

Intralenticular Bimanual I/A for Subluxated Lenses

This technique allows complete and controlled aspiration of lens matter.

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Ectopia lentis is characterized by subluxation or dislocation of the crystalline lens of the eye, commonly associated with disorders such as Marfan syndrome, homocysteinuria (Figure 1), and Weill-Marchesani syndrome.¹ It can also occur idiopathically, and in some cases it is hereditary.¹

Surgical management of subluxated lenses in ectopia lentis is often a challenge for anterior segment surgeons due to the associated zonular weakness, which makes lens extraction and IOL implantation challenging. Indications for lens surgery in ectopia lentis include uncorrectable poor visual acuity, dislocation of the lens into the anterior chamber, cataract, lens-induced uveitis or glaucoma, and imminent complete luxation of the lens. Most of the time, surgery is indicated to correct vision in cases in which the edge of the lens comes into the pupillary space.²⁻⁴

In these cases, lens extraction may be performed through a limbal or pars plana incision. In eyes with mild to moderate zonular weakness, lens aspiration through a limbal incision may be done by stabilizing the bag with an endocapsular tension ring.^{2,3} However, if the lens is extensively dislocated, the best option is to perform lens aspiration with a limbal or pars plana approach.⁵

Surgical procedures described in the literature include a pars plana or limbal approach lensectomy,^{6,7} intracapsular cataract extraction,⁸ lens irrigation and aspiration,⁹ and phacoemulsification with a Cionni Modified Capsular Tension Ring (Morcher GmbH).¹⁰ Visual rehabilitation is achieved by correction of aphakia either with glasses or contact lenses⁷⁻⁹ or with IOL implantation. Anterior chamber lens choices include open-loop¹¹ or iris-fixed IOLs,¹² and posterior chamber options include scleral- or iris-fixed IOLs.^{8,13,14} Although studies have shown no differences in the safety and efficacy of open-loop anterior chamber, scleral-sutured posterior chamber, and iris-sutured posterior chamber IOLs for the correction of aphakia in eyes without adequate capsular support, there are risks associated with each of these

techniques.¹⁵

The number of surgical techniques and the varied modes of visual rehabilitation described in the literature indirectly indicate the difficulty associated with these approaches. Our technique, intralenticular bimanual irrigation/aspiration for subluxated lenses,¹⁶ is simple, effective, and safe, especially in eyes with large degrees of zonular weakness.



Figure 1. An eye with extensive subluxation associated with homocysteinuria.

SURGICAL TECHNIQUE

Surgery is performed under local or general anesthesia, depending on the age of the patient. A superior approach is preferred. Two stab incisions, one at the 10- and the other at the 2-o'clock position, are made with a 15° blade in clear cornea, just anterior to the vascular arcade (Figure 2A). The anterior chamber is formed with sodium hyaluronate 1.4% (Healon GV; Abbott Medical Optics Inc.). A small nick is made in the anterior capsule on one side to create a small capsulorrhexis of 1.5 mm to 2.0 mm with Utrata forceps or, preferably, end-opening intravitreal forceps (Figure 2B). Another 1.5-mm to 2.0-mm capsulorrhexis is created on the other side using the same technique. The anterior capsule can be stained with trypan blue to increase visibility of the anterior capsule. Staining is particularly helpful for beginners and when the subluxation is large. Gentle hydrodissection can make the lens aspiration easier (Figure 2C).

Bimanual intralenticular irrigation/aspiration is performed by introducing the irrigation cannula through one capsular opening and the aspiration cannula through the other (Figure 2D). The irrigation cannula helps to hydrate the lens for easy aspiration and to keep

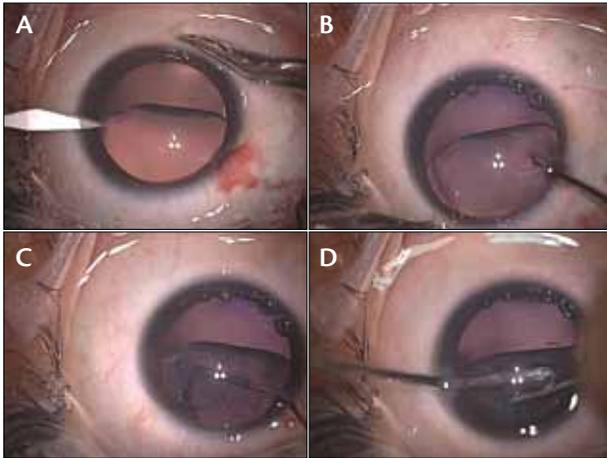


Figure 2. (A) A clear corneal incision is created using a 15° blade. (B) A small capsulorrhexis is performed using intravitreal forceps. (C) Limited hydrodissection is carried out. (D) Bimanual intralenticular lens irrigation/aspiration is performed.

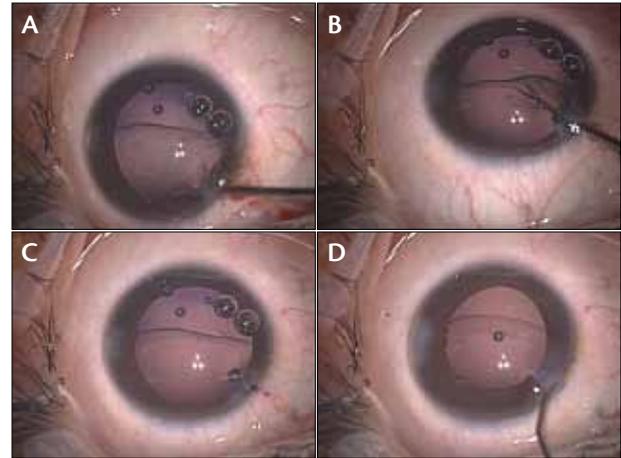


Figure 3. (A) The anterior capsular opening is enlarged with intravitreal scissors. (B) The anterior capsulotomy is extended using intravitreal forceps. (C) Anterior capsulotomy continues. (D) Hydration of the wounds is performed at the end of the surgery.

the lens in a central position so that aspiration can be done under direct visualization.

