

Ab-interno scleral suture loop fixation with cow-hitch knot in posterior chamber intraocular lens decentration

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Aim of Study: To describe a simplified ab-interno cow-hitch suture fixation technique for repositioning decentered posterior chamber intraocular lens (PC IOL). **Materials and Methods:** Two cases are presented with the surgical correction of decentered and subluxated IOL. Ab-interno scleral suture fixation technique with hitch-cow knot in the eye was performed with a ciliary sulcus guide instrument and 1 year follow-up was completed. **Results:** Both of the patients had well centered lenses postoperatively. Corrected distant and near visual acuities of the patients were improved. There was no significant postoperative complication. In the follow-up period of 1 year, no evidence of suture erosion was found. **Conclusions:** Ab-interno scleral suture loop fixation with hitch-cow knot in the eye was effective in repositioning decentered or subluxated PC IOLs with excellent postoperative centered lenses and visual outcomes.

Key words: Cow-hitch knot, intraocular lens decentration, scleral fixation

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Various techniques have been described for scleral fixation of decentered intraocular lens (IOLs) based on the shape and design of the IOL.^[1-7] These methods can be divided into three groups. In the first group, the haptic is pulled outside the eye and replaced inside the eye again after making a knot. In the second group, a suture loop around the haptic is made ab-externo. In the third group, a scleral fixation of the haptic is made by tying a knot around the dislocated haptic inside the eye. Among these techniques, tying a knot inside the eye seems to be safe and less invasive as it decreases the risk for complications when removing the haptic from the eye and reduces the possibility of slippage resulting from making a suture loop. Although the latter one provides some advantages, it requires some extra manipulations. We developed a scleral fixation technique for IOL decentration that forms a cow-hitch knot around the dislocated haptic inside the eye with a minimal number of maneuvers. We also used Can ciliary sulcus guide to facilitate the safe placement of the needle into the ciliary sulcus.

Surgical Technique

The conjunctiva and Tenon capsule are dissected where the dislocated haptic will be fixated. At the same meridian, a clear corneal paracentesis is made, and another clear corneal paracentesis is made at the same meridian 180° from this site. Then, an ophthalmic viscosurgical device is injected to

maintain anterior chamber stability and to keep the vitreous posterior. A double-armed 10-0 straight polypropylene suture (Mani, Japan) is introduced under the haptic through the clear corneal paracentesis and pulled out through the opposite paracentesis side guided by the straight side of Can ciliary sulcus guide. It is an instrument consisting of different tips at each side. One side for curved needles and the other side for straight needles [Fig. 1a-c]. At the opposite paracentesis side, a hook is introduced into the anterior chamber and remaining part of the suture was passed over the haptic and then pulled out through the paracentesis. The needle is passed through the end of the loop and then pulled slightly to initiate the formation of cow-hitch knot. Then, the needle is inserted from the back side into the ciliary sulcus guide. The guide encompassing the needle is reintroduced into the anterior chamber through the paracentesis and is proceeded over the haptic and beneath the iris until a hard stop is felt where the tip of the guide touches to the ciliary sulcus. The needle is pushed from back side while keeping it in the guide and passed through the full-thickness sclera. Once the cow-hitch knot is tightened by pulling the suture, the IOL is centered and positioned [Fig. 2a-j and Video 1]. The needle was then passed

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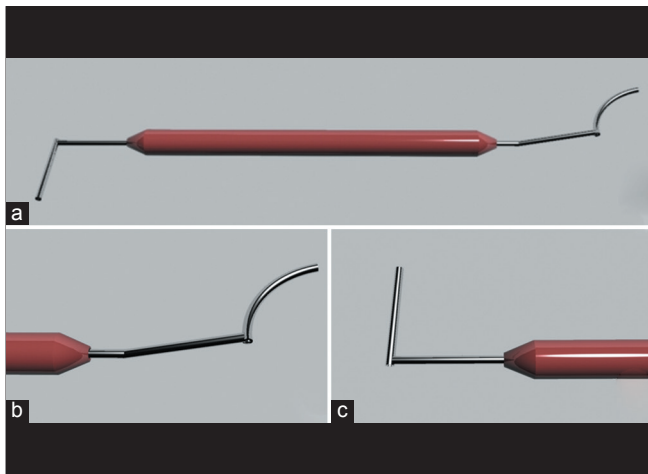


Figure 1: (a) Can ciliary sulcus guide has two sides for both straight and curved needles. (b) One side for curved needles. (c) One side for straight needles

through the partial thickness of the sclera, and the suture was tied to itself. Suture knots were left long and were buried under the conjunctiva.

Case Reports

Case 1

A 58-year-old man visited our clinic with complaints of vision loss in the left eye and diplopia for 5 days. He had cataract surgery for his left eye 5 years ago. His slit lamp examination showed an inferiorly dislocated 1-piece IOL and vitreous in the anterior chamber. His preoperative uncorrected distance visual acuity (UDVA) was 0.1, and intraocular pressure (IOP) was 16 mmHg with Goldmann applanation tonometer. IOL repositioning and fixation of the haptic to the sclera at the 12 o'clock position with our technique following anterior vitrectomy were performed. One week after the operation, his best-corrected distance visual acuity (BCDVA) was 0.8 and the IOP was 16 mmHg. Visual acuity (0.8) and centered IOL were maintained without serious complications for 1 year.

