Annual IOL Issue

Focusing on the available lens options in Europe and the United States.

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The Annual IOL Issue is back. After a hiatus in 2009, Cataract & Refractive Surgery Today Europe has again chosen its January issue to host a cover series on IOLs. This year’s roundtable went virtual, soliciting e-mail responses from opinion leaders on IOLs. CRST Europe wanted to know what surgeons worldwide are including in their armamentarium of IOL options for presbyopia-correcting, toric, and aspheric lenses.

PRESBYOPIA-CORRECTING IOLs

**CRST Europe:** Describe your personal experience with presbyopia-correcting IOLs (see Accommodating and Light-Adjustable Technologies and Multifocal and Multifocal Toric IOLs), including the pros and cons of the lenses you have used.

**Alfonso:** Since 1988, we have used more than 10 models of presbyopia-correcting IOL. Specifically, we prefer diffractive bifocal lenses because of their versatility. I prefer the AcrySof IQ Restor +3.0 D (Alcon Laboratories, Inc., Fort Worth, Texas) in 85% of my patients and the AT.LISA (previously called the Acri.LISA; Carl Zeiss Meditec, Jena, Germany) in the other 15%. Using the Restor +3.0, I get a 95% satisfaction rate in my patients; we have found good distance, near, and intermediate vision. With the AT.LISA 366D, patients have good near vision with a large range of powers. Additionally, we have the possibility to correct astigmatism with the AT.LISA toric. Diffractive bifocal IOLs also have many possibilities for future development, including customization and light energy distribution between foci.

We currently also use bifocal toric multifocal IOLs such as the AT.LISA toric and, in the future, the AcrySof Restor toric, as well as those with variable asphericity for post-LASIK patients.

**Carones:** I have experience with the Crystallens AT-45 (Bausch & Lomb, Rochester, New York), the Tecnis Multifocal (Abbott Medical Optics Inc., Santa Ana, California), the ReZoom (Abbott Medical Optics Inc.), and the three AcrySof Restor IOLs (spherical add 4.00 D and aspheric add 4.00 and 3.00 D). My experience with the Crystallens AT-45 was unsuccessful, with high unpredictability with regard to restoring accommodation, plus a series of IOLs that decentered due to capsular bag fibrosis and a high posterior capsular opacification (PCO) rate. For these reasons, I discontinued use of the Crystallens AT-45 after approximately 50 implants.

My experience with the Tecnis Multifocal is relatively satisfactory. In my hands, this IOL provides some spectacle independence; however, in some cases, it causes significant night-vision problems and provides poor intermediate vision. With the ReZoom, my patients have suboptimal quality of vision at all distances, with no significant advantages compared with the multifocal diffractive IOLs that I implant routinely.

The first-generation Restor (spherical, 4.00 D add) was extremely effective in providing good reading and distance vision, but again with some significant night-vision problems and poor intermediate vision. The aspheric Restor 4.00 D add partially resolved night-vision symptoms, but my lens of choice in most cases today is the aspheric AcrySof Restor IQ +3.0 D IOL. This lens provides a high rate of spectacle independence at all distances, with little compromise in terms of quality of vision at nighttime. It is easy to implant through a 2-mm tunnel incision, which is my standard incision size for coaxial microincision phaco surgery. I use this lens whenever patients ask for spectacle independence. I have to add that I have not used mix-and-match strategies with different IOLs.

**Cionni:** I began to gain experience with these IOLs while participating in the original Restor (SN60D3) US Food and Drug Administration (FDA) clinical trials. I was initially impressed with the results; however, once I implanted a number of SN60D3 IOLs, my enthusiasm began to diminish because some patients were not happy with their results. I observed two problems in these patients: (1) distance vision was hazy and less than perfect, and (2) reading vision was too close, making intermediate vision inadequate.

Along came ReZoom, which promised better distance and intermediate vision. After several dozen patients, I was again underwhelmed and began to become disheartened with presbyopia-correcting IOLs in general. Arrival of the Crystallens 5.0 and the aspheric AcrySof IQ Restor +4.0 D IOL provided my patients with better options; however, unless I mixed IOL styles, patients often had to choose intermediate or distance vision. The recent introduction of AcrySof IQ Restor +3.0 D seems to provide patients with better distance vision and less compromise for intermediate and near vision than any previous IOL. Therefore, I am once again enthusiastic about offering presbyopia-correcting IOLs to my patients.

*(Continued on page 49)*
### ACCOMMODATING AND LIGHT-ADJUSTABLE TECHNOLOGIES

#### Akkommodative 1CU
**HumanOptics AG (Erlangen, Germany)**

The Akkommodative 1CU is a one-piece hydrophilic acrylic IOL with an ultraviolet (UV)-light inhibitor. Its four haptics are elements of fixation designed to enable enhanced reading comfort using the focus-shift principle. This foldable monobloc posterior chamber lens is available in 0.50 D steps from 16.00 to 35.00 D. The biconvex design is 9.8 mm in overall diameter, with a 5.5-mm optic. The small-incision IOL may be inserted through a 1.8-mm incision.

**Status:** The 1CU has the Conformité Européene (CE) Mark and is available in Europe. The lens is not available in the United States.

#### Crystalens HD
**Bausch & Lomb (Rochester, New York)**

The fourth-generation Crystalens, the HD, features a 360º square-edge design and an enhanced accommodating biconvex optic (5 mm) that reportedly increases the effect of accommodative arching compared with previous Crystalens models. Available from 10.00 to 33.00 D, in 0.50 D steps, the enhanced optic reportedly increases depth of focus for an improvement in near vision without compromising distance or intermediate vision.

**Status:** The Crystalens HD has the CE Mark and is sold in countries monitored by the European Medicines Agency (EMEA). The Crystalens was the first US Food and Drug Administration (FDA)-approved accommodating lens in the US market.

#### FluidVision
**PowerVision, Inc. (Belmont, California)**

A preliminary product design of the FluidVision may create more than 10.00 D of accommodative range, according to company literature. The lens' hydraulic actuators use fluid movement to change the shape of the lens, paralleling the Helmholtz theory. As the eye's ciliary muscles constrict and zonules relax, the FluidVision lens thickens; when the muscles relax and the zonules tighten, the lens thins.

**Status:** The FluidVision lens does not have the CE Mark, nor is it FDA-approved. The company has begun clinical trials outside the United States and will report results at the American Society of Cataract and Refractive Surgery (ASCRS) meeting in April.

