

European Perspective on Mixing and Matching Multifocal IOLs

Surgeons in Europe have more lenses from which to choose.

BY MICHAEL C. KNORZ, MD

As with many other technologies in the ophthalmic field, here in Europe, we have a slight advantage over our US colleagues in terms of the variety of multifocal IOLs that we are able to implant. This article outlines some of the multifocals currently available in Europe and discusses my experience and thoughts on mixing and matching these IOLs.

THE MULTIFOCAL LENSES AVAILABLE IN EUROPE

Diffractive

AcrySof Restor IOL

The single-piece, acrylic AcrySof Restor lens (Alcon Laboratories, Inc., Fort Worth, TX) has a 6-mm optic and can be injected through a 2.8-mm incision. Its apodized diffractive design has 12 zones with a total add of +4.00 D. It is available in two models, one that filters blue and ultraviolet light and another that blocks ultraviolet light only. The IOL is available in a power range of +10.00 to +30.00 D.

Acri.LISA 366D and 356D

Manufactured by Acri.Tec GmbH (Berlin, Germany), the single-piece, aberration-correcting, aspheric, hydrophobic acrylic, microincisional Acri.LISA IOL (not available in the US) is actually more a hybrid multifocal. In the acronym *LISA*, *L* stands for a light intensity distribution of 65% (refractive) far and 35% (diffractive) near;

I represents independent from pupillary size; *S* means smooth refractive/diffractive surface profile; and *A* stands for optimized aspheric surface. The Acri.LISA 366D IOL has a total add power of +3.75 D. It is designed for injection through a sub-2-mm cataract incision using the A2-2000 injector (Acri.Tec GmbH). The lens is available in a power range of 10.00 to 32.00 D in 0.50 D increments. IOLs in 1.00 D increments can be specially made with an 8-week lead time.

The company's Acri.LISA 356D IOL has essentially the same diffractive/refractive multifocal design as the 366D except that the former is designed to go through a larger incision. It is available in 0.50 D increments of 10.00 to 30.00 D, with IOLs of 0 to 9.00 D and 31.00 to 44.00 D available with 8 weeks' lead time.

Tecnis ZM900

The three-piece, diffractive, multifocal, silicone Tecnis ZM900 (not available in the US; Advanced Medical Optics, Inc., Santa Ana, CA) has a 6-mm optic. Its diffractive design on the posterior surface creates two focal points that are 4.00 D apart. As a result, light entering the eye is evenly distributed between near and distance vision and is independent of the pupil's size. Additionally, the Tecnis ZM900 has a modified, prolate anterior surface that is intended to compensate for the spherical aberration of the cornea to create an optical system that is free of spherical aberration. This design

should allow patients higher image contrast than with a spherical multifocal lens. The Tecnis ZM900 is available in 0.50 D increments from 5.00 to 34.00 D.

Refractive

ReZoom Multifocal IOL

The ReZoom Multifocal IOL (Advanced Medical Optics, Inc.) is a three-piece acrylic lens with five refractive zones: a low-light/distance-dominant zone; a near-dominant zone; a distance zone; another near-dominant zone; and a bright light/distance-dominant zone (moving from the outer zone inward). Transitions provide intermediate vision. With a design the company calls *balance view optics*, the ReZoom multifocal is intended to have 100% light transmission over all five optical zones. The lens has a total near add of +3.50 D and is available from 5.00 to 30.00 D in 0.50 D increments.

MF4 IOL

From Carl Zeiss Meditec AG (Jena, Germany), the MF4 (not available in the US) is a single-piece, hydrophilic acrylic IOL featuring a four-zone optic with a tripod haptic design. It has a 6-mm optic and a total near add of +4.00 D. The manufacturer describes the IOL as an autofocus multifocal IOL. Although this lens was first introduced approximately 4 years ago by IOLTech Laboratories (La Rochelle, France), there has been little published on its results. The MF4 multifocal IOL is available from 15.00 to 26.00 D in 0.50 D increments.

M-Flex Multifocal IOL

The M-Flex Multifocal IOL (not available in the US; Rayner Intraocular Lenses Ltd., Hove, East Sussex, UK) is the newest multifocal on the European market. This hydrophilic acrylic IOL has a 6.25-mm, multizone aspheric optic. It comes with either four or five zones, depending on the base power. The lens is distance dominant with a +3.00 D near add. The first M-Flex Multifocal IOL was implanted in 2005, although no results have been published to date. The lens is available in powers from 14.00 to 25.00 D in 1.00 D increments and from 18.50 to 23.50 D in 0.50 D increments.

