Tiltless and centration adjustable scleral-sutured posterior chamber intraocular lens

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We present a technique for posterior chamber intraocular lens (IOL) scleral suturing for the management of aphakia, which includes the use of a needleless Gore-Tex CV-8 suture to create a girth hitch around both IOL fixation eyelets using microinstruments. This technique avoids intraocular needle manipulation, provides long-term IOL stability, avoids both passive and torque-induced IOL tilt, and enables fine tuning of the intraoperative IOL centration using the Purkinje reflexes.

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Online Video

A wide variety of surgical methods are currently used for aphakic correction, including angle-fixated anterior chamber intraocular lenses (AC IOLs), iris-enclavated AC IOLs, iris-sutured posterior chamber IOLs (PC IOLs), and scleral sutured PC IOLs. Each technique has disadvantages. Anterior chamber IOLs may result in corneal endothelial damage and uveitis-glaucoma-hyphema (UGH syndrome).[1] Iris-fixated IOLs may result in pupil distortion or UGH. Sutured PC IOLs may be tilted or decentered and can experience late IOL dislocation.[2] With scleral-sutured PC IOLs alone, a bevy of suturing and fixation techniques abound. Although "glued" IOLs have been gaining popularity, concerns about long-term safety remain.[3] The quest for a gold-standard procedure remains elusive. We present a technique of no-tilt scleral-sutured PC IOL implantation in which IOL centration can be fine-tuned.

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SURGICAL TECHNIQUE

A side-port paracentesis is created nasally for anterior chamber maintainer (ACM) access, and a conjunctival peritomy centered on the 4:30 and 10:30 meridians is performed. Hemostasis is achieved using a wet-field cautery in the area of the planned scleral tunnel but not at the sites where the sutures are to be placed to reduce scleral devitalization and, perhaps, decrease the risk for future scleral thinning.

A temporal 7.0 mm scleral groove is carved posterior to the limbus and tunneled anteriorly into the margin of clear cornea. An ACM is placed into the paracentesis and the globe pressurized with irrigation.

A thorough anterior vitrectomy is achieved via a single-port pars plana cannula to remove residual vitreous strands in the pupillary, retropupillary, and retroiridial space. After the anterior segment is clear of vitreous gel, the vitrector is removed and the cannula plugged.

Two sets of 0.5 mm paired openings are created in the scleral wall at the level of the ciliary sulcus using a 15-degree blade (Figure 1, *A* and *B*). The estimated location of the sulcus from external landmarks can vary significantly. Human stereopsis seems to be the most effective mechanism to find the right level. The blade is passed into the eye parallel to the iris plane, entering the scleral wall until half the

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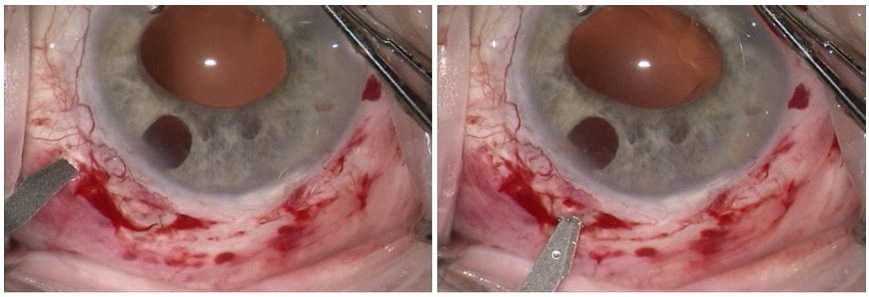

A *B*

Figure 1. *A* and *B*: Two opposed pairs of sclerotomies (±2.0 mm between each sclerotomy of each set) are made at the ciliary sulcus level with a 15-degree blade using depth perception and stereopsis to determine the appropriate entry level.

blade has entered the wound. If the blade is seen in front of the iris, the pass is too anterior and another pass slightly more posterior is made, leaving the initial opening unsutured and abandoned. Although the distance from the limbus might vary from 1 eye to another depending on the estimated position of the sulcus by stereopsis, each pair of openings should be at the same distance from the limbus.