#### Light Adjustable Lens
**Calhoun Vision, Inc. (Pasadena, California)**

The power of the Light Adjustable Lens (LAL) can be noninvasively adjusted and fine tuned by applying UV light at 365 nm after the lens is implanted in the eye. Postoperatively, homogeneously distributed photosensitive macromers in the lens are irradiated with spatially distributed UV light to cause selective polymerization. Diffusion of the unirradiated macromers to the irradiated region then induces changes to the lens’ shape and/or refractive index and produces a predictable power change. Correction of myopia, hyperopia, and astigmatism of up to 2.00 D are reportedly possible. After the desired refractive state is achieved, the lens is photo-locked to consume any remaining, unreacted macromer and stabilize the refractive power.

**Status:** The LAL has the CE Mark and is available in Europe. The company is about to complete FDA phase 2 clinical trials and expects to submit for phase 3 approval in the first quarter of 2010.

#### LiquiLens
**Vision Solutions Technologies (Rockville, Maryland)**

The LiquiLens contains two immiscible fluids with different refractive indices. With the eye looking straight ahead, the fluid with an index of refraction calculated to provide distance emmetropia is in the line of sight. On downgaze, gravity shifts the second fluid into the line of sight, which, when added to the first fluid, increases the dioptic power of the lens. The action is similar to oil and water in a thin vial. According to the company, LiquiLens is the only accommodating IOL that works independent of the action of the ciliary mechanism. It is capable of providing more than 13.00 D of power, allowing the user to achieve and sustain comfortable focal plane movement at any desired near-point distance.

**Status:** Vision Solutions Technologies is finalizing its preclinical testing and about to begin human studies in Europe.

#### NuLens DynaCurve
**NuLens, Ltd. (Herzliya Pituach, Israel)**

Developed to provide more than 10.00 D of accommodative power, the NuLens DynaCurve is a two-piece lens that generates power as the ciliary muscles respond to the naturally occurring blur stimulus for accommodation. One piece...
**COVER STORY**

**ACCOMMODATING AND LIGHT-ADJUSTABLE TECHNOLOGIES**

of the NuLens DynaCurve is a HEMA plate that is placed on top of the collapsed capsular bag after cataract removal; the second piece is a rigid haptic system with a silicone gel center. This second part of the IOL is held in place on top of the HEMA plate with patented sulcus-fixation haptics. According to company literature, these rigid haptics create an effective reference plane that works to deform the silicone gel as capsular diaphragm movement presses the HEMA plate anteriorly. The anterior and posterior pressures displace the silicone forward, mimicking the accommodative effect.

**Status:** NuLens has started its first human trials, and more than 20 lenses have been implanted in cataract patients. Six-month results are promising, and the company says it is on the path to initiate regulatory processes during 2010.

**Smart IOL**

Medennium, Inc. (Irvine, California)

The concept behind the Smart IOL is to fill the entire capsular bag so that the ciliary muscle may resume control of lens shape alteration. This hydrophobic acrylic IOL, customized with precise optical specifications such as power and anterior and posterior curvatures, has unique thermoplastic properties that allow it to be reconfigured into a thin rod. After it is implanted through a phaco incision, the Smart IOL warms to body temperature and transforms back into its originally designed configuration. The material modulus is similar to that of the natural lens, reportedly allowing the natural accommodative system to alter its shape and power.

**Status:** According to the company, development of the lens has been completed and awaits funding for clinical trials.

**Synchrony**

Abbott Medical Optics Inc. (Santa Ana, California)

This dual-optic accommodating IOL has a one-piece lens design that connects a high-powered anterior optic (anterior convex) and a minus-powered optic (posterior concave) with a spring-like haptic design. The variable-powered posterior concave optic covers more surface area than the 32.00 D anterior convex optic, which reportedly provides stabilization and centration within the capsular bag. This combination maintains emmetropia at any distance. The Synchrony comes preloaded in its own injector, allowing minimal handling and control during implantation.

**Status:** The Synchrony has the CE Mark, and Visiogen has completed its premarket approval submission to the FDA. The company anticipates approval in 2010.

**Tek-Clear**

Tekia, Inc. (Irvine, California)

The Tek-Clear is designed to take advantage of the natural accommodating processes. According to company literature, the lens haptic-optic design incorporates a bending-beam that fully optimizes the IOL movement anteriorly and posteriorly as the ciliary muscle contracts and relaxes. The 360º full-bag haptic design incorporates a precision square edge known to significantly limit or eliminate posterior capsular opacification (PCO). This allows the capsular bag to remain flexible and responsive to the natural accommodating process. The lens is a hydrophilic acrylic material with a 5.5-mm square edge optic; it is available from 17.00 to 30.00 D in 0.50 D steps and has customizable haptic sizes from 10 to 11 mm, in 0.2-mm steps. It can be implanted through a 2.8-mm incision.

**Status:** The Tek-Clear received the CE Mark in 2006 and is currently available in Europe, Latin America, and Asia.

**Tetraflex**

Lenstec (St. Petersburg, Florida)

The Tetraflex’s patented haptic design is contoured with 5º anterior angulation to optimize the equiconvex optic for near and far vision. As vitreous is displaced during accommodation, the lens moves and the vaulted anterior optic bends. A tab on the periphery of the acrylic optic identifies that the correct side faces up during insertion. The 5.75-mm optic is intended to reduce the risk of halos and glare, and the square-edge design reduces PCO. The overall diameter of the IOL is 11.50 mm; it is available in 1.00 D steps from 31.00 to 36.00 D and 0.50 D steps from 5.00 to 18.00 and from 25.00 to 30.00 D. It is available in 0.20 D steps from 18.00 to 25.00 D.

**Status:** The Tetraflex is commercially sold in Europe and received the CE Mark in 2004. The lens is also sold in China, Australia, Taiwan, Canada, and countries in the Middle East and Eastern Europe. The Tetraflex FDA clinical trial has been truncated, and the company anticipates approval in late 2010.

* Gathered from company sources
Claoué: I first described the use of foldable multifocal IOLs to treat presbyopia at the European Society of Cataract and Refractive Surgeons (ESCRS) meeting in 1997. Although this modality was not well received at the time, it has become the gold standard for presbyopia surgery. The procedure is now called presbyopic lens exchange (PRELEX), a term coined by Kevin L. Waltz, MD, OD, from Indiana. I have therefore well over 10 years’ experience with presbyopia-correcting lenses and have tried a number of multifocal and accommodating IOLs. My experience with so-called accommodating IOLs is broadly that of the European ophthalmic community; although many patients seem happy, objective measurements do not match the claims. The physiology and optics of accommodating IOLs are poorly understood, and predictability is also poor. Many of the designs are retrograde, for example omitting a 360º square edge.

In contrast, the optics of multifocal IOLs are well understood and yield good predictability if the surgeon is obsessive about biometry. However, criticisms of this technology, including contrast sensitivity and unwanted visual effects, are well rehearsed. Alio et al2 showed that contrast sensitivity with modern multifocal IOLs matches that of monofocal IOls.

