

Introduction to Secondary IOLs



Scleral fixation of a lens with two eyelets requires precise sclerotomy placement and suture management to avoid rotation.

BY THOMAS L. JENKINS, MD; RAVI R. PANDIT, MD, MPH; AND DAVID XU, MD

There are multiple options for secondary IOL implantation in aphakic eyes, including the use of anterior chamber IOLs, iris-fixed IOLs, or scleral-fixed IOLs.¹ In young patients or patients with insufficient iris support, narrow anterior chambers, corneal endothelial disease, or other anterior segment pathology, scleral fixation of a posterior chamber IOL should be considered.

This article describes considerations pertinent to suture type, lens selection, and surgical technique when implanting a scleral-fixed IOL. We also describe the technique used at our institution for scleral fixation with one particular combination of IOL and suture material.

SUTURE TYPES

Multiple authors have demonstrated excellent IOL positioning and stability with sutured scleral-fixed lenses using a variety of suture types, including 10-0 polypropylene, 9-0 polypropylene, and polytetrafluoroethylene (PTFE; Gore-Tex, W.L. Gore & Associates) suture materials.²⁻⁵

PTFE is a nonabsorbable monofilament suture with high tensile strength. It is an attractive option for scleral fixation of IOLs due to its durability and low rate of suture-related complications. In 2018, Khan et al, at our institution, reported favorable outcomes of combined pars plana

vitrectomy and ab externo scleral fixation of posterior chamber IOLs with PTFE suture after a minimum of 1-year follow-up with no documented instances of suture breakage or lens dislocation.³

LENS TYPES

Many models of foldable acrylic IOLs have been used for scleral suture fixation. The Akreos AO60 (Bausch + Lomb) is a one-piece, foldable hydrophilic acrylic IOL with four eyelets through which sutures can be passed. This lens is commonly used as a secondary IOL, but there have been well-documented reports of optic opacification with calcium salt deposition after air or gas fill due to

its hydrophilic properties.⁶⁻⁹ Given the frequent comorbid factors that place aphakic patients at high risk of requiring retinal surgery (eg, previous trauma, retinal damage from dislocated IOL, vitreous traction), the Akreos lens may be seen as inappropriate for use in some patients.

The enVista MX60 IOL (Bausch + Lomb) is a one-piece hydrophobic acrylic IOL with two eyelets. In contrast to the Akreos lens, no cases of opacification have been reported with this lens. It may, therefore, represent a more versatile option in a vitreoretinal surgical context in which intraocular air or gas tamponade is likely to be used. Despite the two-eyelet design of the MX60 IOL, with proper technique

AT A GLANCE

- Options for secondary IOL implantation in aphakic eyes include the use of anterior chamber IOLs, iris-fixed IOLs, or scleral-fixed IOLs.
- Polytetrafluoroethylene (PTFE) suture, also known as Gore-Tex suture, is an attractive option for scleral IOL fixation because of its durability and low rate of suture-related complications.
- A one-piece foldable hydrophobic acrylic IOL may be preferred for patients in whom intraocular air or gas tamponade is likely to be needed.

and suture placement it has been shown to result in surgically induced astigmatism similar to that of other IOL models.¹⁰

The CZ70BD (Alcon) is a one-piece PMMA lens with two eyelets that are suitable for suture fixation. However, this lens requires a larger scleral tunnel incision, as the optic is not foldable.

At our institution, we have had the most experience with the Akreos and the enVista.

OUR TECHNIQUE

Surgical placement of a PTFE scleral-fixated IOL can be challenging due to the need for precise sclerotomy placement and suture management to avoid rotation of the lens during intraocular insertion. The steps used for this surgery at our institution are described below.

A toric lens marker is used to mark the cornea at two points 180° apart. Marking the 3 and 9 clock positions is the most common, but some surgeons choose 10 and 4 clock positioning to avoid the nasal bridge.

