examination.

The majority of these patients, referred to a tertiary care center, had received the AcrySof IQ Restor IOL +4.0 D (Alcon Laboratories, Inc.; 69 eyes), but others had a ReZoom IOL (Abbott Medical Optics, Inc.; one eye), Tecnis Multifocal lens (two eyes), or an AcrySof IQ Restor IOL +3.0 D lens (Alcon Laboratories, Inc.; four eyes). Most important is that almost all of the eyes had correctible factors beyond the multifocal design itself that might have contributed to the glare or halos. They included residual refractive error (35%), wavefront anomalies (21%), decentration of the IOL (17%), posterior capsular opacification (10%), and DED (4%). The investigators found that most causes of patients' dissatisfaction with multifocal IOLs can be treated successfully.

The aforementioned researchers' conclusion resonates with my own experience. By carefully selecting patients and using thoughtful surgical protocols, surgeons can minimize the incidence of dysphotopsia. Furthermore, effective counseling can help patients to prepare for potential night vision problems and to understand that these symptoms improve greatly within the first year. Overall, the value of multifocality for patients far exceeds the short-term dysphotopsia that a few experience with multifocal IOLs. ■

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1. Tecnis Multifocal 1-Piece IOL, Model ZMB00 [package insert]. Santa Ana, CA: Abbott Medical Optics, Inc.; 2009.
2. AcrySof IQ Restor [package insert]. Fort Worth, TX: Alcon Laboratories, Inc.; 2008.
3. De Vries NE, Webers CAB, Touwslager WRH, et al. Dissatisfaction after implantation of multifocal intraocular lenses. *J Cataract Refract Surg.* 2011;37:859-865.