

# Pars plicata posterior continuous curvilinear capsulorhexis

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We describe a technique of pars plicata manual posterior capsulorhexis performed after implantation of an intraocular lens (IOL) in pediatric cataract surgery. The technique can be used to create a posterior capsulectomy of a desirable size in a controlled manner to avoid destabilization of the IOL. It can be applied selectively in cases of pediatric cataract surgery.

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 Online Video

Management of the posterior capsule is a significant factor in the outcome of pediatric cataract surgery. Posterior capsule opacification (PCO) is rapid and inevitable in very young children if an intact posterior capsule remains after cataract surgery. The younger the child, the more acute the problem because the onset of PCO is faster and the amblyogenic effect greater. A primary posterior capsulectomy (with or without anterior vitrectomy) is considered a routine surgical step in managing pediatric cataract, especially in young children. However, the question arises of how and when to perform the posterior capsulectomy and vitrectomy during pediatric cataract surgery. Some surgeons advocate removing the posterior capsule and anterior vitreous before intraocular lens (IOL) implantation. Others prefer to have the IOL in place before performing the posterior capsulectomy

and anterior vitrectomy. The advantage is that the IOL can be safely fixated in the desired plane (in the bag).

The common practice is to perform the posterior capsulectomy and anterior vitrectomy before IOL implantation if the limbal approach has been used. However, in soft vitrectomized infant eyes or microphthalmic eyes, it is relatively difficult to implant adult-sized IOLs. It is also difficult to dial the trailing haptic inside the capsular bag with the available adult-sized IOLs, and the leading haptic may slip into the vitreous. To avoid these problems, some surgeons implant the IOL in the bag and perform either retropseudophakic posterior capsulectomy and vitrectomy<sup>1</sup> or a pars plicata posterior capsulectomy and vitrectomy.<sup>2,3</sup> We believe that a manual posterior continuous curvilinear capsulorhexis (PCCC) creates an opening with a strong margin that resists peripheral tears and holds the vitreous in place. It allows safe anterior vitrectomy and prevents uncontrolled widening of the opening. We describe a technique of manual PCCC performed through the pars plicata after IOL implantation in the capsular bag.

## SURGICAL TECHNIQUE

A temporal conjunctival peritomy with minimal cauterization is performed initially. Two limbal paracentesis incisions of 1.0 mm are then made 180 degrees apart in the clear cornea. A 3.0 mm temporal single-plane clear corneal incision with a 1.5 mm to 2.0 mm internal entry is created. An anterior capsulorhexis is initiated by making a nick with a 26-gauge cystotome and completed by repeatedly grasping the flap using a Utrata forceps. Bimanual irrigation/aspiration is

