

Capsular Tension Rings: When to Use Them, When to Refer

Zonular weakness can result in a number of complications during and following cataract surgery, including posterior capsular rupture, vitreous loss, and lens dislocation and decentration. Capsular support devices such as capsular tension rings (CTRs) can help facilitate successful surgery in eyes with zonular issues by improving bag stability and centration. When positioned in the bag, the standard C-shaped ring works by exerting an outward force that redistributes tension from areas of intact zonules to strengthen areas of weak or missing zonules.

Yet too many surgeons are reluctant to use CTRs, said Richard S. Hoffman, MD, who practices in Eugene, Oregon. “Every cataract surgeon should have a working familiarity of CTRs” and know when they are needed, he said. “Especially in challenging cases of pseudo-exfoliation [PEX], their use can spell the difference between success and complete disaster.”

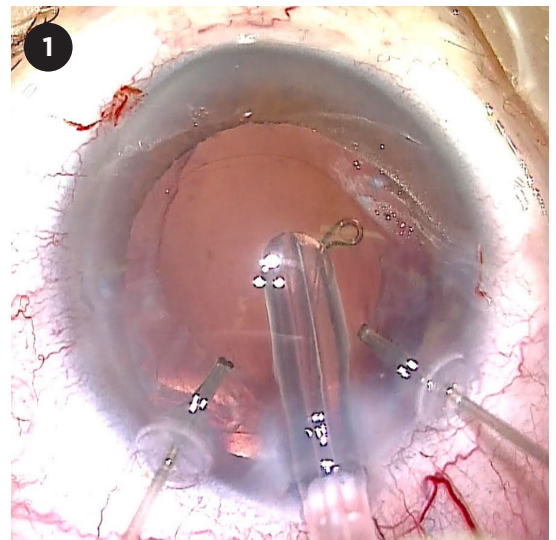
A Straightforward Solution for Complicated Cases

At Wills Eye Institute in Philadelphia, Brandon D. Ayres, MD, receives many complicated cataract cases requiring capsular support. “As a referral practice, we take care of a great deal of pathology,” he said. As a result, he said, “we see a lot of cases that other ophthalmologists don’t want to touch—many of which involve CTRs.”

Part of the issue is that these cases do require more time and can slow down a busy ophthalmologist’s day, said Dr. Ayres. Yet, much of the reluctance involves lack of experience.

For instance, some cataract surgeons rarely have to place CTRs, said Dr. Ayres. “So when they’re faced with the unfamiliar, it’s common to hesitate because they are not quite sure what the steps are.” And because CTRs are typically involved with non-routine cataract patients—for example, a case of zonular dialysis—surgeons may assume that the CTR procedure itself is just as complicated. “There is a definite fear of making a situation go from bad to worse,” said Dr. Ayres. “Sometimes CTRs can make other steps of the surgery a bit more complex—cortex removal or even nuclear removal, for example—so it can be difficult to mentally go through a decision tree when you have little experience behind it,” he added.

Overall, Dr. Ayres said, “Placing a CTR is relatively easy, and all it takes is that first activation energy to finally say, ‘Okay, we’re going to do this.’ It’s such a straightforward technique, and it can turn a harrowing case into something much more manageable.”



LOOSE ZONULES. Placement of a CTR in a patient with moderate to severe zonulopathy.

Start Simple

A strategic first step for becoming more familiar with CTRs is to practice loading and unloading the injector outside of the OR.

Next, consider starting with an easy case involving minimal zonular weakness that allows for placement of the ring late in the surgical process, said Thomas A. Oetting, MS, MD, at the University of Iowa in Iowa City. This could be a patient with mild PEX or a patient with trauma and a minor area of zonulopathy. In these patients, placing the CTR in an intact capsular bag is relatively straightforward and not urgent.

Dr. Hoffman also suggests placing CTRs in patients slated to receive toric IOLs. “CTRs can help decrease the incidence of lens rotation, especially in

BY MIKE MOTT, CONTRIBUTING WRITER, INTERVIEWING BRANDON D. AYRES, MD, RICHARD S. HOFFMAN, MD, AND THOMAS A. OETTING, MS, MD.

patients who have a long eye or a large capsular bag,” he said. For surgeons who have never used a CTR before, these routine patients offer a great opportunity to gain experience, he added.

Initially, you’ll want to avoid patients with severe zonulopathy (e.g., those with homocystinuria, ectopia lentis, or Marfan syndrome), said Dr. Ayres, because you’ll need multiple capsular support techniques to correct these patients. But a patient with mild trauma or a case of PEX with a little zonulopathy offers a great opportunity to work on placement and manipulation of the ring, he said. “That’s going to be your home run that allows you to then branch out and tackle more challenging cases.”