The openings in each pair are separated by 3.0 to 4.0 mm, and the sets are placed 180 degrees from one another. A needleless Gore-Tex (expanded polytetrafluoroethylene [ePTFE]) CV-8 suture (W.L. Gore & Associates, Inc.) (off label for ophthalmic use) is then placed in the anterior chamber through the main wound (Figure 2) and retrieved by a 25-gauge microforceps via one of the scleral openings. The other end of the needleless suture is similarly retrieved through the paired opening, leaving a suture loop exiting the eye through the primary wound (Figure 3). The process is repeated with a second piece of suture at the opposing set of openings, 180 degrees away.

At this stage, the ePTFE suture loops are exiting the eye through the main scleral incision and the distal ends of the sutures are exiting through each of the 4 sclerotomies. Meticulous attention is required to maintain suture loop orientation and avoid tangling or twisting the suture loops.

A CZ70BD (Alcon Laboratories, Inc.) poly(methyl methacrylate) PC IOL is brought to the operating field and put over an instrument wipe, stabilized by a dollop of an ophthalmic viscosurgical device (OVD) on the surface of the instrument wipe. The proximal ePTFE loop is then folded over itself, creating a girth hitch (Figure 4), which is affixed to the trailing haptic of the IOL. Each arm of the hitch should rest on 1 side of the haptic eyelet, effectively separating the 2 arms of the suture by approximately 1.5 mm (Figure 5, *A* and *B*). The IOL is then oriented with the unattached haptic toward the wound, and the same fixation process is repeated with the distal suture loop and the leading haptic of the IOL. With a properly executed girth hitch, the arms of the suture should rest above the

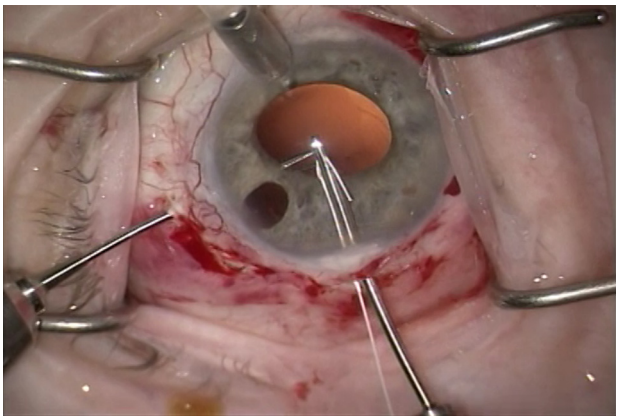

Figure 2. A needleless ePTFE suture is presented into the anterior chamber through the main wound using a 23-gauge microforceps and handed to a 25-gauge microforceps entering from 1 of the sclerotomies.

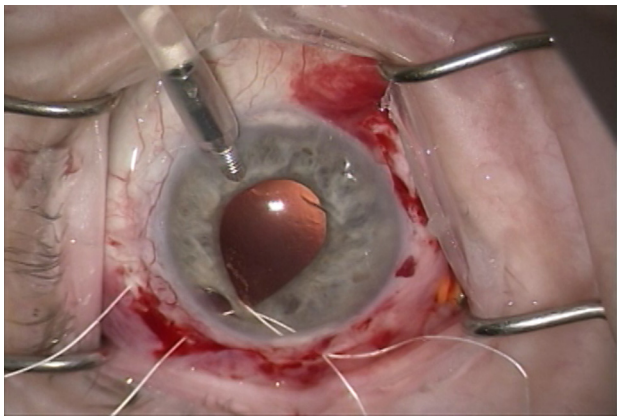

Figure 3. The other end of the needleless suture is similarly retrieved through the paired opening, leaving a suture loop exiting the eye through the primary wound.