Results of Bioptics (ICL + LASIK) for Correction of High Myopia

Dr. Lakshmi Krupa, Dr. Jyotyhsna Rajagopal, Dr. Sri Ganesh, Dr. Vidhyani

Aim: Study outcome of bioptics (ICL+LASIK) in management of high myopia in young patients. Material and Methods: Retrospective review of medical records of 11 patients who underwent bioptics from Aug 2008 to Mar 2011 done. Data included ref error, pre–op BSCVA, post-op visual acuity, gain in visual acuity, type of ICL implanted, follow up period and complications if any. Results: 20 eyes of 11 patients underwent Bioptics. Mean refr error was –22.28 D (range -17.0 D to – 29 D). On statistical analysis of post operative UCVA, all eyes had a vision of 6/18 or better with 80% of eyes achieving 6/9 or better which was statistically significant. 90 % of eyes had gain in visual acuity ranging from 1- 4 lines with mean gain of 1.87 lines. Follow up period ranged from 2-24 months with all eyes maintaining UCVA and no eyes had regression. Conclusion: Bioptics (ICL+LASIK) is the preferred procedure providing significant improvement in UCVA for high myopic patients unsuitable for single refractive surgery.

One of the main goals of a refractive procedure is to obtain accurate results with an adequate level of safety. However, when treating patients with high ametropia exceeding range correctable by LASIK or PIOL (phakic intraocular lenses), a combination of procedures may be required to meet this goal.

Bioptics is a sequential method of treating large and complex refractive errors, aiming to improve stability and predictability, maintain a large optical zone, and preserve corneal prolate sphericity, thus limiting induced spherical aberrations.1,2,3 This can be achieved by a combination of refractive techniques with different mechanisms of action. Thus bioptics is normally performed using an intraocular implant [a phakic or pseudophakic IOL] associated with modification of corneal curvature (laser ablation, thermal shrinkage, incisions, intrastromal implant). The implant addresses most of the spherical error, while corneal surgery follows for fine tuning. Patients with high myopia achieve better uncorrected visual acuity than BSCVA (best spectacle corrected visual acuity) presumably due to image magnification.

We describe in this study our experience with a collamer posterior phakic IOL (STAAR Visian ICL) to correct maximal degree of myopia followed by wavefront guided excimer laser on the cornea 2-3 weeks later for residual error. The STAAR Visian ICL can correct myopia from -3.0 to -19.0 D and astigmatism from 1 to 6 D.
Aim of this study the visual outcome, predictability and safety of bioptics in the management of high ametropia.

**MATERIALS AND METHODS**

A retrospective observational case series of 20 eyes of 11 patients who underwent bioptics (ICL + LASIK) between August 2008 and March 2011 at Refractive Services clinic of Nethradhama Superspecialty Eye Hospital, Bangalore, was done.

Preoperative assessment included refractive error assessment, BSCVA, biomicroscopy, retinal examination, AC depth and pachymetry by orbscan (II Bausch and Lomb), white to white measurement by calipers. Power of ICL determined using ICL power calculation software provided by STAAR company. Patients with astigmatism and myopia advised TICL and patients with only myopia ICL. Patients with lens/corneal opacity, glaucoma, h/o uveitis, pseudoexfoliation/ pigment dispersion, h/o retinal detachment or macular pathology were excluded. In all patients corneal flap was created first with femtosecond laser (Intralase) under topical anesthesia followed by implantation of ICL/TICL through a temporal 2.8 mm clear corneal incision. Intraoperatively peripheral iridotomy done.

The advantages of Lasik flap creation prior to ICL implantation are:

1. Refractive stability achieved by 15-20 days post ICL implantation as 2.8 mm incision is used allowing correction of residual power by LASIK 2-3 weeks later facilitating earlier visual rehabilitation.
2. Prevents risk of ICL - Lens touch/ risk of ICL dislocation from sulcus into posterior chamber due to pressure increase during suction.

2-3 weeks post ICL residual refractive error verified, wavescan repeated and residual error corrected with customized LASIK (custom vue – VISx star S4 IR). Post operative visits scheduled on day 1, 1 month, 6 months and 1 year. At each postoperative visit, except first day, patients examined for UCVA, BCVA, manifest refraction, and applanation tonometry.

**RESULTS**

In a group of 20 myopic eyes, with a mean preoperative spherical equivalent refraction of -22.97 ± 3.23 D and a mean cylinder of 1.62 ± 0.96 D, subjected to bioptics, the mean postoperative spherical equivalent and cylinder were, respectively, -0.42 ± 0.27 and 0.25 ± 0.29 D. All eyes had unaided visual acuity of 6/12 or better with 80% of eyes achieving 6/9 or better. 90% of eyes had gain in visual acuity ranging from 1-4 lines with mean gain of 2 lines. No loss of lines from BSCVA noted. Eighty percent (18 eyes) were within ±0.50D of
Emmetropia. Follow-up period ranged from 2-24 months. The refractions remained stable with a statistically insignificant change during follow up with all eyes maintaining UAVA and none of the eyes had regression. No intra or post operative complications occurred.

This study demonstrates that bioptics (ICL+ LASIK) is a suitable procedure for patients with high myopia who are not suitable for a single refractive surgery. Bioptics procedure meets the ultimate goal of refractive surgery - emmetropia with excellent unaided visual acuity.

REFERENCES


