

Posterior Chamber IOL Placement or Rescue Via a Sutureless Scleral Fixation Technique

A novel approach for eyes with insufficient capsular support.

**BY H. MATTHEW WHEATLEY, MD; LEONARD FEINER, MD, PhD;
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In this issue of Retina Today, H. Matthew Wheatley, MD; Leonard Feiner, MD, PhD; and Jonathan L. Prenner, MD, discuss a novel approach to posterior chamber intraocular lens placement or rescue via a sutureless scleral fixation technique.



We extend an invitation to readers to submit pearls for publication in Retina Today. Please send submissions for consideration to Ingrid U. Scott, MD, MPH (iscott@psu.edu); or Dean Elliott, MD (dean_elliott@meei.harvard.edu). We look forward to hearing from you.

—Ingrid U. Scott, MD, MPH; and Dean Elliott, MD

Intraocular lens (IOL) implantation in an eye with insufficient capsular support continues to present a unique surgical challenge. Standard approaches to this anatomic problem are well known to vitreoretinal surgeons. An interesting meta-analysis from the Ophthalmic Technology Assessment Committee of the American Academy of Ophthalmology reviewed the standard approaches to this surgical problem, which included the anterior chamber IOL (ACIOL), scleral-sutured posterior chamber IOL (PCIOL), and iris-fixated PCIOL. The review did not identify compelling data to recommend 1 technique over another.¹ Thus, modern open-loop ACIOLs and sutured PCIOLs appear to be reasonable approaches to eyes with insufficient capsular support.

After performing many of these procedures and following patients for many years postoperatively, however, we recognized that each approach has liabilities. ACIOL placement may increase the risk of developing glaucoma, intraocular inflammation and corneal decompensation.²⁻⁵ Over time, degradation and lysis of the sutures used to

fixate a PCIOL to the iris or sclera may occur, leading to subsequent IOL dislocation and need for an additional surgical procedure.^{1, 6-10} After significant experience with these liabilities, we asked if there could be a more elegant approach that takes advantage of the sulcus position of a PCIOL and avoids reliance on sutures. In an effort to create a minimally invasive approach that could improve outcomes in these cases, we developed a technique that allows for ciliary sulcus-based scleral fixation of a 3-piece PCIOL without the use of sutures, scleral flaps, or fibrin glue. This approach may minimize or eliminate some of the complications that are associated with ACIOL implantation and iris- or scleral-fixated IOLs.

We spent several years working on a multitude of approaches to this problem and have settled on a novel technique that is based on a significant modification of an anterior segment procedure. In our approach, we take advantage of the surgical instrumentation and skill set unique to the posterior segment surgeon, minimize the need for costly surgical adjuvants, and increase the reliability of the procedure.¹¹ Through these modifications, we

have been able to achieve an efficient, reproducible operation that can be performed both for the rescue of a subluxed or dislocated IOL and for the implantation of a secondary IOL. The technique allows permanent scleral fixation of the polypropylene haptics of a 3-piece IOL directly into the sclera to achieve a position in the ciliary sulcus, thus obviating the need for suturing.

TECHNIQUE

A conjunctival peritomy is performed, and light scleral cautery is used to achieve adequate hemostasis. A standard 23-gauge 3-port vitrectomy is then performed. Two ciliary sulcus-based sclerotomies (CSS) are created with a 20-gauge microvitrectoretinal (MVR) blade and scored to approximately 18 gauge. These CSS are made 2 mm from the limbus to achieve a ciliary sulcus location and are positioned 180° apart at 6 and 12 o'clock. This precise positioning is required to ensure perfect lens centration. Next, the solid bore blade from a 23-gauge trocar system is used to create a 3 mm-long, partial-thickness scleral tunnel to connect with each CSS. These tunnels are created parallel to the limbus and must be made in a uniplanar manner. Passing the blade from a temporal to nasal position helps to avoid challenging hand positions that can make creating uniplanar parallel tunnels more difficult. For example, in a right eye, the inferior scleral tunnel is started in the opening of the 6 o'clock CSS and passed nasally until the blade exits the sclera 3 mm from the CSS. The superior tunnel is started 3 mm temporal to the 12 o'clock CSS and extended nasally, exiting the sclera in the base of the CSS.

