Refractive Lens Exchange – the bridge between cataract and refractive surgery

Stefanie Petrou Binder MD in Berlin

GONE are the days when ophthalmic surgeons were satisfied with merely restoring vision by replacing an old, clouded crystalline lens with a new, clear IOL. The emphasis has now shifted to attaining the highest possible visual quality without spectacles through the combination of cataract and refractive surgical techniques, said Prof Thomas Kohnen MD in the keynote lecture at the joint meeting of European Society of Ophthalmology and the German Ophthalmology Society (SOE/DOG).

“Modern cataract surgery has turned into refractive surgery with the optimisation of quality of vision after lens removal. The solutions that Harold Ridley and Jose Barraquer were looking for are being found in the combination of cataract and refractive surgery. The next challenge for surgeons will be to reverse presbyopia by using these techniques,” said Dr Kohnen, head of the refractive surgical team at the Goethe University Eye Clinic, Frankfurt, Germany.

Refractive surgery involves a corneal procedure that implements an excimer laser for corneal ablation, an intraocular procedure using intraocular implants, or frequently a combination of the two for the correction of refractive errors, Dr Kohnen said.

LASIK is now used successfully to correct myopia, hyperopia, and astigmatism. Higher order aberrations (vertical and horizontal coma and spherical aberrations) can only be corrected by refractive surgical means, not with glasses. The major advantage of the research currently being undertaken in refractive surgery is its concentration on higher order aberrations, Dr Kohnen observed.

**Phakic IOLs**

Phakic IOLs are now being used to correct higher myopia, higher hyperopia, and higher astigmatism. In a recent US/European investigation that included 54 highly myopic patients requiring a mean correction of -10.0 D, Dr Kohnen reported that the Alcon Phakic Acrysof, a new angle-supported IOL, showed very good 6-months results. The implantation technique is very quick and easy, he said.

At six months, 81% of the patients reached uncorrected visual acuity of 20/25 or better, with 53% reaching 20/20 or better. All patients achieved vision of at least 20/40. Predictability was good, with 95% within 1.0 D of emmetropia at three months and 96% at six months. Eighty-five percent of Dr Kohnen’s patients were within 0.5 D of emmetropia at three months, as were 83% at six months.

**RLE and multifocal IOLs**

Dr Kohnen noted that refractive lens exchange is where cataract and refractive surgery meet. Surgeons can now use familiar cataract surgery techniques to correct myopia, hyperopia, astigmatism and even presbyopia. Dr Kohnen explained that the natural human lens shows serious signs of change (yellowing) at around 47 years. He predicted that this fact would be the basis for increased refractive lens extractions in the future. Advances in lens removal technologies for younger, softer lenses, such as the Aqualase system (Alcon), are a great step forward, he noted.

He predicted that the next step would be refractive lens exchange to reverse presbyopia. One way to confront the challenge is through the use of multifocal IOLs, Dr Kohnen observed.

He cited an FDA study that investigated the ReSTOR® multifocal lens (Alcon) that found that 92% of patients receiving the lens had 20/40 or better for best corrected distance vision. In binocular surgeries, all of the patients had vision of at least 20/40, six months after surgery. The near-visual results were just as promising, with 98% achieving at least 20/40, and even better results for patients with binocular implantations.

The loss of contrast was lower than that observed with previous multifocal IOLs, he noted. In addition, patient satisfaction was very high, with 92% opting for the same lens implant again one month after first-eye surgery. Spectacle independence for these implants was as high as 88%. He predicted that with better technical improvements, particularly in IOL biometry, future results are very likely to improve.

Refractive lens extraction imposes greater challenges than conventional cataract surgery. Accurate biometry is vital. PCO reduction has also become a key theme for refractive lens exchange, as patients are much younger than cataract patients and PCO may become evident if adequate measures are not taken.

Accommodative IOLs have not yet reached their potential, but there is a lot of excitement about the prospects for these lenses. Accommodative lenses currently available include the Crystalens® (Eyeonics) and the ICU (Humanoptics). Lenses now in clinical trials include the Synchrony (Visiogen) based on a dual-optic design. Further down the pipeline is the SmartIOL (Medennium) a lens that fills the entire capsule and has a movement of 0.5 mm, with the potential to provide 7.0 D of accommodation.

Much research is needed before multifocal and accommodative IOLs reach their potential. Nonetheless, Dr Kohnen emphasised that the future lies in the combination of cataract and refractive surgery to correct presbyopia.

Thomas Kohnen
kohnen@em.uni-frankfurt.de

**Spectacle independence 6 months after 2nd eye surgery**

![Spectacle independence graph](Image)

**EuroTimes February 2006**