After complete aspiration of the lens matter, the anterior chamber is carefully examined to rule out the presence of vitreous. In the event of vitreous strands in the anterior chamber, a limited anterior vitrectomy is performed. The capsular bag is filled with an ophthalmic viscosurgical device, and the two small capsular openings are joined together using intravitreal scissors or Utrata forceps to make a central capsular opening around 5.0 mm (Figures 3A and 3B), thus avoiding subsequent anterior capsular fibrosis and visual axis obscuration. The capsular rim is left intact for IOL support in a subsequent secondary implantation procedure (Figure 3C). A peripheral iridectomy in the superotemporal or superonasal quadrant is performed to prevent pupillary block in case the anterior hyaloid face is intact. The anterior chamber is re-formed with balanced salt solution, and stromal hydration is performed to close the two ports (Figure 3D).¹⁶ The wounds are checked for leaks, and, if required, a suture is placed.

Postoperatively, patients are prescribed topical prednisolone acetate 1% and moxifloxacin 0.5% four times a day for 4 weeks and tropicamide 1% three times a day for 1 week. In cases of bilateral aphakia, aphakic glasses are prescribed on the first postoperative day or at the earliest possibility.

ADVANTAGES AND LIMITATION

Numerous techniques for lens aspiration in eyes with subluxated lenses have been described.⁶⁻¹⁰ When the extent of subluxation is large, the surgeon may encour-

ter several challenges. First, there is a tendency for the lens to get displaced peripherally and therefore reduce the surgeon's visibility. This is partly due to the positive pressure created in the anterior chamber by the irrigating fluid. Second, the subluxation may be so marked that the peripheral part of the lens becomes difficult to visualize. Third, Marfan syndrome is associated with iris dilator muscle atrophy,¹⁷ hence a poorly dilated pupil can further add to the difficulty of direct visualization of part of the lens during aspiration.

All of these factors pose difficulties in performing complete lens aspiration. Iris retractors and capsular hooks have been used to dilate the pupil and stabilize the capsular bag in eyes with zonular deficiency,^{16,18} however, use of these devices requires surgical expertise and can often damage the iris or even tear the capsule. At times, the lens becomes so subluxated that it is difficult to perform a central 5.5-mm to 6.0-mm capsulorrhexis. There is also a chance of hydrating

TAKE-HOME MESSAGE

- Surgical management of subluxated lenses in ectopia lentis is often a challenge for anterior segment surgeons.
- With this intralenticular bimanual irrigation/aspiration technique, the lens can be stabilized by the irrigation cannula, the area to be aspirated can be brought into focus, and complete lens aspiration can be performed.
- One limitation of leaving the posterior capsule intact may be posterior capsular opacification and visual impairment, which can be resolved during a subsequent IOL implantation procedure.

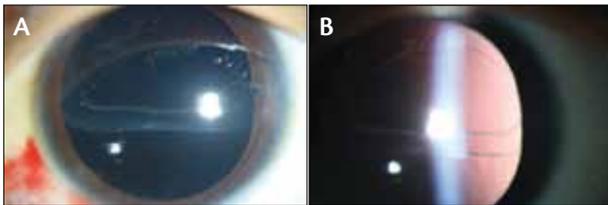


Figure 4. (A) Diffuse and (B) retroillumination postoperative images showing an intact posterior capsule with an anterior capsular opening around 5.0 mm.

the vitreous with the irrigating fluid, causing subsequent vitreous loss. Finally, there is the risk of lens matter falling into the vitreous cavity and requiring vitreoretinal intervention, especially in pediatric eyes, which account for the majority of cases of ectopia lentis.

Our technique avoids most of these challenges. The lens can be stabilized with the irrigation cannula, the area to be aspirated can be brought into focus, and a complete lens aspiration can be easily performed. Additionally, the irrigation cannula hydrates the cortical matter, enabling complete aspiration. Furthermore, creating two small capsular openings in the midperiphery of the lens that are directly visible often eliminates the problem of poor visibility. With our technique, there is less chance of vitreous becoming hydrated and lens matter falling into the vitreous cavity, as aspiration is intralenticular.

Another added and probably important advantage is that the capsular rim is left intact (Figure 4). This may allow IOL implantation in the sulcus once the capsular rim fibroses, thus avoiding the complications and difficulties associated with anterior chamber and sulcus-fixed IOLs.¹¹⁻¹⁵

One limitation of leaving the posterior capsule intact is the possibility of posterior capsular opacification and visual impairment. However, this can be easily tackled during a subsequent IOL implantation procedure.

CONCLUSION

Our technique of intralenticular bimanual irrigation/aspiration for subluxated lenses in eyes with an extensively subluxated crystalline lens is simple, effective, and safe, allowing complete and controlled aspiration of lens matter. Additionally, this approach facilitates postoperative visual rehabilitation. Therefore, our technique is extremely useful for anterior segment surgeons who are not accustomed to a pars plana approach to lenectomy. ■

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1. Which approach do you most often employ in the management of subluxated lenses?

- Pars plana or limbal approach lenectomy
- Intracapsular cataract extraction
- Lens irrigation/aspiration
- Phacoemulsification with a Cionni Modified Capsular Tension Ring
- I use a different technique

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