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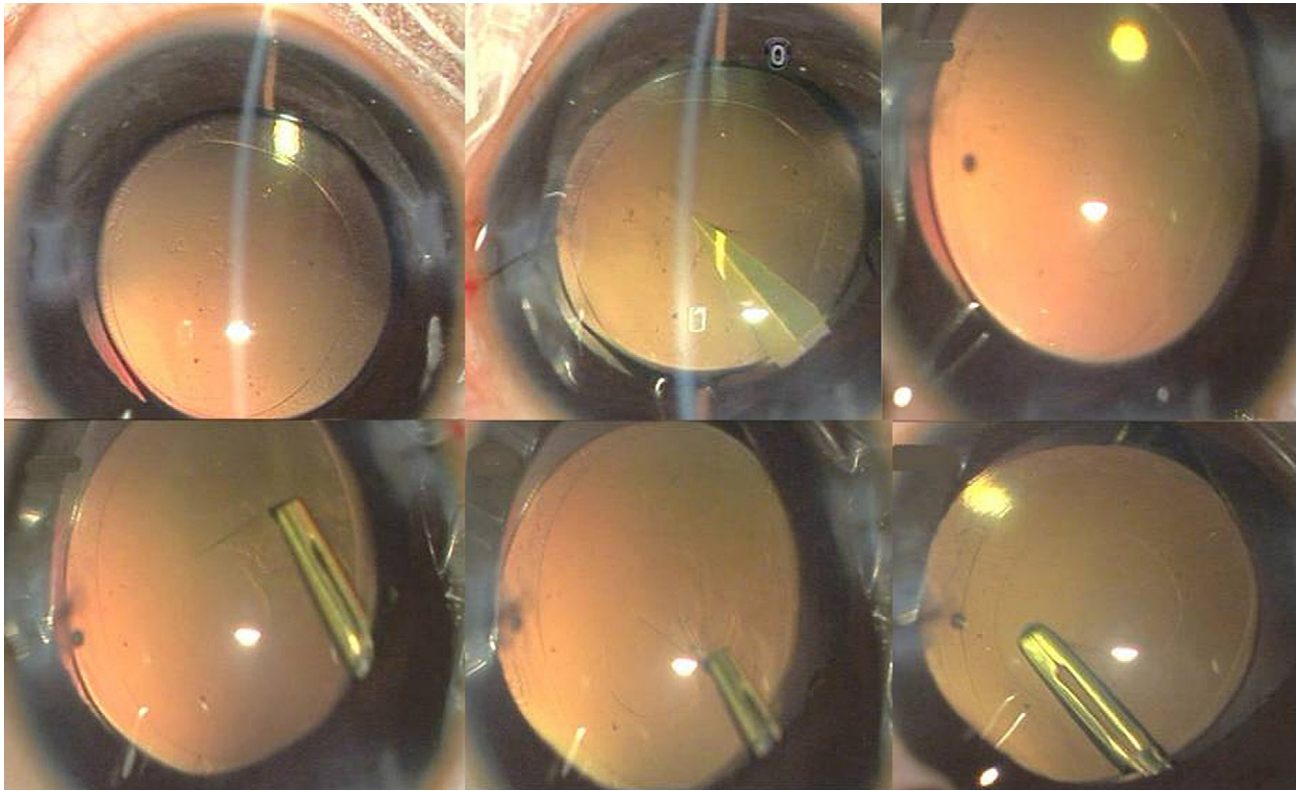
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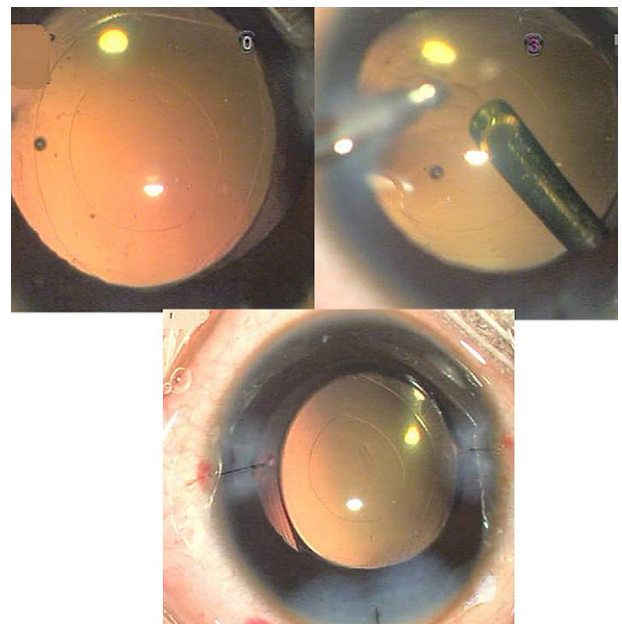
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**Figure 1.** After IOL implantation, an MVR blade is advanced through the pars plicata to initiate a puncture in the center of the posterior capsule. A coaxial capsulorhexis forceps is introduced, and a flap is generated to fashion and complete the posterior capsulorhexis.

