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PRESBYOPIA CORRECTION WITH MULTIFOCAL LENSES

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Refractive lens exchange (RLE) is the term used for the ultrasound removal of clear lens with implantation of the intraocular lens (IOL) in order to correct patient's refractive error. It is predominantly used in patients with presbyopia (aged 45 years or older). RLE is in fact identical surgical event as the removal of cataract; and it found its place in refractive surgery with the improvement of surgery techniques and invention of multifocal IOLs. First IOLs successfully dealing with presbyopia, named multifocal intraocular lenses (MFIOLs), were launched on the market in early 1980s. They were the first step towards full vision correction after cataract surgery. First generations of MIOLs were designed to have different refractive power in the central zone and toward periphery; producing in this manner several foci. These lenses were able to provide patients with good near vision even without the use of spectacles, thus correcting presbyopia. The main disadvantages of MIOLs caused by lens design, were disturbing phenomena such as halo and glare especially at night in some patients and the fact that patients needed some time for their brain to adapt to MFIOLs (neuroadaptation). Patients which have had bilateral multifocal IOL implantation on the same day tend to have less problem with neuroadaptation. Another disadvantage of first multifocal IOLs was their inability to correct vision at intermediate distance, which is mostly important for younger presbyopes using computers or other tasks at the distance of 80 cm to 1m. Later on, trifocal IOLs and low add MFIOLs were invented, successfully correcting vision for all visual needs: at distance, intermediate and near. Most recently, a novel IOL called extended range of vision IOL was launched, with a minimal level of disturbing photic phenomena and high level of patient satisfaction. In a recent study comparing the optical quality of three widely used MFIOLs assessed with an instrument which measures modulation transfer function of each lens, it has been shown that different MFIOLs show best optical quality at either distance, intermediate or near vision; possibly helping the clinicians to choose the proper lens depending on the patient's visual requirements. Although multifocal IOLs are able to fully correct vision in high percentage of patients, they were firstly not applicable in eyes with the astigmatism, since such eyes have an individual need for correction of cylindrical power and axis which is different in each eye. The most recent advancement in IOL technology is a com-

bination of multifocal and toric design, resulting in multifocal toric design of the lens which provides a complete visual recovery for patients with astigmatism and presbyopia.

Keywords: refractive lens exchange; multifocal intraocular lenses; astigmatism; intraocular lenses.

MULTIFOCAL IOL IMPLANTATION AFTER LASIK

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Purpose: As part of the normal aging process patients who are undergoing keratorefractive procedures may ultimately develop cataract and will need cataract extraction with intraocular lens implantation. Those patients, used to very good vision, have very high expectations and demand perfect vision without correction after cataract surgery. Until recently refractive results were not as good as expected. Most of the patients had some refractive surprise after cataract surgery – mainly hyperopic shift after previous myopic correction. The reason for this can be found in current instrumental error in keratometry readings which consequently result in IOL formula error. Numerous IOL calculation methods were developed over the years for improvement of final outcomes. Due to the inaccuracy in IOL calculations and optical quality of cornea altered with laser refractive surgery until recently multifocal IOLs were not advised for implantation. With improvement in IOL calculations and development of new MFIOLs combined with improvement in excimer lasers and techniques nowadays MFIOL can be considered as an option for that kind of patients.

Material and methods:21 patients underwent binocular cataract surgery with implantation of Symfony IOL. All patients had some type of keratorefractive surgery in the past.13 eyes were myopic prior to the keratorefractive surgery and 8 eyes were hyperopic. IOL power was calculated with two methods IOL Master and and ASCRS web page (http://iol.ascrs.org/). Uncorrected distance (UDVA) and near (UNVA) visual acuity, spherical equivalent (SE) and high order aberrations were measured at 3 months postoperatively.

Results: In eyes with previous myopia average UDVA was 0,06±0,08LogMAR(range 0,2 to 0,0), average UNVA was 0,07±0,08LogMAR (range 0,2 to 0,0) and SE was +0,28±0,34D (range -0,50 to +0,75D).Average values of trefoil were 0,09±0,07μm