GLUED IOL – BROKEN for POSTERIOR CAPSULE

AMAR AGARWAL & ATHIYA AGARWAL

Advantages of GLUED IOL

This fibrin glue assisted sutureless PCIOL implantation technique would be useful in a myriad of clinical situations where scleral fixated IOLs are indicated, such as luxated IOL, dislocated IOL, zonulopathy or secondary IOL implantation.

No special IOLs: It can be performed well with rigid PMMA IOL, 3 piece PC IOL or IOLs with modified PMMA haptics. One, therefore, does not need to have an entire inventory of special SFIOLs with eyelets, unlike insutured SFIOLs. In dislocated posterior chamber PMMA IOL, the same IOL can be repositioned, thereby reducing the need for further manipulation. Furthermore, there is no need for newer haptic designs or special instruments other than the 25 gauge forceps.

No tilt: Since the overall diameter of the routine IOL is about 12–13 mm, with the haptic being placed in its normal curved configuration and without any traction, there is no distortion or change in shape of the IOL optic (Figure 6). Externalization of the greater part of the haptics along its curvature stabilizes the axial positioning of the IOL and thereby prevents any IOL tilt. ⁸

Less pseudophacodonesis: When the eye moves, it acquires kinetic energy from its muscles and attachments and the energy is dissipated to the internal fluids as it stops. Thus,
**FIGURES 5A AND B:** Haptics (h) exteriorized by 25G forceps (f) beneath the scleral flaps (sf) in dislocated IOL

**FIGURE 6:** Anterior segment OCT showing 360 degrees good centration of the IOL

Pseudophacodonesis is the result of oscillations of the fluids in the anterior and posterior segment of the eye. These oscillations, initiated by movement of the eye, result in shearing forces on the corneal endothelium as well as vitreous motion leading to permanent damage. Since the IOL haptic is stuck beneath the flap, it would
prevent the further movement of the haptic and thereby reducing the pseudophacodonesis.\(^9\)

**Less UGH syndrome:** The authors expect less incidence of UGH syndrome in fibrin glue assisted IOL implantation, as compared to sutured scleral fixated IOL. This is because; in the former, the IOL is well stabilized and stuck onto the scleral bed and thereby, has decreased intraocular mobility, whereas in the latter, there is increased possibility of IOL movement or persistent rub over the ciliary body.

**No suture related complications:** Visually significant complications due to late subluxation\(^{10}\) which has been known to occur in sutured scleral fixated IOL may also be prevented as sutures are totally avoided in this technique. Another important advantage of this technique is the prevention of suture related complications,\(^{11,12}\) like suture erosion, suture knot exposure or dislocation of IOL after suture disintegration or broken suture.

**Rapidity and ease of surgery:** All the time taken in SFIOL for passing suture into the IOL haptic eyelets, to ensure good centeration before tying down the knots, as well as time for suturing scleral flaps and closing conjunctiva are significantly reduced. The risk of retinal photic injury\(^{13}\) which is known to occur in SFIOL would also be reduced due to the short surgical time. Fibrin glue takes less time [Reliseal (20 seconds)/Tisseel (3 seconds)] to act in the scleral bed and it helps in adhesion as well as hemostasis. The preparation time can also be reduced in elective procedures by preparing it prior to surgery as it remains stable up to four hours from the time of reconstitution. Fibrin glue has been shown to provide airtight closure and by the time the fibrin starts degrading, surgical adhesions would have already occurred in the scleral bed. This is well shown in the follow-up anterior segment OCT (Figure 7) where postoperative perfect scleral flap adhesion is observed.

