



I Howard Fine

Joseph Colin

# Surgeons expect use of accommodating IOLs to grow

Devon Schuyler  
in Las Vegas

ALTHOUGH they may have gotten off to a slow start, accommodative intraocular lenses will grow as companies continue to refine the technology, according to I Howard Fine, MD, clinical professor of ophthalmology at Oregon Health and Science University in Oregon.

“Accommodating IOLs, and presbyopia IOLs in particular, are the wave of the future for ophthalmology,” he told *EuroTimes*.

In a presentation on accommodative lenses at the annual AAO meeting, Dr Fine said that he expects accommodative IOLs to completely replace multifocal IOLs and become the dominant refractive surgery option.

Multifocal IOLs do have the advantage of requiring no accommodative effort, he said. However, they do require central nervous system adaptation, will always produce halos or blur circles, result in some loss of contrast sensitivity, and may be a bad choice for people with age-related macular degeneration.

Accommodative IOLs have numerous advantages over multifocal IOLs, he said. First of all, they mimic the patient's experience before presbyopia sets in. Another advantage is that all light comes from and is focused as a single focal point. Finally, they provide the potential for continuous, excellent vision at all distances, and produce no unwanted retinal images, no loss of light energy, no loss of contrast sensitivity, and no central nervous system adaptation. The disadvantages are that they require adequate amplitude of accommodation to avoid reading fatigue and that they require adequate capsule clarity and elasticity.

The best-studied accommodative IOL is the CrystaLens (Eyeonics), which is approved for use in the US and Europe. Dr Fine's clinic took part in the study that earned US FDA approval for the lens. For one part of the study, his centre looked at uncorrected binocular vision in 24 people and found that 73 per cent had distance vision of 20/25 or better; intermediate vision of J2 or better; and near vision of J2 or better 11 to 15 months after surgery.

In the overall FDA clinical results on uncorrected binocular vision in 124 patients, 92 per cent had distance vision of 20/25 or better; 98 per cent had intermediate vision of 20/25 or better; and 73 per cent had near vision of 20/25 or better 11 to 15 months after surgery. In addition, 73.5 per cent either did not wear spectacles or wore them almost none of the time.

The other accommodating IOL that is available in Europe is the ICU (HumanOptics). Currently under development are dual-optical IOLs such as the Synchrony (Visiogen) and the Sarfarazi (Bausch & Lomb), deformable IOLs such as NuLens, Power Vision, FlexOptic, and the SmartIOL (Medennium), and a light adjustable IOL (Calhoun Vision).

The advantage of dual-optic IOLs is that they yield more accommodative amplitude for the same amount of lens movement compared with single-optic IOLs. Deformable IOLs offer the possibility of much greater amounts of accommodative amplitudes, and light-adjustable IOLs will allow for sequential enhancements.

## A natural choice for baby-boomers

Sandy T Feldman MD, who also spoke at the meeting, said that accommodating IOLs were a natural choice for baby-boomers, “who all

want young bodies and perfect vision.”

Dr Feldman, of ClearView Eye & Laser Medical Center in San Diego, California, cited the excellent results with the CrystaLens as a good reason for their increasing popularity. For example, in clinical results submitted to the Food and Drug Administration, 24.8 per cent of 242 primary eyes and 51.6 per cent of 124 bilateral subjects had near visual acuity of 20/25 or better one year after surgery. Accommodating IOLs also have demonstrated results superior to those with standard IOLs in push up, defocus, and dynamic retinoscopy studies.

He said that the CrystaLens has several mechanisms of action. The first is translational movement, which occurs in an anterior/posterior direction. The second is “accommodative arching,” in which the IOL arches or curves. The third is asymmetric tilting of the lens.

In summarising the strengths of accommodating IOLs, Dr Feldman said that they provide high-quality distance vision without loss of contrast sensitivity, excellent intermediate vision, and high quality near vision that improves over time. In addition, wavefront studies have revealed that the power changes mimic those of the younger, natural lenses. He also pointed out that most studies have demonstrated power changes greater than the purported 1.0 D of monocular accommodation.

## Current limitations

Accommodating IOLs do have several limitations and weaknesses, however. For example, the patient must have zonules because the IOLs cannot be placed in the sulcus. Problems with capsular contraction syndrome occurred in early models, and there may be unknown effects of capsule,

effort, and placement on the IOL. For example, the forward movement of the optic may be inhibited by a small capsulorhexis.

Dr Feldman also pointed out that patients must go through a learning curve when they first receive the implants, and that posterior capsular opacification may occur. Finally, he pointed out that accommodating IOLs appear to increase negative spherical aberrations and coma.

Despite these drawbacks, he described accommodating IOLs as a “win-win-win” for patients, physicians and manufacturers, and said that he was “looking forward to continuing improvements” in the lenses.

Joseph Colin, MD, who moderated the AAO session, told *EuroTimes* he agrees that the use of accommodating IOLs and presbyopia IOLs in particular, are the wave of the future for ophthalmology. The only question, said Dr Colin, is when.

He pointed out that the optical and visual performance of the current accommodative IOLs is not ideal, and a lot of concerns remain about the long-term stability of the accommodative properties and complications such as capsular bag contraction and posterior capsule opacification.

He said that the new models under development are bulky – which may lead to astigmatism – but seem to have improved optical characteristics.

“They are necessary steps in the long way towards the optimal IOL,” said Dr Colin, who is head of the ophthalmology service at the Pellegrin-Tripode Hospital in Bordeaux, France.

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