Sectoral peritomies 3 clock hours in size are performed centered on the corneal marks, and hemostasis is maintained through the use of wet-field cautery. Calipers are used to mark 3 mm posterior to the limbus and 2.5 mm above and below the posterior mark, such that the markings are 3 to 5 mm apart on each side (Figure 1). The surgeon may adapt the precise posterior and intersclerotomy measurements based on his or her own surgical results.

Depending on surgeon preference, a 23-, 25-, or 27-gauge needle is used to make sclerotomies at the inferior marks, and sclerotomy ports of the corresponding gauge are inserted at the superior scleral marks (Figure 2). An inferotemporal transconjunctival infusion cannula is inserted, and a standard three-port pars plana vitrectomy is performed.

The infusion is clamped, and the anterior chamber is maintained with

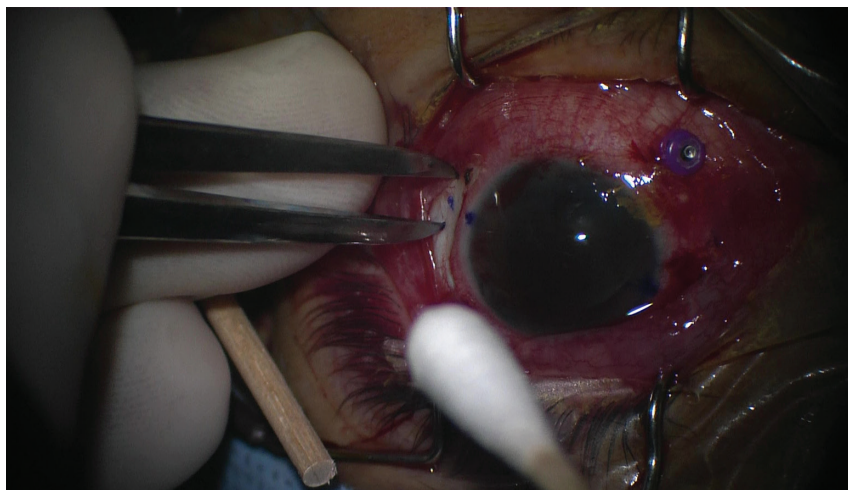


Figure 1. Calipers are used to mark 3 mm posterior to the limbus and 2.5 mm above and below the posterior mark.

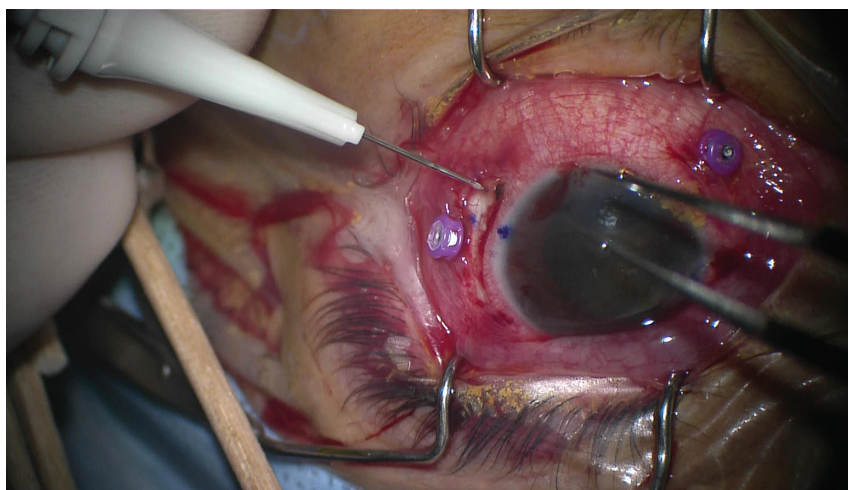


Figure 2. A 23-, 25-, or 27-gauge needle is used to make sclerotomies, and sclerotomy ports of the corresponding gauge are inserted at the superior scleral marks.