**Stability of the IOL Haptic**

As the flaps are manually created, the rough apposing surfaces of the flap and bed heal rapidly and firmly around the haptic, being helped by the fibrin glue early on. The major uncertainty here is the stability of the fibrin matrix *in vivo*. Numerous animal studies have shown that the fibrin glue is still present at 4–6 weeks. Because postoperative fibrosis starts early, the flaps become stuck secondary to fibrosis even prior to full degradation of the glue (Figures 8A to D). The ensuing fibrosis acts like a firm scaffold around the haptic which prevents movement along the long axis (Figure 9A). To further make the IOL rock stable, the author has started tucking the haptic tip into the sclera wall through a tunnel. This prevents all movement of
thehaptic along the transverse axis as well (Figure 9B). The stability of the lens first comes through the tucking of the haptics in the scleral pocket created. The tissue glue then gives it extra stability and also seals the flap down. Externalization of the greater part of the haptics along its curvature stabilizes the axial positioning of the IOL and thereby prevents any IOL tilt.

**Steps of Surgery for a Glued IOL**

It is to look at the various steps of surgery for a glued IOL (Figures 10 to 38). This shows the way that an injectable foldable IOL can be glued into an eye with no capsules.

**FIGURES 7A AND B:** Anterior segment OCT showing the scleral flap placement on day 1 (A) and adhesion well maintained till six weeks (B)
IOL haptic grasped with a microsurgical technology MST forceps (USA)

26 gauge needle creates a scleral pocket at the edge of the flap

IOL haptic tucked into the scleral pocket

Fibrin glue applied under the scleral flaps

FIGURES 8A TO D: Surgical technique of the glued IOL
(A) Long axis movement is prevented by the tissue glue

(B) Transverse axis movement is prevented by the scleral tuck

FIGURES 9A AND B: Stability of the IOL

FIGURE 10: Aphakic case. No capsule seen

FIGURE 11: Scleral markers applied on the cornea. This will help to get marks created on the cornea 180 degrees apart to make sclera flaps
**FIGURE 12:** Marks made on the cornea. Conjunctiva cut on either side of the marks

**FIGURE 13:** Scleral flaps made 180 degrees apart

**FIGURE 14:** Sclerotony made 1 mm from the limbus under the sclera flap using a 20 G needle

**FIGURE 15:** 23 G vitrectomy to remove anterior and midvitreous
**FIGURE 16:** Clear corneal incision

**FIGURE 17:** Foldable 3 piece IOL being injected slowly. It is to note the cartridge is inside the eye. One should not do wound assisted as the injection might happen too fast. This can either break the IOL or push it so fast that it might go into the vitreous cavity

**FIGURE 18:** Foldable IOL injection continued with one hand. This injector has a pushing mechanism so one hand can be used. The other hand holds an end opening microrhexis forceps (23 G) and is passed through the sclerotomy under the sclera flap and is ready to grab the haptic

**FIGURE 19:** End opening forceps grabs the haptic tip
FIGURE 20: Forceps pulls the haptic while injection of the foldable IOL is continued.

FIGURE 21: Haptic externalized.

FIGURE 22: Assistant holds the haptic which is externalized.

FIGURE 23: Trailing haptic is flexed into the anterior chamber. The other hand holds the end opening microrhexis forceps and is passed through the other sclerotomy under the sclera flap.
FIGURE 24: End opening forceps ready to grab the haptic tip

FIGURE 25: Haptic caught

FIGURE 26: Haptic is gradually pulled towards the sclerotomy

FIGURE 27: Haptic externalized
FIGURE 28: Both haptics externalized and can be seen lying under the sclera flaps

FIGURE 29: Vitrectomy done at the sclerotomy site

FIGURE 30: 26 G needle makes a sclera pocket at the edge of the flap where the haptic is seen

FIGURE 31: Forceps holds the haptic and flexes it to tuck it inside the scleral pocket
**FIGURE 32:** Haptic in the sclera pocket

**FIGURE 33:** PC IOL stable

**FIGURE 34:** Infusion cut off and air fills the anterior chamber

**FIGURE 35:** Fibrin glue (Tiessel, Baxter) application
FIGURE 36: Scleral flap sealed

FIGURE 37: Fibrin glue applied on conjunctiva and clear corneal incision to seal them

FIGURE 38: Immediate postoperation on table
REFERENCES


