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Editorial

Presbyopia Correcting Intraocular Lenses

Mohamed Salem*

Zagazig University, Egypt

***Corresponding Author**: Mohamed Salem, Zagazig University, Egypt.

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The ultimate goal of performing cataract surgery and implanting an intraocular lens is to achieve the maximum visual outcome as compared to the best corrected visual acuity in the presence of a clear natural crystalline lens for all given distances.

Presently, there are three types of intraocular lenses that can partially achieve the best presbyopia correction in a pseudophakic subject.

Partially accommodative intraocular lenses

They work on the focus shift principle, as the materials used in manufacturing this model of IOLs are flexible silicone or acrylate and designed to have a hinge at the haptic-optic junction which allows forward movement of the optic with haptic compression, by this mechanism the IOL optic shifts forward with ciliary muscle contraction and vitreous pressure.

Theoretically, in the normal eye, an IOL displacement of 0.60 mm would initiate approximately 1.0 D of accommodation in the spectacle plane.

Three main models of partially accommodative IOLs are currently available:

- Single plate haptic.
- Double optics connected by struts (dual optic IOL).
- Deformable IOLs.

Postoperative lens position shift, capsular opacification and fibrosis are not uncommon complications of that type of IOLs.

Bausch & Lomb Crystalens® and Tekia Tek-Clear® are examples of the commercially available IOLs of that category.

Multifocal intraocular lenses (MFIOLs)

A different mechanism of action by simultaneously separating light into different foci and then relying on neuroadaptation for patients to achieve satisfactory vision at different distances.

MFIOLs can be refractive, diffractive or a combination of two.

Refractive MFIOLs work by providing annular zones of different refractive power, however they are very sensitive to different pupil sizes and decentration.

The rough transitions between the refractive zones also can result in some adverse effects such as haloes, glare and diminished contrast sensitivity.

Diffractive MFIOLs work by placing diffractive microstructures in concentric zones and decreasing the distance between the zones as they get further from the center in order to produce multiple optic foci.

Diffractive MFIOLs are less dependent on the pupil size and centration than the refractive ones.

Once deciding to implant MFIOLs, certain comorbidities should be excluded.

Irregular corneal astigmatism as well as glaucoma and age-related macular degenerated are on the top of the list of these disorders.

Regular corneal astigmatism more than 1.5 D is not recommended for MFIOLs as it is associated with poor visual outcome.

Zeiss Lisa series, Abbott TECNIS ZKB00®, ZLB00ZMT®, PhysIOL® fine vision series and Oculentis Lentis® series are among the commercially available diffractive type of MFIOLs.

Extended depth of focus (EDOF) IOLs

The third modality of presbyopia correcting intraocular lenses, they work by creating a single elongated focal point to enhance the range of vision.

TECNIS Symfony® IOL (Abbott medical optics) has an anterior aspheric surface and a posterior achromatic diffractive surface which produces an achromatic diffractive pattern that elongates a single focal point and compensates for the chromatic aberration of the cornea.

There was no significant difference in contrast sensitivity between the EDOF IOLs and monofocal IOLs.

A recent randomized controlled study compared Alcon trifocal PanOptix® MFIOLs with Abbott Symfony® EDOF IOLs, it found that the trifocal IOL produced better uncorrected near and intermediate visual acuity.

However, the higher order aberrations were similar in both groups, the incidence of night glare and haloes were seen frequently with EDOF over the MFIOLs [1-5].

Bibliography

1. Driver T and Devgan U. "Choosing the best intraocular lens for the patient's need". In Prajna N.V (Ed), Peyman's principles & practice of ophthalmology, Volume 2(2). Jaypee brothers medical publishers (2019): 639-643.

2. Madrid-Costa D., *et al*. "Visual simulation through different intraocular lenses in patients with previous myopic corneal ablation using adaptive optics: effect of tilt and decentration". *Journal of Cataract and Refractive Surgery* 38.5 (2012): 774-786.

3. Alfonso JF., *et al*. "Prospective visual evaluation of apodized diffractive intraocular lenses". *Journal of Cataract and Refractive Surgery* 33.7 (2007): 1235-1243.

4. Pedrotti E., *et al*. "Comparative analysis of the clinical outcomes with a monofocal and extended range of vision intraocular lenses". *Journal of Refractive Surgery* 32.7 (2016): 436-442.

5. Monaco G., *et al*. "Visual performance after bilateral implantation of 2 new presbyopia correcting intraocular lenses: Trifocal versus extended range of vision". *Journal of Cataract and Refractive Surgery* 43.6 (2017): 337-347.

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