Laser Refractive Surgery Solutions For Correcting Post Cataract Surgery Refractive Errors.

Modern cataract surgery \(^1\) is also a refractive procedure and is performed to correct a refractive error such as myopia, hyperopia, and astigmatism especially when associated to a decrease in accommodation. Emmetropia (spherical equivalent \(-0.5\) to \(+0.5\) D and \(<1.0\) D astigmatism) is the goal in most cataract cases. Accurate biometric analysis, selection and calculation of the adequate IOL, and modern techniques for cataract surgery all help surgeons to move toward the goal of cataract surgery as a refractive procedure free from refractive error. However, in spite of all these inputs and the preventive measures residual refractive error still occasionally occurs after cataract surgery. Refractive surprise after cataract surgery can be an unpleasant and frustrating situation for both the patient and the physician. Therefore, it is important to know the different methods that can be used to resolve this unsatisfactory situation, such as corneal-based surgery (laser refractive surgery) and lens-based procedures (IOL exchange or piggyback IOLs) and the expected outcomes and possible complications of the different procedures.

Lens based procedures like IOL exchange or piggyback IOLs have a lot of disadvantages along with advantages. There can be again issues with IOL power calculation and/or wrong IOL being used. With the lens based surgery the finesse can be \(0.4\) to \(0.5\) D at best \(^2\) in most of the cases. These are intra operative procedures which are technically difficult and the risks are more as far as the intra and post op. complications are concerned.

Considering all these, laser refractive surgery offers simpler, less risky and more accurate solution to tackle the post operative refractive errors with higher predictability of results. The finesse can be \(0.1\) to \(0.2\) D with PRK and LASIK. In addition, laser refractive surgery can correct pseudophakic presbyopia and higher order aberrations along with correction of spherical and cylindrical errors. The biggest advantage apart from accuracy is that it is an extra ocular procedure which has good patient’s acceptance. LASIK can be safely done in cases with posterior capsular rent or post YAG capsulotomy as compared to lens based surgeries.

Indications are low to moderate myopic or hyperopic sphero-cylindrical errors, pseudophakic presbyopia and existence of higher order aberrations. The procedure can be either Lasik or PRK based on the corneal thickness and other parameters. Lasik treatment after cataract surgery have better outcomes in eyes implanted previously with monofocal IOLs than multifocal IOLs. There is a limitation in the predictability of hyperopic LASIK.
refinement in eyes previously implanted with multifocal IOLs, and this may be because of the existence of errors in the estimation of residual refraction in eyes with multifocal IOLs because of the presence of several foci. A reference point for spherical subjective refraction should be established when refracting patients with multifocal IOLs, such as the midpoint of the clear vision interval provided by the depth of field of the IOL to avoid postoperative problems of predictability.

Timing of surgery is very important. Laser refractive surgery should not be considered within 3 months of cataract surgery. One should wait for total refractive stability and make sure that the incisions are tight and well sealed.

A recent study showed that LASIK was the most accurate way to "touch up" cataract surgery.

In this study, 65 eyes of 54 patients were studied which had not achieved accurate correction after cataract surgery and still needed glasses or contacts. 17 of these eyes were treated by an exchange surgery in which the previous lens implant (IOL) was removed and a new intraocular lens was put in its place ("IOL exchange"). 20 eyes had a second implant placed on top of the existing implant ("piggyback IOL"). 28 eyes had LASIK. The results of these three approaches to touching up cataract surgery were compared.

The two lens based approaches had similar results. IOL exchange and piggyback IOL surgery produced similar correction of near sightedness, farsightedness, and astigmatism ("refractive error"). The eyes that had LASIK to touch up the cataract surgery result, however, had better overall correction. In terms of visual results, 62.5% of eyes in the IOL lens implant exchange group were within 1 diopter of the intended result, compared to 82% in the piggyback IOL group and impressive 100% in the LASIK group.

The two main limitations of laser refractive surgery are high refractive error and limited availability of excimer laser for cataract surgeons. Since majority of the patients who undergo cataract surgery are old, before considering laser option one should keep in mind the dryness which is common in old age.

Conclusion

According to the reports available, LASIK has shown to be the most accurate procedure to correct residual refractive error after cataract surgery. Other options are considered if there are contra indications for Lasik / PRK or when there is no available excimer laser platform.
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   1/6/2014

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