

## Retropupillary Implantation of Iris Claw Lens to correct aphakia in the absence of capsular support

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### Introduction

The ideal intraocular lens in cases of inadequate capsular support is still debated. Posterior chamber intraocular lens (IOL) implantation remains the ideal outcome following cataract extraction. However in Aphakia, posterior chamber IOL dislocation, Large posterior capsular rent or Whole bag removal, Marfan syndrome / ectopialentis, Large zonular dialysis, Traumatic dislocation of crystalline lens, there may be insufficient remaining capsular support for either intra capsular or posterior chamber sulcus placement of the IOL. The various IOLs available are 1) anterior chamber IOL (ACIOL), 2) scleral fixated IOL and 3) iris fixated IOL, both anterior and posterior.<sup>[1,2]</sup>

The first iris-claw IOL was introduced by Worst et al. in 1972<sup>[3]</sup>, and a modification of this became the Artisan lens (Ophtec BV). (Fig 1a, 1b)

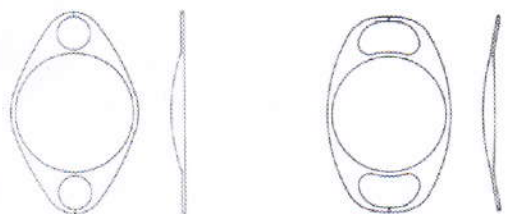


Fig. 1a

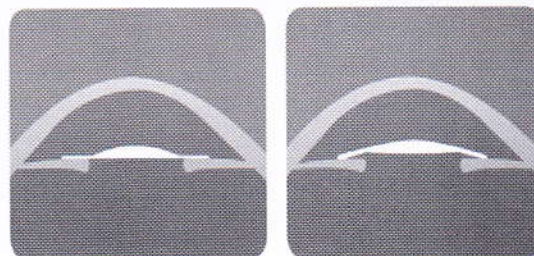


Fig. 1b

This IOL design incorporates a claw that is fixed to the immobile midperipheral portion of the iris; thus, it was suggested that the IOL did not disrupt the normal physiology of the iris or angle structures. The bridging arc of the IOL was also said to eliminate erosion of the pupil border, which occurs with traditional pupil-supported IOLs<sup>[4]</sup>. It was suggested that the initial biconvex model increased the risk for pseudophakic bullous keratopathy (PBK). A modified convex-concave version was introduced in 1996 to increase the distance between the IOL and the corneal endothelium; this model has since been in common use. Subsequently, in 2005, the Verisyse iris-claw IOL (Abbott Medical Optics, Inc.) became available. The technique of retro pupillary iris fixation of iris claw lens which was first reported by Andreas Mohr in 2002<sup>[5]</sup>, offers several advantages. It combines the benefit of posterior chamber implants with a low-risk method of surgery and its cosmetic benefit, by hiding the IOL haptic and parts of the lens behind the iris, less surgical time and also preserves the anatomy of the anterior segment with respect to the position of the natural crystalline lens. Retropupillary fixation of iris-claw lenses enhances stability, prevents tilting of the lens and reduces the glare phenomenon, which is characteristic of the lens being implanted in the anterior chamber. There are also few disadvantages like disenclavation, pupillary deformity and iris atrophy.



## Indications

Marfan syndrome/ectopialentis  
Pre-op zonular dialysis  
Traumatic dislocation of crystalline lens  
Large zonular dialysis during surgery  
Large posterior capsular rent  
Whole bag removal  
Posterior dislocation of IOL  
As a secondary procedure in aphakia

## Contraindications

Iris atrophy  
Pseudoexfoliation  
Large iridectomy, Sphincterotomy  
Uveitis  
Low corneal endothelial count