MIXING AND MATCHING

With such a wide range of multifocal IOLs available in Europe, it is interesting to note that the idea of combining different types of multifocals in the same patient is fairly new. The novelty of mixing these lenses is motivated by the inherent limitations of each IOL design. Refractive multifocals such as the ReZoom provide excellent distance and good intermediate vision, but certain

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patients find their near vision to be insufficient with this type of lens. In contrast, diffractive designs such as the Tecnis Multifocal and AcrySof Restor IOLs provide excellent near and good distance vision, but some patients may find their intermediate vision with these lenses to be unsatisfactory. Combining a diffractive and refractive multifocal IOL is an attempt to compensate for each design's limitations.

I routinely use the ReZoom and the Tecnis Multifocal IOLs and have some experience with the AcrySof Restor lens. I have no experience with the other IOLs mentioned in this article. With its distance-dominant design, the ReZoom lens provides very good distance vision, slightly better than the Tecnis Multifocal or the AcrySof Restor IOL, I find. Intermediate vision with the ReZoom lens is good, also better than with the other two lenses in my experience. My patients' near vision is not as good as with the Tecnis Multifocal or the AcrySof Restor IOL. In contrast, the Tecnis Multifocal lens has provided excellent near vision to all of my patients who have received it, although some have been frustrated by their lack of intermediate or computer vision.

After advocating the bilateral implantation of the same IOL design for years, I recently changed my opinion because of some of my patients' complaints (mentioned earlier) regarding reduced intermediate vision with a diffractive IOL design such as the Tecnis Multifocal IOL and insufficient near vision with a refractive IOL design such as the ReZoom lens. The benefit of a mixed approach is that it enables surgeons to balance the strengths and weaknesses of these multifocals in order to provide cataract surgery and refractive lens exchange patients with the best possible range of vision and the greatest degree of independence from spectacles.

The mixing of multifocal IOLs is becoming my standard of care, particularly when I am operating on a 50-something presbyope who still works at a computer, drives a car, and enjoys an active lifestyle. For refractive lens exchange, I will always operate on the patient's dominant eye first. I usually implant a ReZoom multifocal IOL in these eyes because of its strength in the areas of distance and intermediate vision. If the patient is also happy postoperatively with his near vision, I will implant the same IOL in his second eye. If he is not or is unsure, I will implant a Tecnis

COVER STORY

Multifocal IOL in his second nondominant, eye. With this approach, I hear no more complaints from patients who cannot see their computer screens. Statistically, approximately 30% of my patients receive a ReZoom IOL in both eyes, and 70% receive a ReZoom lens in their dominant eye and a Tecnis Multifocal IOL in their nondominant eye.

OTHER CONSIDERATIONS

I consider two more issues when implanting multifocal IOLs. The first relates to the typical side effects. All patients will see halos with a multifocal IOL, but I would estimate that the phenomenon is transient in approximately 60% of recipients. It is therefore important to mention this side effect before surgery and to use multifocal IOLs only in those patients who do not want to wear spectacles. They should understand that multifocal lenses are a compromise and are only indicated if independence from spectacles is important.

The second issue is closely linked to the requirement of spectacle independence. Because multifocal IOLs cannot achieve emmetropia in all eyes, a certain number of eyes require a refractive enhancement (approximately 10% to 20% in my practice). I will typically perform LASIK in these eyes about 3 months after implanting the IOL. In eyes with a Tecnis Multifocal IOL, I will perform wavefront-guided LASIK using the Visx Star S4 laser (Advanced Medical Optics, Inc.) with iris registration. In eyes with a refractive multifocal IOL such as the ReZoom, I do not find currently available aberrometers reliable and will therefore perform standard LASIK.

For eyes that have relatively high corneal astigmatism prior to IOL surgery (in my hands, this means astigmatism of 2.00 D or more), I will use the IntraLase FS 60 laser (Advanced Medical Optics, Inc.) to cut a flap (100 μ m thick, 9 mm in diameter) immediately prior to performing the refractive lens exchange or cataract surgery. I will not lift the flap at that time, which I find is a significant advantage of using the IntraLase FS laser. Approximately 4 weeks later, I will lift the flap and perform the laser enhancement. This technique shortens the time between the lenticular and laser surgeries, which means a faster visual recovery for the patient. ■

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