I was involved in the design of the M-flex IOL (Rayner Intraocular Lenses Ltd., East Sussex, United Kingdom), which was originally made with a 3.00 D add (2.25 D at the spectacle plane) to reduce the effect of halos. I implanted the first M-flex in August 2005 and was impressed with the low incidence of unwanted visual side effects. When Rayner introduced the M-flex +4 (3.00 D at the spectacle plane), I expected that the incidence of halos would increase; however, they did not, and I suspect the relatively low refractive index of Rayner’s hydrophilic acrylic material is responsible. Thus, in 2010, significant advances have been made to multifocal IOL designs to eliminate their perceived weaknesses. I believe multifocal IOLs remain the most predictable lenses for the treatment of presbyopia.

Cochener: In 2003, I began using pseudophakic diffractive multifocal IOLs with some hesitation because of poor visual quality associated with the first diffractive multifocal lens models 13 years earlier and halos and poor near vision with the Array (Abbott Medical Optics Inc; no longer available). In this category, I have used the AcrySof IQ Restor (+4.00 D add) and Tecnis ZM900. We conducted a comparative study between these two lenses that showed similar refractive and visual results but slightly better quality of vision in near and intermediate vision with the Tecnis.

In parallel, I have experience using the AT.LISA for high ametropia (because this lens is available from 0.00 to 40.00 D); the toric AT.LISA for significant corneal astigmatism; and the latest generation of the AcrySof IQ Restor, the +3.0 D.

I have also experimented with mix-and-match techniques, implanting a refractive IOL in the dominant eye and a diffractive IOL in the nondominant eye. This concept of diffractive-refractive combination is not popular in France, and I must admit that we had to explant two ReZoom IOLs from nondominant eyes due to binocular dysfunction.

If I had to synthesize my personal results with multifocal IOLs, I would say that patients have better intermediate and near vision with mix-and-match or the AcrySof IQ Restor +3.0 D compared with the Tecnis or AcrySof IQ Restor +4.0 D. However, in term of quality of vision, outcomes favor the AcrySof IQ Restor +4.0 D. Additionally, the AT.LISA appears to be competitive to the AcrySof IQ Restor +3.0; it has an acceptable, although higher, rate of PCO and a lower cost.

The AT.LISA remains my first choice in delicate cases of multifocal implantation as a secondary procedure after previous refractive surgery. Concerning the quality of vision, we have not experienced any cases of explantation or severe visual disturbances with any multifocal diffractive IOLs.

My experience with accommodating IOLs is limited to the first-generation 1CU (HumanOptics AG, Erlangen, Germany) and the Crystalens HD. Both lenses were less predictable than current diffractive multifocal IOLs, especially in near vision recovery.

Goes: We obtain excellent results with staged implantation. We start with the ReZoom lens in the distance-dominant eye and implant the second eye 1 week later using the same lens if reading vision is acceptable in the first eye or with the Tecnis ZM 900 if the patient wants better reading vision. Distance and intermediate vision is excellent with the ReZoom, and reading vision is excellent with the Tecnis.

We also achieve good results with sequential, same-
session implantation of two Tecnis IOLs. This procedure is performed under topical anaesthesia on an outpatient basis. It is specifically useful for contact-lens-intolerant high hyperopes because it avoids the period of anisometropia. Recently, we substituted the Tecnis ZM 900 for the acrylic model (ZMA00), which should be available as a one-piece lens early this year. In doing so, 95% of our patients are spectacle independent; however, the other 5% complain of photic phenomena.

**Pepose:** In my practice, we have enjoyed excellent results and found high patient satisfaction with the Crystalens HD accommodating IOL, with improved near vision resulting from the bispheric modification of the central optic. The advantage of the Crystalens HD is that when the refractive target is achieved (0.25 D to plano in the dominant eye and -0.25 to -0.50 D in the nondominant), patients enjoy seamless, blended vision with high image quality and minimal complaints of photic phenomena or night glare. Some patients do not attain as much near vision as others; these cases may require low-power readers for smaller print or in low illumination.

For patients with atypical, asymmetric topography or a history of hyperopic LASIK, I would choose the Crystalens 5-0 or the newest model, the AO, which is currently undergoing clinical evaluation in the United States and may be available in Europe as early as April. The Crystalens AO has a uniform power and zero spherical aberration across the entire optic, minimizing alignment issues and the possibility of combining unwanted corneal and pseudophakic higher-order aberrations (HOAs), which may negatively interact to produce a highly aberrated composite whole-eye wavefront.

My practice also has experience with the ReZoom, AcrySof Restor, aspheric AcrySof IQ Restor +4.0 and +3.0 IOLs, and the Tecnis Multifocal. We have used these lenses bilaterally and in various combinations. All of these IOLs produce a greater degree of nighttime glare and photic phenomena compared with accommodating IOLs, so patients must be counseled accordingly preoperatively. The Tecnis Multifocal provides a balance of light energy between its near and far foci, and it has the advantage of being pupil independent; however, the optic directs less energy at intermediate. The aspheric AcrySof IQ Restor +3.0 has a more comfortable near point and through focus than the +4.0, but it may result in lower image quality compared with monofocal or accommodating IOLs, especially in patients who maintain smaller pupils.

**Vukich:** I have been working with presbyopia-correcting lenses since the Array multifocal IOL was developed. I have experience with other multifocal options, with both diffractive and refractive designs.

I have worked with the Crystalens accommodating IOL from its conception to the current HD version. I am also an investigator for the Tetraflex (Lenstec, St. Petersburg, Florida) and the Synchrony dual-optic implant (Abbott Medical Optics Inc.). I have had some experience with virtually all of the presbyopia-correcting lens modalities available in the United States and those that are under investigation.

**PREOPERATIVE COUNSELING**

**CRST Europe:** Briefly describe your process for patient selection and preoperative counseling with presbyopia-correcting IOLs.

**Alfonso:** We have separate preoperative processes for cataract and refractive lens exchange patients. My first choice in both cases is a bifocal diffractive lens, and if there is some contraindication (eg, retinal pathology, optic nerve alteration), I implant a monofocal lens. Older cataract patients typically are not as demanding and are generally happy after surgery. In cases of residual refractive error, we prescribe spectacles. Younger cataract patients or refractive lens exchange patients expect to obtain emmetropia. In the presence of residual refractive error, we perform a secondary procedure using the excimer and femtosecond lasers or PRK. We never guarantee complete spectacle independence.

**Carones:** My patient selection criteria have been simplified compared with years ago, because the latest presbyopia-correcting IOLs are much less demanding than those of previous generations. Particularly with the AcrySof Restor IQ +3.0 D, the potential compromises regarding quality of vision and intermediate vision are almost negligible, so that we have the opportunity to promote all-distance spectacle independence.