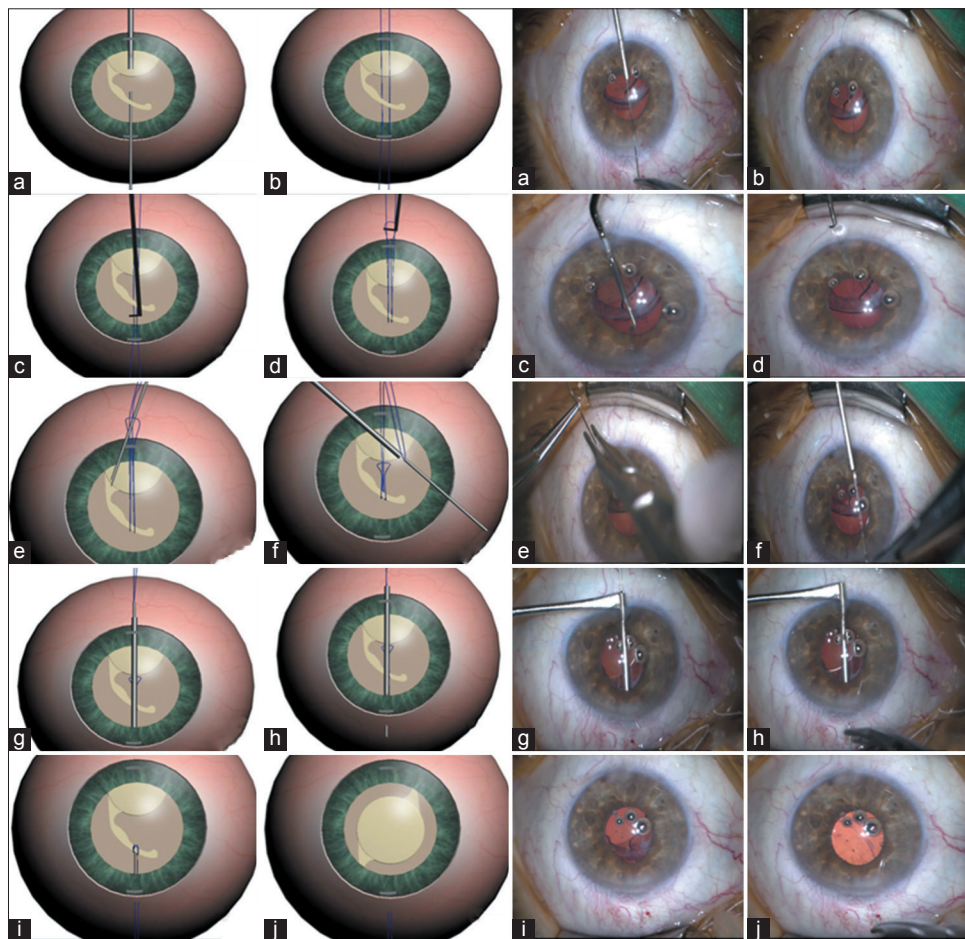


Figure 2: (a and b) A double-armed 10-0 polypropylene suture on a straight needle is introduced under the haptic through the corneal incision. (c) The suture is pulled out through the opposite paracentesis side guided by the straight side of ciliary sulcus guide. (d) The other end of the suture is passed over the haptic and then pulled out through the paracentesis. (e) The needle is passed through the end of the loop and then pulled slightly. (f) After forming a cow-hitch knot, the needle is inserted from the back side into the ciliary sulcus guide. (g and h) The needle is pushed from the back side and passed through the sclera. (i and j) Cow-hitch knot is tightened, and the suture is tied after the intraocular lens is centered and positioned

Case 2

An 82-year-old woman with a history of bilateral age-related macular degeneration was referred to our clinic with a 3-piece IOL dislocation in the right eye after a complicated phacoemulsification surgery. Her preoperative UDVA was 0.1 and IOP was 16 mmHg. The IOL was subluxated nasally. Fixation of the haptic to the sclera at the 9 o'clock position with our technique was performed without any serious intraoperative or postoperative complication. After 1 year follow-up, the IOP was 12 mmHg and BCDVA remained at 0.4. She has also bilateral age-related macular degeneration.

Discussion

Considering the potential complications, scleral suture fixation of dislocated haptic would be preferred to IOL exchange. The least traumatic method to reposition the IOL is essential. Pulling outside the dislocated IOL may provide a fixed knot and reduces the likelihood of IOL slippage, but it requires rotating the IOL that may lead to damage and complications. Suture loop technique is relatively less invasive, but the absence of a knot may cause IOL slippage.

Our technique is minimally invasive and minimizes awkward manipulations. By using a closed system for fixation, we maintained the IOP control. The needle is not passed in and out of the eye several times. We also used the straight side of a ciliary sulcus guide both for mating the suture needle and piercing the sclera. Although it is an ab-interno technique, we eliminated the potential complications of blind piercing due to lack of direct viewing of the piercing point using this guide. With relatively smooth surface, this guide also minimizes the iris damage during proceeding the needle. We make a cow-hitch knot in the eye that keeps the IOL stable and reduces the risk of slippage. We can also use this method in case of in-the-bag IOL dislocation.

A 1-piece hydrophobic acrylic IOLs in the first case and a 3-piece hydrophobic acrylic IOL in the second case were used. Although planned scleral fixation of a 1-piece IOL is not indicated because of complications, IOL exchange is more complicated than scleral fixation when the issue is subluxated or dislocated IOL. Hence, it may be reasonable to fixate the current IOL to the sclera.

Postoperative infection is an issue after secondary IOL implantation or manipulation surgery, and there are several

reports about endophthalmitis following scleral suture fixation techniques.[8,9] Any of other complications such as vitreous hemorrhage, hyphema, and retinal detachment were not seen in our 1–2 years follow-up.

Regardless of IOL material and design, we believe that our technique is simple and safe in repositioning of decentered, subluxated, and dislocated posterior chamber IOLs. Although our postoperative data confirm stability through 1–2 years, and it is not a short period, long-term follow-up is necessary to determine the safety of this technique.

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Conflicts of interest

There are no conflicts of interest.

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