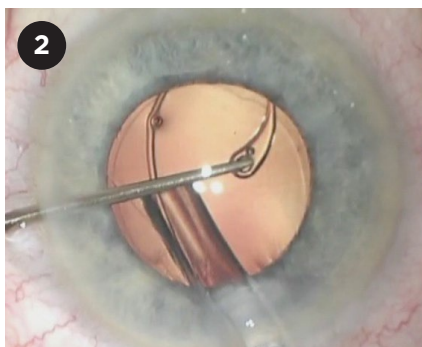
Pearls for Success

Keep the bag inflated. Prior to implanting the ring, be sure to completely fill the capsular bag with a cohesive ophthalmic viscosurgical device (OVD), said Dr. Oetting, so that when you inject the CTR, you don’t create any creases in the equator of the bag that can cause the ring to catch. Using OVD to make space between the anterior capsule and the cortex is also particularly important when placing the CTR early on during cataract surgery when lens material is still present, he said. That way, you don’t end up with trapped material between the capsular wall and the ring.

Pick your size wisely. Although you’ll most often be using a medium-sized CTR, take measurements to estimate the best fit, said Dr. Hoffman. The ends of a correctly sized ring should slightly overlap, and the ring’s diameter should be slightly larger than the diameter of the capsular bag.

For a basic rule of thumb, said Dr. Hoffman, if the axial length is greater than 28 mm, use a large CTR. If it’s less, use the horizontal white-to-white (WTW) measurement to determine the CTR size. A WTW measurement between 11.5 and 12.5 mm necessitates a medium. If it’s less, use a small CTR, and if it’s greater, use a large. When in doubt, said Dr. Ayres, you can always size up, since larger rings have no apparent disadvantages.

Aim for the weakness. A standard CTR can be inserted any time after



PEX. Placing a CTR in a patient with pseudoexfoliation using a lens-positioning hook.

construction of the capsulorrhexis, said Dr. Hoffman. But—to paraphrase Ken Rosenthal, MD—aim for as early as necessary and as late as possible. Although early stabilization of the capsular bag with a CTR is important, the ring’s presence can also complicate removal of the lens material.

When you’re ready, insert the CTR underneath the capsulorrhexis and inject it into the ciliary sulcus, so that the leading edge of the ring lands softly at the equator of the capsular bag, said Dr. Ayres. And if you have any zonulopathy, aim for that area of zonular weakness. “With a normal eye, it doesn’t matter which direction you inject the CTR,” he said. “But if you have a patient with zonular dialysis, for example, directing the leading arm of the ring toward the area of weakness helps displace all of the stress onto the intact zonules 180 degrees away.”

Know when to modify—or to refer. A standard standalone CTR works well in patients with mild diffuse zonular weakness or focal weakness extending less than 3 to 4 clock hours, said Dr. Hoffman. However, standard rings are oftentimes unable to center or stabilize the capsular bag in cases of more advanced weakness, and a more modified technique may be needed.

Placing a CTR in a patient with a very loose bag, for example, may require the use of a Sinsky hook, said Dr. Oetting. The hook helps guide the leading eyelet of the ring to prevent any catching on the folds of the bag and avoid other structures like capsule retractors. And it results in little to no stress on the capsular bag, said Dr.

Hoffman. “By placing the hook into the eyelet as I’m injecting the ring, I’m able to place the CTR without that leading eyelet touching the capsular bag equator,” he said.

Instead of a hook, many surgeons opt to use a 10-0 nylon or Prolene suture to help gently place the ring, said Dr. Hoffman. “You can also place the suture through the leading eyelet, holding on to the suture with intraocular forceps as you inject the ring. The suture serves as a leash that helps prevent that leading eyelet from pushing into the equator until the entire CTR is out of the injector.”

Early on in the learning curve, however, these more creative techniques likely aren’t on your to-do list, said Dr. Ayres. “As these cases get more complicated, the level of surgical complexity increases exponentially. These are the cases that are reasonable to refer out because there’s so much more involved.” Even so, said Dr. Ayres, there are many opportunities to add advanced capsular support techniques to your armamentarium. Wet labs, for example, offer an accurate practice model.

“Outside of these complex scenarios, though, every cataract surgeon should be comfortable placing a CTR,” said Dr. Ayres. Despite recent advances in microincisional cataract surgery, cases involving zonular compromise and long-term IOL instability are always a possibility, he said, and CTRs have proven to be an extremely useful solution when such cases arise.

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Dr. Oetting is clinical professor of ophthalmology and visual sciences at the University of Iowa in Iowa City. *Relevant financial disclosures: None.* See the disclosure key, page 8. For full disclosures, see this article at aao.org/eyenet.

MORE ONLINE. For more on CTRs in patients with PEX, see this article at aao.org/eyenet.