Once patients are screened for contraindications such as macular degeneration and amblyopia, they are informed and educated by an optometrist. Multimedia information devices such as DVDs are used to demon-
strate the pros and cons of various IOLs. Multifocal IOLs are my standard lens of choice when patients have no contraindications.

**Cionni:** All patients who are considering cataract surgery in my office are educated about presbyopia-correcting IOLs using literature mailed before their visit and educational DVDs in the office before I see them. I believe strongly that every patient should know about the availability of these IOLs—but this does not mean that all patients are candidates. Patients who do not have excellent visual potential, for any reason, are told that they will likely not do well with presbyopia-correcting IOLs and therefore should not pay for such an upgrade. Most patients with previous LASIK are likely good candidates, as long as the ablation was well centered and significant HOAs are not present. These patients are informed that an enhancement will more likely be needed because choosing the perfect IOL power is less likely in post-LASIK patients. Postradial keratotomy (RK) patients are discouraged from presbyopia-correcting IOLs; however, if the RK was only four or six incisions, they may fare well with the Crystalens.

At the preoperative exam, we discuss the pros and cons of these IOLs and make certain that the patient understands that we do not promise spectacle freedom, but rather, less dependence on glasses.

**Claué:** I always ask, “Do you hate spectacles?” If the answer is anything other than yes, I tend to favor a monofocal lens. If there is a patient desire to minimize spectacle dependence, then I undersell seriously: I tell them that the majority of people manage most activities without glasses, but I emphasize that they cannot expect to be spectacle independent—even though 95% are 20/30+ and J2+ unaided. I tell my patients that some people see unwanted ghost images that tend to resolve over 6 months. I explain, if appropriate, that their insurance company is likely to pass on to the patient the difference between the cost of a monofocal and multifocal IOL and that they will need bilateral surgery for the full effect. I ensure that each patient can give full informed consent, including understanding the potential for infection, and ask if they are interested in immediate sequential bilateral surgery. I then refer interested patients to the International Society of Bilateral Cataract Surgeons Web site (www.isbcs.org).

**Cochener:** Refractive surgeons know that informing patients of their options and proper patient selection conditions the success of surgery, especially in presbyopic patients. Indications for presbyopia-correcting IOLs progress with the experience of the surgeon and his knowledge of the indications and limitations of each specific model.

The best candidate for presbyopia-correcting lenses is a patient of more than 55 years of age who has good binocular vision, no deep amblyopia or ocular pathology, normal fundi, and no systemic disease. I avoid any patient with high expectations. In my early approach with multifocal lenses, the population consisted of refractive lens exchange patients asking for presbyopia correction; based on convincing results, I extended the indication to older cataract patients who desired spectacle independence and visual improvements. Refinement of lens calculations and the advent of toric multifocal IOLs have optimized refractive results; however patients should be informed that in case of residual ametropia, an enhancement may be necessary.

We defend the concept of using a customized approach according to the patient’s personal activities. In practice, most patients receive bilateral diffractive implants; we discuss the AcrySof IQ Restor +4.0 D for people who require fine near vision and an accommodating IOL when the patient predominantly needs intermediate vision and/or far vision with optimal quality of vision.

**Indications for presbyopia-correcting IOLs progress with the experience of the surgeon and his knowledge of the indications and limitations of each specific model.**

—Beatrice Cochener, MD

**Goes:** The first rule remains: under-promise and over-deliver. The surgeon should consider setting aside more preoperative chair time to discuss the patient’s expectations. Such a strategy will likely result in less postoperative chair time. Give patients the pros and cons from the start—discuss the potential for retreatments such as LASIK or PRK, and inform them about any extra payment in the event a touch-up is needed. Ask about their professional activities and hobbies, and find out if they drive a lot at night. Be wary of contact–lens-intolerant patients with obsessive behavior or excessive expectations.

**Pepose:** The process of patient selection and counseling begins with a modified Dell questionnaire to assess whether the patient places an added value on...
AT.LISA and AT.LISA toric
Carl Zeiss Meditec (Jena, Germany)

An acronym for light distributed asymmetrically, independence from pupil size, SMP technology, and aberration-correcting optimized aspheric optic; the AT.LISA multifocal IOLs are hydrophilic acrylic lenses with a hydrophobic surface. The optic diameter is 6 mm, with a total diameter of 11 mm (ATLISA 809M and ATLISA toric 909M; formerly called Acri.LISA 366D and Acri.LISA toric 466TD) or 12.5 mm (ATLISA 801; formerly called Acri.LISA 376D). This one-piece diffractive IOL adds 3.75 D at the IOL plane. The haptic angulation is 0º. According to the company, a new version of the AT.LISA 809M is available with a violet light filter (AT.LISA 809MV), and it will soon be available in a toric model. The 809M, 809MV, and 909M are implantable through an incision as small as 1.5 mm; the incision must be at least 2.2 mm for the 801.

Lentis Mplus
Oculentis GmbH (Berlin); distributed by Topcon Europe (Rotterdam, Netherlands)

This one-piece acrylic multifocal lens combines an aspheric, asymmetric far-vision zone with a sector-shaped near vision zone (3.00 D add) to provide a seamless transition between visual zones. It is also available with a 1.50 D add. When light hits the transition area, it is reflected away from the optical axis. The Mplus works independent of pupil size. The lens has a biconvex optic with a diameter of 6 mm, an overall diameter of 11 (LS-313 MF) or 12 mm (LS-312 MF), and a 360º square-edge design. The posterior of the optic is aspheric. The manufacturer’s recommended incision size for both designs of the Lentis Mplus is 2.6 mm. The LS-312 MF is available with 0.50 D steps between 10.00 and 27.00 D; the LS-313 between 15.00 and 25.00 D.

M-flex and M-flex T
Rayner Intraocular Lenses Ltd. (East Sussex, United Kingdom)

Based on the company’s multizoned refractive aspheric optic technology, the M-flex has either four or five annular zones to provide the patient with 3.00 or 4.00 D of additional refractive power, respectively. The patented AVH haptics create perfect centration and stability and help reduce the incidence of postoperative complications. The lens is available with an optic diameter of 6.25 mm (630F) or 5.75 mm (580F). The overall lengths are 12.5 and 12 mm, respectively. The 630F with 3.00 D add is available from 14.00 to 25.00 D in 0.50 D steps; with 4.00 D add, it is available from 10.00 to 25.00 D in 0.50 D steps. The 580F is available with a 4.00 D add from 25.50 to 30.00 D in 0.50 D steps.

