

Evolution of Scleral Fixation, Haptic Externalization and Tucking Techniques

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Phakic rehabilitation poses challenges for patients without capsular support, making traditional intraocular lens (IOL) implantation difficult. In such cases, an Anterior Chamber (AC) IOL or a scleral-fixed posterior chamber IOL (SF-PC IOL) can be considered as options. To ensure a well-centered IOL, haptics should be away from the ciliary processes, iris, and oraserrata, with sufficient distance from the iris to prevent capture. Delayed IOL dislocation can occur due to suture breakage, but it can be prevented by proper IOL size and snugly opposing the stitched haptics into the ciliary sulcus.

Secondary PC IOL implantation/fixation can be single haptic fixation or double haptic fixation.¹ In either case, scleral suture fixation of a single-piece IOL made of polymethylmethacrylate (PMMA) involves passing sutures through the ciliary sulcus from either the inside or outside of the eye. The sutures are then tied to the IOL haptics to anchor it securely to the sclera. Some IOL with suture eyelets have been developed to minimize the risk of suture slippage and IOL dislocation.²

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In the last two decades, significant advancement has been made in the field of suture-less SF-PC IOL. These include technical enhancements, expanded indications, and better instrumentation. Suture-less

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technique has gained popularity amongst eye surgeons due to reduced incidence of suture-related complications. These procedures offer ease of implantation, simplifying surgery and leading to improved visual outcomes for patients. The combination of fewer complications, simplified procedures, and positive functional results has led to an increasing adoption of suture-less surgery. The patients with aphakia or inadequate capsular support greatly benefit from enhanced visual rehabilitation and overall satisfaction.

Haptic externalization and effective tucking stabilizes the haptics, but it can be challenging to construct the tunnel and pull the haptic into it.³ Agarwal et al, developed a modified approach known as the “handshake” method for externalization of haptics with glued intrascleral fixing.⁴ This adjustment makes the technique simpler and more maneuverable by shifting the IOL haptic from one IOL forceps to another with direct visualization in the pupillary plane. The “handshake” method broadens the use of glued-IOL strategy in tricky situations involving haptic manipulation, like IOL drop or haptic slippage. Additionally, it guarantees a properly shaped globe throughout the entire procedure, providing an intraoperative advantage for better outcomes.⁵

In one of our techniques, we used 23 Gauge needle to externalize the IOL haptics for both fixation sites. We threaded the haptics outside the eye using another modification, inject first and then fixate. Another technique described in literature involves threading the IOL haptics using 27-gauge needle and externalization from the eye.⁵ Nevertheless, Yamane’s well-designed and minimally invasive flanged haptic intra-scleral fixation technique has gained popularity.⁶

Inserting haptic into a needle without bending it is challenging. Some surgeons have chosen to use certain types of IOL with haptics that can tolerate intraocular manipulation or 27-gauge trocars and forceps to grasp

the haptics and externalize them. Disinsertion force needed to dislocate an intra-scleral-fixed IOL is greatly increased by formation of a flanged haptic. Haptic tucking method is simple to learn and apply. The haptic tip should be reinserted into the vitreous cavity. Because there is no limitation brought on by a tunnel or sutures, the IOL can be adjusted for centration with the least amount of torsional strain.⁷ Due to the internal positioning of the haptic tip without any stress, the risk of haptic exposure or erosion is eliminated, leading to a reduced likelihood of endophthalmitis.

“Stay Back Technique” of scleral fixation of a decentered IOL-bag complex is a streamlined method for fixing the anteriorly displaced IOL-bag complex to the sclera. This method improves the optic-haptic junction visibility when the prolene suture is being passed through.⁸

We devised another technique, which involved threading haptics into dry eye punctal plugs and externalizing them from the eye through a 23G trocar entry. A multipiece IOL with pre-threaded plugs was gently inserted, and the haptics were tucked into designated sites using forceps. In another modification, Vicryl suture tied to the punctal neck made it further easy to externalize the plug head. The method was considered secure, easy to learn, and reduced the risk of complications.

A new type of intraocular acrylic lens, the single-piece suture-less scleral fixation (SSF) Carlevalle lens, has emerged with a distinctive design featuring flexible sclero-corneal plugs at its haptics. Various surgical approaches have been described for its fixation, offering promising outcomes, while Barca et al, achieved promising outcomes with suture-less intra-scleral fixation.^{9,10}

In our opinion, historically, the anterior chamber has been reluctant to accept artificial devices, making AC IOL almost a taboo, and iris-fixed IOLs have been unsuccessful. A reproducible, surgeon-friendly, and safe sulcus fixation or haptic externalization technique is currently needed. There is a hope for future collaboration between surgeons and the industry to develop an IOL designed with a dedicated attached suture needle for easy, quick, and safe haptic externalization and tucking.

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