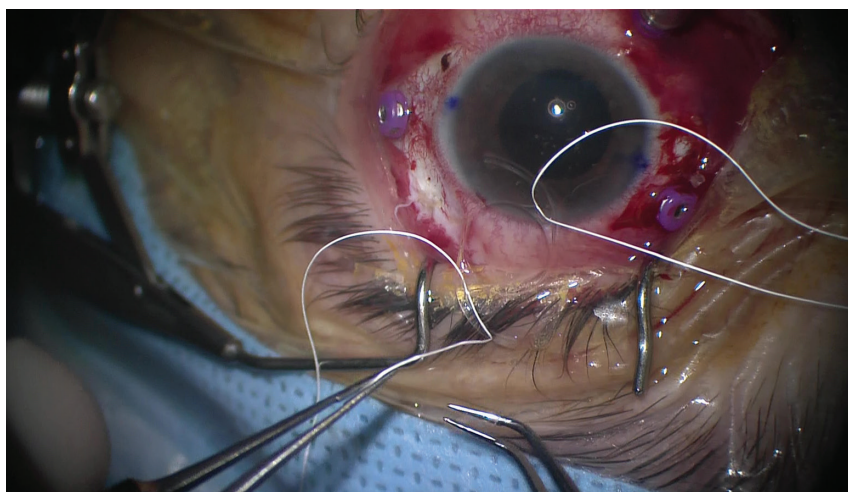


Figure 3. One half of an 8-0 PTFE suture with the needle removed is threaded through each eyelet of an MX60 IOL, with both ends of the suture going over the haptic.

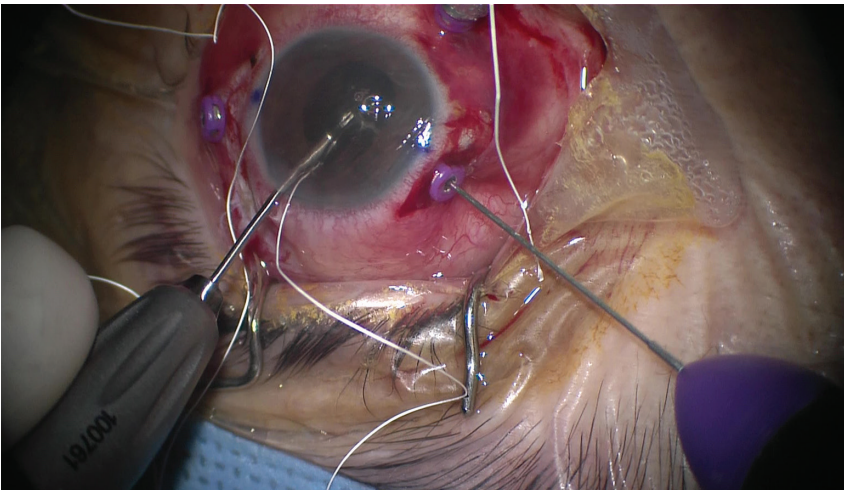


Figure 4. Each end of the suture from the leading haptic of the IOL is passed into the anterior chamber and retrieved from the corresponding sclerotomy using 27-gauge forceps.