Because standard multifocal IOLs are often contraindicated for patients with more than 1.50 D of corneal astigmatism, Rayner offers the M-flex T, a multifocal toric IOL combining the separate optical features of the parent models, M-flex and T-flex. The M-flex T is currently manufactured as models 588F and 638F, with a 5.75- or 6.25-mm optic and overall length of 12 or 12.50 mm, respectively. M-flex T with 3.00 D or 4.00 D add is available with spherical equivalent from 14.00 to 32.00 D in 0.50 D steps and cylinders from 1.00 D to 6.00 D in 0.50 D increments.

AcrySof IQ Restor IOL +3.0 and +4.0 D
Alcon Laboratories, Inc. (Fort Worth, Texas)

The AcrySof IQ Restor is a one-piece biconvex IOL available with either 3.00 or 4.00 D add correction at the lenticular plane. Both lenses have identical asphericity, energy distribution profile, and shape. The center 3.6 mm of the lens is an apodized diffractive optic, featuring nine concentric steps on the +3.0 D model and 12 concentric steps on the +4.0 D model, which gradually decrease. Surrounding the diffractive optic, the lens incorporates a refractive region to direct light to a distance focal point. According to the company, the lens has an optic diameter of 6 mm and an overall diameter of 13 mm. The available diopter range for the +3.0 D model is from 6.00 to 34.00 D. For the +4.0 D model, it is available from 10.00 to 34.00 D.

Tecnis Multifocal
Abbott Medical Optics Inc. (Santa Ana, California)

The Tecnis Multifocal IOL is a presbyopia-correcting lens with a foldable hydrophobic acrylic optic. The Tecnis optic has a patented wavefront-designed aspheric surface to reduce spherical aberration to zero. A proprietary diamond-lathing process is used to place the precise diffractive pattern of each individual lens. The full diffractive optic is designed for pupil independence and provides vision at all distances and in all lighting conditions. In the US Food and Drug Administration (FDA) clinical study, 96% of patients reportedly functioned comfortably at near without glasses.1

1. Tecnis Multifocal Foldable Acrylic Intraocular Lens (package insert); Santa Ana, California; Abbott Medical Optics Inc.

* Gathered from company sources
an enhanced range of vision and greater spectacle independence. Following this assessment, the patient’s daily routines, vocation, and avocations are reviewed. For example, does the patient work in a low-contrast environment, frequently drive at night, or work long hours on a computer? Does he or she have unique needs, such as reading the smallest print on the stock page, knitting, or fly-fishing—each of which requires a close focal point? Do they have realistic expectations, and are they able to accept and understand the concept that achieving the optimal end result may require a number of progressive steps, such as Nd:YAG laser capsulotomy or laser vision enhancement, as well as time to complete the process?

Vukich: In terms of patient counseling, perhaps the No. 1 thing to remember is to set expectations realistically. Patients who expect to be free of glasses for all activities are set up for disappointment. We have to counsel these patients to reach some level of understanding that presbyopia-correcting lenses will minimize—not eliminate—the need for glasses. Patients should know that under all circumstances they will have the ability to go about with their day-to-day activities. But there will almost certainly be a percentage of individuals who still need additional help at some distance, whether for driving at night or prolonged reading. In those individuals, you have to make sure they are aware of these things during the preoperative counseling process. Otherwise, you are setting them up for disappointment.

The currently available presbyopia-correcting lenses do a good job of going beyond what a single-vision lens does. In other words, this technology provides benefits not available to patients with current multifocal lenses. Certainly most patients are satisfied; however, it is not the majority we worry about. It is the occasional patient who maybe is disappointed with his postoperative vision who creates a difficult atmosphere and for whom it is difficult to deliver the value he believes he paid for. Pleasing these patients is probably the biggest issue surrounding presbyopia-correcting lenses.

FUTURE OF PRESBYOPIA-CORRECTING IOLS

CRST Europe: What is the future for presbyopia-correcting IOLs? What type of lens will you be implanting in 5 years?

Alfonso: We have implanted more than 3,000 diffractive lenses to date. Over the next 5 years, there will be a number of new diffractive toric and customized IOLs on the market. In addition to providing efficacy, safety, predictability, and stability, this type of surgery should also be systematic and symmetric. New diffractive optics will incorporate these possibilities.

Carones: The future is difficult to forecast. My ideal IOL would be an accommodating design that is inserted through a small opening in the anterior capsule in a gel-like state, which may truly restore accommodation. However, I am not sure this goal can be achieved in 5 years. Thus, I believe that an improved multifocal diffractive IOL will be the model most often implanted at that time.

Cionni: All current presbyopia-correcting IOLs have compromises. The design that currently provides the highest chance of patient satisfaction in my hands is the AcrySof IQ Restor +3.0 D. However, ultimately, I hope to be implanting a true accommodating IOL with good refractive predictability.

Claué: It is risky to talk about the future. We all know what we want: a perfect presbyopia- and aberration-correcting IOL that is safe, easy to implant, and cheap enough for health care economists to fund. I doubt we will have achieved all of this in 5 years.

Cochener: Satisfaction rates achieved with multifocal lenses are already acceptable and have been further improved with the availability of aspheric and toric models and modified diopter additions (eg, 4.00 D add vs 3.00 D add).

In the future, perhaps we will be able to use a trifocal IOL design instead of the current bifocal, with the goal of better vision quality at different distances. Whatever refinements are made to the multifocal concept, we will still be compensating for the loss of accommodation and never truly restoring it. Moreover, dispersion and loss in light distribution is inevitable, making the patient dependent on surrounding light conditions.

The hope for the future is to benefit from the development of accommodative lenses in terms of design and material biocompatibility with modern small-incision phacoemulsification. However, the principle goal is to achieve accommodative restoration and better efficacy.
in near vision compared with current accommodating models. In 5 years, for instance, we will be able to assess the new aspheric optic of the Crystalens.

Goes: Hopefully the future of IOL technology is a one-piece, preloaded, truly accommodating IOL (or gel) that will be inserted through a 1-mm incision. But I fear that these options will not be available in 5 years. The search for phaco-ersatz started more than 25 years ago with Jean-Marie Parel, PhD, and later on the Groningen (Netherlands) team, and we are still at the beginning of this journey.

Pepose: The future of pseudophakic presbyopia correction lies with accommodating IOLs. A dual-optic accommodating IOL such as the Synchrony, already available in Europe and in the final stages of FDA evaluation, offers a well-defined mechanism of action and a promising, theoretical increase in accommodative amplitude compared with single-optic designs. However, prospective, randomized, comparative trials are required to determine if the larger incision, longer postoperative time to reach emmetropia, and more demanding surgical technique required for dual-optic implantation will be counterbalanced by substantially greater, more consistent accommodation and faster reading speeds than those provided by the latest single-optic pseudoaccommodating IOLs with bispheric optics (eg, Crystalens HD) or newer aspheric diffractive multifocals (eg, AcrySof IQ Restor +3.0 D or Tecnis Multifocal). Just as these single-optic accommodating and multifocal IOLs went through iterative upgrades and improvements, further enhancements and modifications are likely to be applied to dual-optic designs.

