

MULTIFOCAL GLUED IOL FOR APHAKIA WITH DEFICIENT CAPSULES

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INTRODUCTION

Multifocal IOLs allow good vision at a range of distances. Monofocal intraocular lenses which are commonly available give clear point of focus in the distance or closer, but you can choose only one focal point. Multifocal intraocular lenses are designed to avoid the need for glasses by providing two or more points of focus. These intraocular lenses are intended to be placed in the capsular bag. Until recently, it was difficult to provide multifocality for patients who had complicated cataract surgeries which lack normal capsules. Aphakia with deficient capsule has been a limitation for obtaining multifocality. We have made multifocality possible even in complicated cataract surgeries by the Multifocal Glued IOL procedure. In this multifocal IOL implantation is done even in eyes with large posterior capsular rupture (PCR) and aphakias with deficient posterior capsule.

MULTIFOCAL IOL

Multifocal IOL's are of two types namely, refractive and diffractive IOL. Refractive IOL's contains multifocal zones for near, distant and intermediate. ReZoom™ (AMO) is a refractive IOL. The Array SA40N (AMO) is a foldable progressive multifocal IOL with a 6.0 mm optic with 5 concentric refractive zones for near and distance powers. Zones 1, 3, and 5 are distance dominant to form the base power, and zones 2 and 4 are near dominant with 3.50 D added. The Tecnis ZM001 (AMO) is a foldable diffractive IOL with a 6.0 mm optic. It combines diffractive optic technology with an aspheric modified

prolate anterior surface which is designed to reduce the spherical aberrations.

MULTIFOCAL GLUED IOL

Two partial thickness scleral flaps about 2.5 mm x 3 mm are created exactly 180 degrees diagonally apart. Either an infusion cannula (23 g sutureless trocar and cannula can be used) or anterior chamber (AC) maintainer is fixed. (Fig 1) Anterior vitrectomy is performed in eyes with vitreous traction.(Fig 2) Two straight sclerotomies with a 20/22 G needle are made under the existing scleral flaps about 1.0 mm from the limbus. The multifocal refractive or diffractive IOL is introduced through the limbal incision using either a McPherson forceps or an injector. An end gripping 25G/23G micro rhexis forceps (Micro Surgical Technology, Redmond, WA, USA) is passed through one of the sclerotomies (Fig 3) to hold the tip of the haptic . The haptics are then externalized under the scleral flap. A scleral tunnel is made with a 26 G needle at the point of externalization of the haptic and the haptic is tucked into the intralamellar scleral tunnel. The scleral flaps are then closed with fibrin glue (Tisseel, Baxter, USA) (Fig 4 and 5). The Infusion cannula or AC maintainer is subsequently removed. The conjunctiva is also apposed with the fibrin glue.

SURGICAL AND VISUAL RESULTS

We have operated about 5 eyes, out of which three were refractive and two were diffractive type of IOL's. The indications were intraoperative large posterior

capsular rupture in 3 eyes and aphakia in 2 eyes. The mean preoperative best spectacle corrected visual acuity (BCVA) was 0.73 ± 0.28 and the mean postoperative UCVA was 0.76 ± 0.22 . The mean postoperative BCVA was 0.86. The mean postoperative Intra ocular pressure as noted with non contact tonometer was 12.4 ± 1.6 mmHg. Subjective questionnaire-answers for glare, contrast sensitivity and other optical disturbances were obtained from the patients. There was no significant change in the contrast sensitivity. Patient satisfaction was observed to be good after one year follow up.

CENTERATION AND MULTIFOCALITY

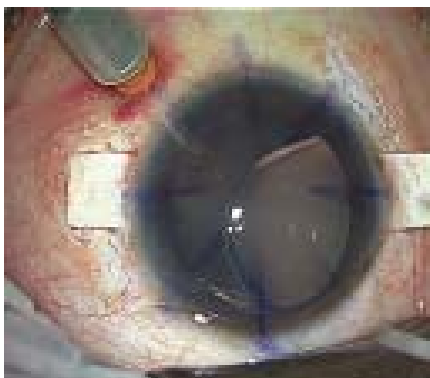
It is well known that good centeration is mandatory in multiple optic IOL's to provide the best corrected vision without optical disturbances. Serial digital slit lamp images of the eye with full pupillary dilatation were taken

to assess IOL centeration. An image processing with Matlab version 7.1 (Mathworks, Inc) was done to quantify decentration. Ultrasound biomicrocopy was used to note the position or tilt of IOL on each visit. The post operative IOL centeration analysis with UBM (Fig 2) has shown good IOL position.

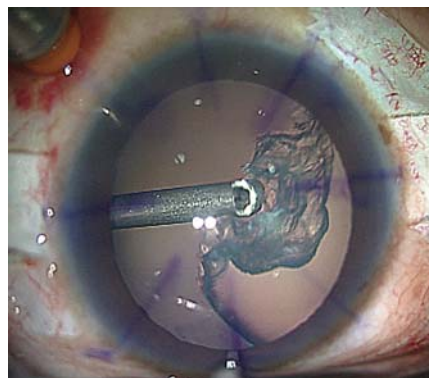
CONCLUSION

Multifocal IOL's have been in clinical application extensively in this decade. Growing patient expectations and the technological advances have been the motivation for the innovative surgical techniques. Thus this method of providing multifocal vision through the glued IOL procedure is a fine step to impart both distant and near vision for the eyes with complicated cataract surgery with deficient capsules.

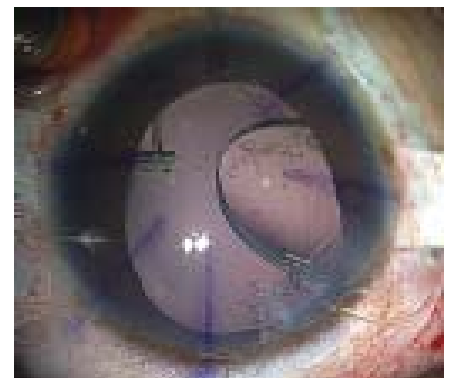
FIG 1-5: Multifocal Glued IOL technique with a Tecnis ZM001 (AMO) foldable diffractive IOL



Coloboma of the lens. Note the sclera flaps 180 degrees apart. Note also the 23 g sutureless trocar and cannula.



Lenectomy with vitrectomy



IOL haptic is externalized with 23 G MST forceps below the scleral flaps
Both the haptics externalized below the flaps.



Haptics tucked into the intralamellar scleral tunnel and then Fibrin glue is applied on the scleral flaps



Multifocal glued IOL in place