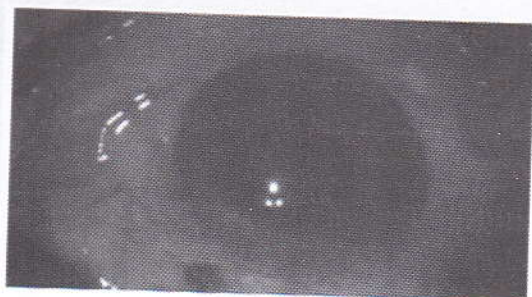
## Investigations

BCVA with refraction  
Slit lamp evaluation  
Measuring intraocular pressure  
Gonioscopy - to rule out anterior synechiae  
Indirect ophthalmoscopy  
Specular microscopy - to evaluate corneal endothelial cells count  
OCT- to rule out retinal pathology

## Surgical Procedure

Under general, sub-tenon, or topical anesthesia, superior or temporal, 5.5 mm sclera- corneal/clear corneal incision is made. Two paracentesis are made 90° from the main section. Intracameral pilocarpine is injected to constrict pupil. Iris claw IOL is introduced into the anterior chamber through main section. Viscoelastic (2% HPMC) is injected at each stage to deepen the anterior chamber and maintain space. Holding the optic with a lens forceps, one haptic is tilted down and pushed under the iris with gentle manipulation. Simultaneously a Sinsky hook is passed through the paracentesis on the same side. Once the haptic of the IOL is behind the iris, the haptic is tilted up to produce an indent on the iris. The iris is enclavated into the haptic claw with gentle push with the Sinsky hook. Then with similar maneuver the other haptic enclavation is done. Anterior or complete vitrectomy needs to be performed in most cases except those with a history of vitrectomy. Viscoelastic is aspirated with Simcoe's canula, anterior chamber is formed with Balanced Salt Solution and the conjunctiva is repositioned. (Fig 2)