Concomitant changes in cataract surgery, such as the introduction of femtosecond-laser–assisted capsulorhexis, liquefaction, and softening or chopping of the lens could facilitate the transition to dual-optic and other accommodating lens designs and create more uniform surgical outcomes.

In my opinion, the greatest diopteric change in accommodation may be associated with accommodating lenses capable of changing shape. Although there remain many challenges, the FluidVision IOL (PowerVision, Inc., Belmont, California) and NuLens DynaCurve (NuLens, Ltd., Herzliya Pituach, Israel) offer exciting possibilities for the future. The FluidVision lens has soft, fluid-filled haptics (the fluid is of a matched refractive index) driven through channels leading to a central internal actuator. The shape and curvature of the deformable anterior optic change during ciliary muscle contraction.

The NuLens DynaCurve is a sulcus-placed IOL. It uses the collapsed anterior and posterior capsules as a zonular-capsular diaphragm, transferring force via a piston-like element to a pliable, deformable gel and pushing it through a rigid round aperture to thereby change its radius of curvature. A similar natural design is found in the eyes of diving water fowl, whose gel-like lens is forced through a rigid muscular iris, achieving up to 60.00 D of accommodation.

It is also possible that light-adjustable lens material, currently under investigation by Calhoun Vision, Inc. (Pasadena, California), may be incorporated into these and other lens designs, thereby increasing the likelihood of achieving emmetropia without more invasive secondary procedures. If problems with capsular fibrosis, gel leakage, and other material and procedural issues can be overcome, it is possible that capsular-bag–refilling techniques using a gel-like polymer could eventually be developed and perhaps facilitated by new femtosecond-laser–assisted lens extraction methodology. However, meeting the challenges associated with filling the bag will likely take longer than a 5-year horizon.

The next phase in presbyopia-correcting lenses will be a variable-focus implant with a smooth range of accommodation.
—John A. Vukich, MD

Vukich: I think the future is accommodative technology. Multifocality, which splits a single source of light into two focal points, is a limited technology because it introduces distortion into the visual system. Some people find this distortion unacceptable. The next phase in presbyopia-correcting lenses will be a variable-focus implant with a smooth range of accommodation. We are starting to see forward progress with single-lens options, such as the Crystalens and the Tetraflex; however, there is much promise in a dual-optic design, such as the Synchrony, or in a lens that has a formable optic, such as the NuLens DynaCurve. This lens has a variable-focus optic based on the deformable anterior surface of the implant.

PROMISING DESIGNS

CRST Europe: In your opinion, what is the most promising new presbyopia-correcting technology or IOL design?

Alfonso: The versatility of diffractive IOLs, such as the AcrySof IQ Restor +3.0 D aspheric bifocal diffractive
lenses. This technology, with different additions and asphericities, would allow us to correct all patients submitted previously for an excimer laser procedure. This will create a great potential for presbyopia-correcting IOLs.

We are also interested in using diffractive, epicapsular phakic IOLs, such as the Visian ICL (STAAR Surgical, Monrovia, California), or with angular support, such as the AcrySof Cachet (Alcon Laboratories, Inc.) platforms.

Another option is piggybacking the ATLISA 536 in front of a monofocal lens.

Carones: There are no new or promising IOL designs that will significantly impact the market and benefit our patients in the next 2 to 3 years. The revolutionary concept of the NuLens DynaCurve looks promising, but I doubt it will be clinically available for the general market in the near future.

Cionni: Each of the newest offerings still has compromises, but the technology is moving in the right direction. Some of the accommodating designs promise a great deal of accommodative amplitude; however, they are challenging to implant and have uncertain refractive outcomes. The newer multifocal designs also promise better distance and near vision, but they still split light.

Claoué: Michael Amon, MD, of Vienna, Austria, has described a new IOL platform that can be used as a supplemental IOL, which is effective as a piggyback implant. The Sulcoflex (Rayner Intraocular Lenses Ltd.), capable of correcting spherical errors and astigmatism, can also convert a monofocal pseudophakic eye into a multifocal eye. This means that even years after initial surgery, when an IOL exchange would be significantly hazardous, the eye can have the absolute presbyopia of a monofocal IOL corrected. I think we will be implanting a lot of these IOLs in Europe over the next 5 years.

Cochener: From a theoretical point of view, approaches that aim to restore accommodation to the lens appear to hold more promise than those that simply compensate for loss of accommodation. New designs of accommodating lenses that could fit through a small incision and reproduce the dynamic accommodation of the crystalline lens in the bag remain an elusive goal. Taking another approach, researchers have also experimentally demonstrated the ability to restore some deformability to the crystalline lens through direct action with a femtosecond laser. However, before these projects become reality, there will be still a place for multifocal lenses with refined designs. We should also focus interest on corneal approaches to presbyopia correction, especially IntraCor (Technolas Perfect Vision, Heidelberg, Germany) and presby-LASIK profiles based on hyperprolacticity rather than multifocality.

Goes: If it can be manufactured, a true accommodating IOL is the most promising technology. For the moment, many lenses remain good possible choices, all depending on the surgeon’s expertise. However, no one technology accurately mimics the performance of the natural crystalline lens. For the surgeon, it is neither advisable to use too many lens combinations nor to switch lenses too often.

Pepose: Multifocal, single-optic pseudoaccommodating, and dual-optic accommodating IOLs have gone through a number of iterative upgrades. As I mentioned, my current go-to lens is the Crystalens HD, which has a central bispheric modification of the optic, further enhancing depth of field. In the near future, the ability to more consistently achieve emmetropia will be enhanced by the introduction of a wide range of toric models, and excellent image quality will be further improved by customized aspheric modifications. Additionally, it is possible that small aperture corneal inlays such as the AcuFocus (AcuFocus, Inc., Irvine, California) may prove synergistic in increasing depth of field and blocking unfocused light in conjunction with accommodating IOLs—and even in patients implanted with monofocal IOLs—in a mix-and-match strategy.

However, the most promising new pseudophakic technologies under development are the shape-changing presbyopia-correcting IOLs I previously mentioned. These may create enough accommodative reserve to represent a true paradigm shift. There will be more consistent improvement of near vision and less need to compromise image quality as seen with the use of multifocal IOLs. All of these current and future technologies must better address the issues of capsular stiffening and fibrosis, achieving emmetropia, and introducing unwanted aberrations during accommodation and disaccommodation while maintaining the benefits of small-incision surgery.

Vukich: The NuLens DynaCurve is showing significant promise in its ability to create a multifocal surface in response to the mechanical change induced by the eye’s accommodative process. Variations on this variable-focus optic are also being investigated. This is an area of intense research right now, and we will be moving forward in developing this next generation of IOLs.