then performed to remove the cortex. A single-piece hydrophobic acrylic IOL is implanted in the bag with an injector (*Figure 1, top left*). All the incisions are sutured with 10-0 nylon, and the residual ophthalmic viscosurgical device (OVD) is left in the anterior chamber. Later, a microvitrectoretinal (MVR) blade is used to create a pars plicata stab wound at a direction slightly anterior to the center of the eye (*Figure 1, top middle*). The pars plicata entry is made 1.0 to 1.5 mm behind the limbus, and the blade is advanced until the tip is visible in the pupillary area. An initial puncture is made in the center of the posterior capsule using the same MVR blade (*Figure 1, top right*). A coaxial capsulorhexis forceps is introduced and a flap generated from the initial puncture. The edge of the flap is grasped and then regrasped approximately every 2 clock hours, and the tear is directed toward the center and downward, fashioning the PCCC in a clockwise manner (*Figure 1, bottom row*). The aim is to create a PCCC smaller than the anterior capsulorhexis, approximately 3.0 to 4.0 mm (*Figure 2, top left*). A limited central automated anterior vitrectomy is performed (*Figure 2, top right*). The vitreous is managed by a 2-port vitrectomy. The vitrectome is passed through the pars plicata, and irrigation is introduced through the paracentesis (to the left of the main incision) into the anterior chamber. The vitrectome is

initially positioned with the port facing upward to perform anterior vitrectomy; gradually, the vitrectome port is also turned to face the optic nerve, ensuring thorough vitreous removal.



**Figure 2.** A limited central automated anterior vitrectomy performed through the pars plicata and postoperative IOL in the bag.

The sclerostomy wound is closed with 10-0 nylon. The residual OVD is removed at the end of the surgery with bimanual limbal vitrectomy. All the incisions are sutured with 10-0 nylon (Figure 2, bottom) (Video, available at <http://jcrsjournal.org>). At the end of the surgery, carbachol 0.01% is injected intracamerally to constrict the pupil. The anterior chamber is reformed with balanced salt solution, and intracameral moxifloxacin (1 mg/0.1 mL) is injected at the end of the procedure.

## DISCUSSION

At present, only adult-sized IOLs are available, and the currently available IOLs are slightly oversized and may not fit into small microphthalmic infant eyes, leading to complications in the long term. It is mandatory to perform a small PCCC in small eyes to avoid vitreous prolapse and destabilization of the IOL. Various options for posterior capsulectomy in children are available. A posterior capsule opening can be created manually (capsulorhexis) or with a vitrector (vitrectorhexis). Some surgeons advocate implanting an IOL and then performing a limbal-approach retropseudophakic manual PCCC or vitrectomy. The drawbacks of this approach are that it is difficult to go behind the IOL and it may endanger the IOL positioning and stability. The size of the opening cannot always be controlled. In addition, the margin of the posterior capsule opening is not regular and strong. Manual anterior capsulorhexis produces the most extensible capsulotomy with a highly regular and stable edge.<sup>4,5</sup> Similar observations may be true for the posterior capsule. Manual PCCC also facilitates anterior vitrectomy because the strong margins prevent peripheral extension. Although performing manual posterior capsulorhexis is technically challenging, it remains a gold standard because it offers greater resistance to capsule tearing and also yields a smooth round edge.

We performed manual PCCC through the pars plicata after IOL implantation. This approach allows the surgeon to create a capsulectomy in a controlled

manner with little risk. Moreover, IOL centration and stability are not disturbed during the posterior capsulectomy. The major advantage of pars plicata PCCC with vitrectomy is that it is possible to achieve in-the-bag fixation of the IOL more consistently. Furthermore, a posterior capsule opening of the desired size is achieved since the IOL is in place. The limitation of the technique is that it has a slightly higher learning curve and is skill dependent. Moreover, the technique does not work in eyes with a large posterior capsule plaque. However, it is a novel approach to creating a posterior capsulectomy of a desirable size in a controlled manner without destabilizing the IOL and can be applied in select cases. To validate the safety of the technique, a study evaluating the postoperative outcomes is underway.

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