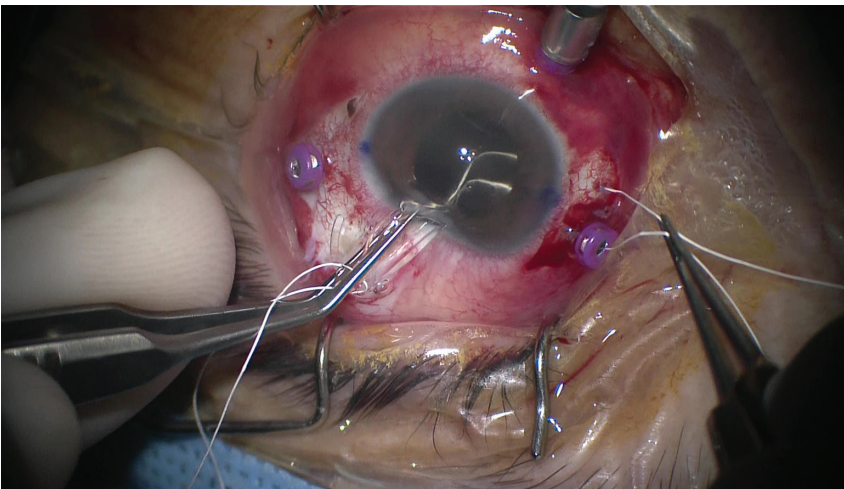


Figure 5. The IOL optic is folded in half, the haptics are tucked into the folded IOL using curved Kelman-McPherson forceps, and the IOL is introduced into the anterior chamber.

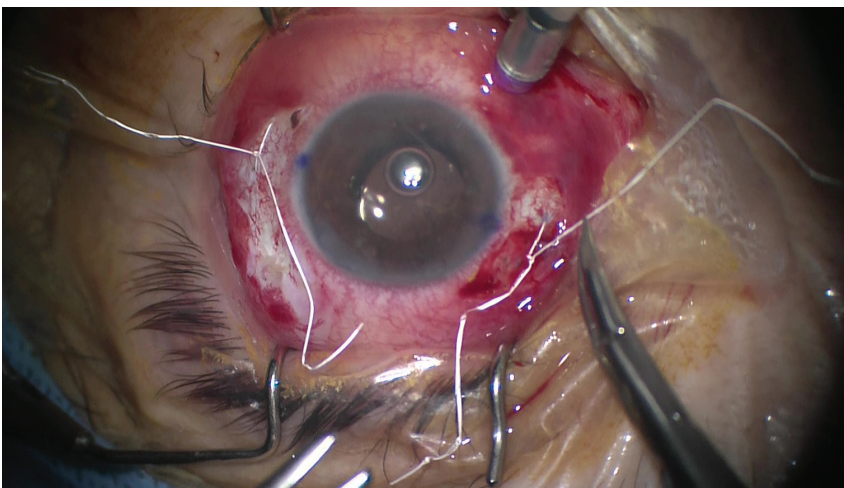


Figure 6. With appropriate tension placed and lens centration confirmed, the sutures are tied.

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use of an OVD. A 2.75-mm keratome is used to create a clear corneal incision at the superior limbus. Some surgeons prefer instead to create a corneoscleral tunnel using an angled crescent knife before entering the anterior chamber with the keratome.

One half of an 8-0 PTFE suture with the needle removed is threaded through each eyelet of an MX60 IOL, with both ends of the suture going over the haptic (Figure 3). Each end of the PTFE suture from the leading haptic is then passed into the anterior chamber and retrieved from the corresponding sclerotomy using 27-gauge intraocular forceps (Figure 4). The optic of the IOL is folded in half, and the haptics are tucked into the folded IOL using curved Kelman-McPherson forceps. The IOL is then introduced into the anterior chamber (Figure 5).

The PTFE suture is tied temporarily with a three-loop throw or a slipknot. The other ends of the suture are subsequently passed through the opposite sclerotomies in a similar manner. After appropriate tension has been placed and lens centration confirmed,

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the sutures are tied using a 3-1-1 or slipknot technique (Figure 6). The knots are trimmed and rotated into the sclerotomy using forceps.

The sclerotomy sites are closely inspected for leakage, and they may be closed with an 8-0 polyglactin suture if necessary, taking extraordinary care to avoid cutting the PTFE suture during the needle pass. After removal of any residual OVD, the clear corneal incision is closed with an interrupted 10-0 nylon suture and the conjunctival peritomies are closed.

CONCLUSION

There are multiple options for placing a secondary IOL in aphakia. In the appropriate clinical context, a scleral-fixed posterior chamber IOL with PTFE suture can offer a stable option with good refractive outcomes. ■

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