TORIC IOLs
CRST Europe: There seems to be an increase in the use
of toric IOLs. In what percentage of cases do you use these lenses, and what is your preferred toric model?

**Alfonso:** We use toric monofocal and multifocal implants in approximately 15% to 20% of patients. However, we have to consider the actual ranges of toricity available today. As higher toricity IOLs become available, they will benefit a larger portion of the population.

**Carones:** My preferred toric IOL is the AcrySof toric (Alcon Laboratories, Inc.), which I implant in roughly 15% of my patients. This figure would be larger should toricity be available in the Restor model.

**Cionni:** Without question, the AcrySof toric is the most predictable and stable of the toric IOLs available today. In my practice, about 20% of patients are implanted with this style IOL.

**Claué:** Unfortunately, in the United Kingdom, our state health care system regards the correction of naturally occurring astigmatism as cosmetic surgery and will not fund it. As such, my use of toric IOLs is predominantly in private patients; if the patient has more than 1.00 D of predictable postoperative astigmatism (after making allowances for the effect of my on-meridian incision), he receives a toric IOL. The one exception is when the optical outcome target is not emmetropia, to balance the contralateral eye, because the patient will require spectacles in every case.

I believe that toric IOLs should be customized to the patient’s cornea and that online advance ordering is the way of the future. Attempts to foist large stocks on operating theaters are inefficient from all perspectives. My preferred IOL is the T-flex (Rayner Intraocular Lenses Ltd.) because it uses the same single-use injector as standard spherical IOLs. A diagram showing the position of the IOL in the eye makes alignment easy. Additionally, it has the 360º square optic edge that is missing from its main competitor, and I regard this as a mandatory part of an IOL platform in the 21st century.

**Cochener:** Approximately 20% of the IOLs I implant are toric. I share the same general enthusiasm for toric lenses as my colleagues because they offer the advantage of being suitable for any kind of cataract. If proper pre- and intraoperative marking is performed, good orientation is commonly guaranteed. For the patient expecting only an improvement in BCVA and UCVA, spectacle independence and good preservation of quality of vision after toric lens implantation will surprise him.

The availability of toric lenses with up to 6.00 D of cylinder allows their use in postkeratoplasty or kerato-conic patients. Innovative platforms such as the Calypso (Carl Zeiss Meditec) and ORange (WaveTec Vision, Aliso Viejo, California), developed to refine centration under the microscope, should improve the accuracy of these lenses.

I have experience with the AcrySof toric monofocal IOL and the toric AT.LISA. Both provide convincing results in term of visual performance, stability of intraocular positioning, and refractive results. We know that most of the unsatisfactory results achieved with multifocal lenses are due to residual astigmatism; therefore, this option of toric multifocal IOLs will significantly decrease the number of secondary enhancement procedures needed after multifocal implantation.

**Goes:** Our preferred model for astigmatism correction (range, 1.50 to 3.00 D) is the AcrySof IQ toric IOL because of its good rotational stability. I have also obtained excellent results with the Artiflex toric phakic IOL (Ophtec, Groningen, Netherlands) in high myopes with astigmatism.

**Pepose:** I routinely use toric lenses in patients with 1.50 D or more of corneal astigmatism. For less than 1.50 D, I generally use limbal relaxing incisions. I currently favor Alcon’s aspheric toric IOL because it is easily injected through a 2.2-mm incision and gives highly predictable outcomes. Its tacky surface results in minimal lens rotation, as long as care is taken to remove the ophthalmic viscosurgical device (OVD) from beneath the IOL. I predict that we will see an expansion of aspheric IOL models and designs with lower and higher toricity in the near future, along with toric multifocal and accommodating IOLs.

**Vukich:** Of the premium lenses that we implant, the vast majority (80%) are toric, the reason being that there is little opportunity for disconnect between attempted and achieved outcomes. If we perform surgery carefully and implant the lens in the proper axis, there is no variability in the response. Patients with preoperative astigmatism achieve a better UCVA with a toric lens than a nontoric lens, and it is easy for the patient to notice this
visual difference. In contrast to current multifocal and accommodating IOLS, it is easy to predictably deliver exactly what you tell the patient you are going to provide with a toric IOL. I think this, maybe more than anything, is the reason that toric lenses have become so popular. With multifocal and accommodating lenses, a percentage of patients will fall short of their preoperative expectations—even when properly counseled. This makes it difficult for the surgeon to deliver the value that the patient feels he paid for. That can potentially be an unhappy situation for everyone.

Currently, we use several toric options. The two that are available in the United States now are the STAAR toric IOL (STAAR Surgical, Monrovia, California) and the AcrySof IQ toric, and there are not a lot of differences. Both are rotationally stable within the eye, and both achieve great visual outcomes. From a practical standpoint, the optical quality of each is excellent.

**ASPHERIC IOLS**

**CRST Europe:** How do aspheric IOLS fit into your armamentarium?

**Alfonso:** An aspheric lens is always our first choice for both multifocal and accommodating IOL platforms. We await a larger range of asphericity to fit individual corneal asphericity better, especially in post-LASIK patients.

**Carones:** Currently, 95% of my implanted IOLS are aspheric. Although it is difficult to assess the real benefits of aspheric IOLS in daily surgery, I implant them on a routine basis because of their theoretical advantages.

**Cionni:** All patients in my practice receive an aspheric IOL unless they have undergone hyperopic LASIK. Since hyperopic LASIK decreases positive spherical aberation, there is usually no need to further decrease spherical aberation.

**Claoué:** We currently have a bewildering array of aspheric options, including negative asphericities that claim to leave the average eye with zero spherical aberation. However, I think it is noteworthy that two of the major IOL companies (Rayner and Bausch & Lomb) have decided to produce zero-aspheric IOLS, and I am certain that in 2010 this is the correct decision. First, it seems as absurd to me to offer a single value of negative asphericity as it would be to offer a single spherical power: Each patient has a unique eye, and we must demand from manufacturers an IOL that corrects the aberrations of that specific eye. The optimal optical outcome is probably not zero spherical aberation.

Second, there is increasing evidence3-8 that patients prefer and perform better with a zero–spherical-aberration IOL than with a negative–spherical-aberration IOL. I believe that this is because we have naively tried to translate results from laser vision correction, where zero–spherical-aberration outcomes seem to be associated with better visual function. Unfortunately, it was forgotten that laser vision correction is typically performed in young patients whose eyes can accommodate, whereas pseudophakic eyes cannot. Until we know the ideal residual spherical aberation for a pseudophakic eye and have the technology to produce customized IOLS, I believe that zero spherical aberation is the best compromise. Obviously, the higher the IOL power, the more important it is to use an aspheric IOL.