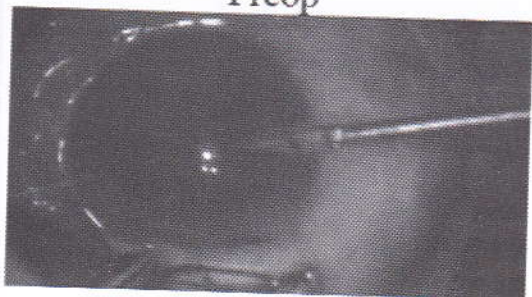




Preop



Marking 5.5mm incision



Making side ports



Anterior Vitrectomy



Putting Iris claw lens under air



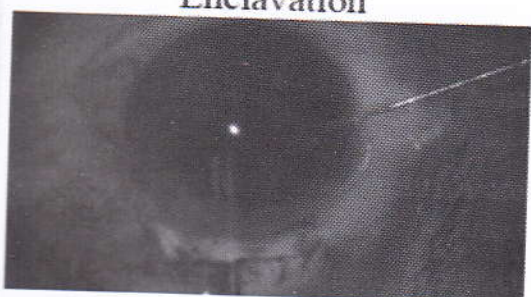
Rotating the IOL 90 degree



Enclavation



Putting IOL under iris



Enclavation in other side



IOL in position

Fig.2. Steps of surgery



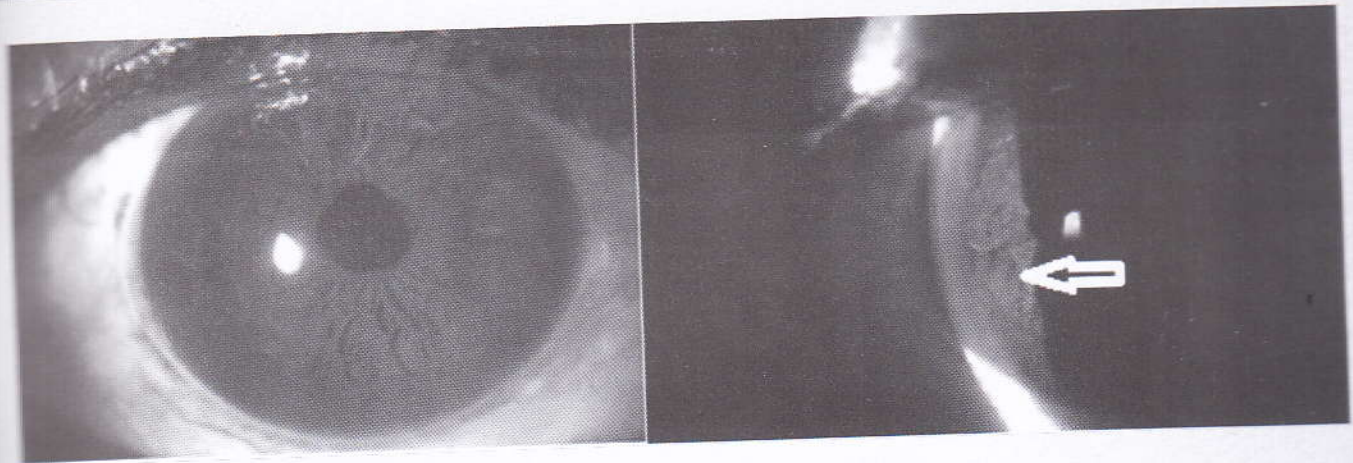


Fig.3 Post operative photo with site of enclavation (arrow)

### Complications

Pupil ovalization  
IOL dislocation  
Elevated IOP  
Pigment dispersion  
Macular edema

IOL decentration  
Corneal endothelial cell loss  
Hyphema  
Pupillary block  
Chronic uveitis, TASS.

### Advantages Disadvantages

No suturing needed  
Easy technique  
Less time required  
No tilting of IOL

Iris atrophy  
Late dislocation of IOL  
Glaucoma  
Lens decentration  
Lens pigmentation

### Discussion:

Several studies have advocated the use of iris-claw IOLs in patients with aphakia without capsular support in cases of good endothelial cell count, normal pupils and absence of contraindications<sup>[6,7,8]</sup>

Each of the available options has its own risks and complications: transscleral fixation of posterior chamber IOLs is an extremely technically demanding procedure with relatively high risk of intra-operative and post-operative complications and requires a large amount of dissection into the conjunctiva and the sclera<sup>[9,10]</sup>.

Angle-supported anterior chamber IOL implantation, although technically easier, has been associated with several complications related to the iridocorneal angle and the corneal endothelium<sup>[11]</sup>. Retropupillary implantation of the Artisan iris-claw lens after vitrectomy has better results<sup>[6,10]</sup>.

Implanting the iris-claw lens above the iris for aphakic eyes decreases the endothelial cell count<sup>[7,12,13,14,15,16]</sup>, in most studies using the retropupillary fixation technique. De Silva et al<sup>[22]</sup> reported that corneal decompensation occurred in 1.7% of eyes.



Two studies of retropupillary iris claw intra ocular lens(RPICIOL) implantation showed pigment dispersion as a complication, but this was not seen in several additional studies<sup>[17,18,19,20,21]</sup>. Disenclavation of one haptic as a complication has been reported previously<sup>[13,18,19]</sup>.

Macular edema and Ovalisation of the pupil, has also been reported previously<sup>[5,13,19]</sup>. The reported incidence of CME after secondary angle-supported IOL implantation ranges from 0% to 33%<sup>[6,23]</sup>.

Rijneveld et al.<sup>[17]</sup> found iridalsynechia in 5 % of patients undergoing RPICIOL implantation and 11 % in patients with implantation above the iris. Gicquel et al.<sup>[13]</sup> reported iridalsynechia in three of 41 patients with RPICIOL.

Elevated IOP is seen in some cases<sup>[18,19]</sup>.

### Conclusion:

Iris Claw lens implantation is effective, predictable and safe procedure capable of delivering good visual outcomes with a low complication rate in patients who are unable to undergo intracapsular or sulcus IOL positioning.

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