After the tunnels have been created, attention can be paid to lens placement. Disposable 25-gauge internal limiting membrane forceps are bent in the middle of the shaft to a 45° to 60° angle. Actuation of the forceps works well even with this degree of distortion. For secondary PCIOL implantation, a 4-mm clear corneal incision is made with a keratome, and viscoelastic is placed into the anterior chamber.

After injection of a 3-piece PCIOL (we prefer the MA60 [Alcon Laboratories, Fort Worth, TX]) into the anterior chamber, the bent 25-gauge forceps are passed through the inferior CSS, and the leading haptic is grasped. The haptic does not need to be engaged at the tip but rather can be engaged anywhere along the distal half and is then externalized. The IOL can then be drawn into the sulcus via the externalized leading haptic. The superior haptic is then grasped with the 25-gauge forceps via the superior CSS and externalized in a similar fashion. Because of the 20-gauge width of the CSS, the haptics will bend but will not break during externalization, even when not grasped at the haptic tip.

In cases of a dislocated PCIOL, the IOL should be ini-

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tially freed from the residual capsular material. The residual capsule should then be removed either with forceps or with the vitreous cutter. The PCIOL is then elevated with forceps to a position just posterior to the iris plane. The bent 25-gauge forceps are then passed through the inferior CSS and used to grasp the inferior haptic and externalize it. A similar process is performed to externalize the superior haptic.

The scleral tunnels can then be recanalized with the 25-gauge forceps, as the sclera surrounding the tunnels can hydrate rather quickly. Restoring the patency of the tunnel facilitates haptic placement.

Haptic implantation into the tunnel should also be performed in a temporal-to-nasal motion to ensure the most advantageous hand positions and angles. If we again assume that the operated eye is the right eye, the 25-gauge forceps are passed through from the distal end of the superior tunnel into the CSS, first exposing the tip of the forceps through the CSS. The tip of the haptic is then handed from smooth tying forceps into the open mouth of the 25-gauge forceps. Once the haptic is engaged, the 25-gauge forceps are drawn out of the tunnel. The tip of the haptic should be drawn far enough so that it passes through the distal end of the tunnel. For implantation inferiorly, the haptic is grasped at the tip and is pushed through the tunnel with counter traction applied via 0.12-mm forceps. The haptic tip should be pushed so that it exits the distal end of the tunnel and is then secured with tying forceps while the 25-gauge forceps are removed. After final centration, which can be achieved by manipulation of the haptic tips, the tips are cut flush to the sclera with scissors.

We recommend suturing the CSS with 7-0 vicryl suture, as well as the 23-gauge trocar wounds and clear corneal incision, if they are leaking. The conjunctiva can then be closed with 6-0 plain gut suture.

DISCUSSION

To date, we have performed more than 2 dozen cases utilizing this technique and have found numerous advantages to this procedure. The main short-term advantages of this procedure are that a PCIOL can be efficiently implanted or rescued into a sulcus-based position in a

minimally invasive manner and without the need for suture fixation. The lenses are well-centered and are stable immediately after implantation.

Key defining components of this technique make it reliable, efficient, and reproducible. These include the generous size of the CSS, which allows the surgeon to externalize the haptic without the cumbersome process of grasping it at its tip. Commitment to a temporal-to-nasal approach allows simple uniplanar tunnel creation and ideal hand positions for haptic manipulation. In addition, the angulation achieved by aggressive bending of the disposable forceps facilitates haptic explantation and implantation. The technique allows a reliable and reproducible operation, with case time not exceeding what it takes us to perform the placement of an ACIOL. ■

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