**Cochener:** Just like other surgeons, I have adopted aspheric IOLS as my first lens choice. One major reason is that any new foldable lenses developed today are aspheric, based on the assumption that asphericity is a required property for better quality of vision. We should also consider clinical evidence: These new aspheric profiles strengthen the final outcome in the older population presenting with natural miosis. Although I do not prefer one aspheric model over another—aberration free versus aberration neutral versus negative spherical aberation—in uncomplicated cases, I would not recommend using an IOL with negative spherical aberation when there is risk of significant tilt or decentration.

When we manage a cataract after corneal refractive surgery, the choice of lens profile should be considered with great care, aiming for a balance between corneal spherical aberations and those related to the IOL. The goal will differ with the patient’s age and current activities. Rather than achieving a Q factor or spherical aberation equal to zero, a slight amount of positive spherical aberation or negative Q factor may be required to achieve good depth of focus. A nice development for the future would be the design of custom IOLS that may be adjusted as a mirror of each individual cornea.

**Goes:** I use aspheric IOLS routinely in more than 90% of eyes. In special cases such as after previous refractive surgery, the choice of the lens depends on the patient’s wavefront measurement.

**Pepose:** Aspheric IOLS have become the new standard optical design compared with older spherical IOLS that—in proportion to IOL power—add to, rather than offset, the positive spherical aberation of the average cornea. For almost all patients (with the possible exception of those with hyperprolate corneas), an aspheric IOL is
It may be possible to optimize results by choosing a customized aspheric IOL.
—Jay S. Pepose MD, PhD

favorable over a spherical IOL. It is important to ensure good IOL centration of lenses with negative spherical aberration, lest they induce secondary astigmatism and third-order aberrations.

Depending on factors including pupil size, corneal spherical aberration, and corneal waveform, it may be possible to optimize results by choosing a customized aspheric IOL. This strategy offsets the corneal spherical aberration of the individual patient. There is also a role for aspheric IOLs of zero aberration, such as the SofPort and Akreos (both by Bausch & Lomb), in finding a delicate balance between optimized asphericity and enhanced depth of field without adding to corneal HOAs.

Vukich: We use aspheric IOLs in most of our patients. I believe that asphericity offers a better optical outcome that benefits my patients, although it is not a huge difference from the patient’s perspective. We know from optical theory and postoperative wavefront analyses that aspheric IOLs generate clearer images than spherical IOLs, which should translate to better quality vision. However, although many surgeons have tried to demonstrate a functional difference in outcomes, it is hard for patients to notice a difference in UCVA with aspheric IOLs.

Generally, we find aspheric lenses to be a suitable option, and they have become my lens of choice for standard surgeries in which a premium lens is not chosen.

PRACTICE STYLES

CRST Europe: What is the biggest positive change you made to your practice in 2009 and will continue to pursue in 2010?

Alfonso: Our use of toric diffractive bifocal lenses has allowed us to solve two problems, astigmatism and presbyopia, in the same procedure.

Carones: I have made no significant changes; however, one minor change that significantly impacted my practice was the introduction of the Cachet phakic IOL (Alcon Laboratories, Inc.). I have started implanting this lens routinely with good results. I have also made some structural changes to my outpatient ambulatory clinic to better service my patients.

Cionni: I cannot say that I have made a tremendous change in my practice this year. I have always been an advocate of premium IOL choices. However, I believe that I am doing a better job educating all patients about their options and choosing the right implants for the right patients.

Claoué: The financial crisis has been particularly savage in the United Kingdom, and most so in London and in the financial corridor where I practice. We have become even more customer-focused to survive in this economic climate.

Cochener: Ophthalmology progresses so fast that we are making not only one change per year but many. We need to stay aware of the considerable refinements that occur every 6 months. With this in mind, the biggest change that I have made in cataract surgery this year is that I now consider cataract procedures as true refractive surgery, and my goal is to achieve emmetropia as often as possible.

We can aim for spectacle independence in addition to visual improvements and strive to preserve the quality of vision. That is why topography and aberrometry have been systematically included in the arsenal of tools for cataract surgery, and toric and multifocal lenses now represent two-thirds of implantations in my practice.

I should also mention that the advent of intraocular imaging for improving the sizing of phakic lenses has provided better safety. This year, I focused on the AcrySof Cachet, which was under FDA evaluation in our center for the past 5 years, and the Visian Toric ICL (STAAR Surgical).

Goes: I started using a xylocaine (lidocaine) anesthetic gel on top of the anesthetic drops. I also started using toric IOLs in phakic eyes as well as for cataract surgery and successfully implanted the first Artiflex toric phakic IOL.

Pepose: This year, we switched from the Verisyse phakic IOL (distributed in the United States by Abbott Medical Optics Inc.) to the Visian ICL because of its smaller incision size, rapid visual recovery, and lack of induced astigmatism. This phakic IOL has a high safety profile in long-term follow-up, and it provides us with an effective, viable alternative to present to myopic patients who are not ideal LASIK candidates. I look forward to the availability of toric versions of the ICL in the near future, along with other foldable phakic IOLs that may be angle-supported.
Vukich: I am excited about the completion of the FDA dual-optic Synchrony IOL trial and what appears to be a near-horizon FDA approval of the lens. I am excited because of the excellent ability of this IOL to deliver an accommodative response in the clinical trial. I am looking forward to being able to offer this lens routinely in my practice.

In 2009, I realized that simple changes can make a world of difference. I began using the Malyugin Ring (MicroSurgical Technology, Inc., Redmond, Washington) with more frequency.

This has been important because of our patients’ use of Flomax (tamsulosin; Boehringer Ingelheim GmbH, Ingelheim, Germany) and other alpha-adrenergic blockers, which change iris consistency and create slowly dilating or poorly dilated pupils (ie, intraoperative floppy iris syndrome). We see a lot of patients who are using or have used tamsulosin. In the past year, rather than work with different OVDs or dilation regimens, I started using the Malyugin Ring for pupil dilation on a routine basis for patients with a history of tamsulosin use. The incorporation of that device on a routine basis has made things easier for patients in this group and much easier for me. This is not a huge difference in terms of economic model or change in implant; it is a simple routine incorporation of an existing technology that works well. It has made my day-to-day operations much easier.

CRST Europe: Thank you all for participating in this virtual roundtable discussion. Although lens availability and preference vary between Europe and the United States, it is evident that surgeons worldwide are excited about the variety of presbyopia-correcting IOLs on the horizon. We will reconvene a new discussion in 2011 to evaluate the progress in this industry.

1. Claoue C. Do we already possess the technology to treat presbyopia? Paper presented at: the ESCRS Congress; September 1997; Prague, Czech Republic.