Methods for Removing a Brunescent Cataract in an Eye With a Small Pupil

BY RICHARD S. HOFFMAN, MD; STEPHEN H. JOHNSON, MD; ARTHUR J. WEINSTEIN, MD; AND R. BRUCE WALLACE III, MD

How do you remove a dense, brunescent cataract in an eye with a pupil that only dilates to 3 mm?

—Topic prepared by R. Bruce Wallace III, MD.

RICHARD S. HOFFMAN, MD

For an elderly patient with a dense, brunescent cataract and a small pupil, I would make some alterations to my usual technique to avoid complications. I would perform the surgery with a local block and stain the capsule with trypan blue. Next, I would place a 7-mm Malyugin Ring (MicroSurgical Technology) and create a 7-mm capsulorhexis using a microincisional capsulorhexis forceps through a microincision. With a large capsulorhexis, I am less likely to blow out the posterior capsule during hydrodissection, and it is easier to phacoemulsify fragments in the anterior chamber. In my experience, performing the capsulorhexis with a microincisional forceps through a 1-mm incision will help prevent the capsulorhexis from tearing out to the equator due to its ability to maintain a fully formed anterior chamber throughout the capsulorhexis maneuver. If the patient has coexisting pseudoexfoliation, I would insert capsular hooks as a prophylactic measure, regardless of the perceived condition of the zonules.

Hydrodelineation usually is not fruitful in the case of a dense, brunescent cataract. In my experience, gentle hydrodissection in multiple quadrants should be performed to help free the lens from the capsule and lessen the likelihood of zonular compromise. I would perform vertical chopping through bimanual incisions, but I would convert to a divide-and-conquer technique if the lens could not be chopped. Brunescent cataracts are usually extremely leathery, requiring additional time and maneuvers to break the endonuclear segments free from their posterior attachments. The surgeon's patience and frequent instillation of a dispersive viscoelastic, both in the anterior chamber and behind the lenticular fragments, will help prevent endothelial compromise and posterior capsular rupture.

STEPHEN H. JOHNSON, MD

The surgeon must decide if the reimbursement level is high enough to make it worth doing the work, and then, he or she must decide whether this is a case best suited for phacoemulsification or extracapsular cataract extraction.

In my hands, a 1.1-mm flared phaco tip (straight Aspiration Bypass System tip; Alcon Laboratories, Inc.), which requires a 2.75-mm incision, is more efficient at emulsifying hard lenses than smaller tips. I instill Viscoat (Alcon Laboratories, Inc.) prior to making a keratome incision and often several more times between the cornea and nucleus during phacoemulsification. For me, small pupils are most efficiently managed with a 7-mm Malyugin Ring. If the red reflex is poor I use a capsular dye. A large capsulorhexis will avoid the nucleus being imprisoned within the capsular bag if alternative techniques for managing the nucleus are required or if the posterior capsule ruptures.

I prefer the vertical quick chop technique, dividing the nucleus into six rather than four pieces. I find that emulsifying each piece in the iris plane by lifting the central apex rather than by tumbling the lens equator centrally provides better control. I try to keep Viscoat between the cornea and lens while using a spatula for control and to keep pieces away from the cornea. If the lens is too dense to chop, I convert to a stop-and-chop technique by making a deep central groove and then cracking the lens by placing the ultrasound tip and spatula deep in the groove and spreading them to break the nucleus. I then chop the

A NOTE ON REIMBURSEMENT

By R. Bruce Wallace III, MD

Several of the pearls mentioned in this article qualify a surgical procedure for the complex cataract surgery code (66982), which is reimbursed at a higher rate. Be sure to review your operative report carefully to justify using this code.

hemispheres into two or three pieces each. Occasionally, I place Viscoat beneath the nucleus to move the posterior capsule away and to elevate pieces as needed.

ARTHUR J. WEINSTEIN, MD

A brunescent cataract with a small pupil always poses some challenges for the cataract surgeon. I recommend enlarging the pupil as the first step to successfully removing the brunescent lens. If the pupil is small and the potential for intraoperative floppy iris syndrome exists due to a history of systemic α-1 blockers, then I recommend iris retractors. They are very helpful, not only for enlarging the pupil, but also for controlling its overall size. If the pupil is small for any other reason, I use the Beehler Pupil Dilator (Moria SA) to achieve adequate dilation.

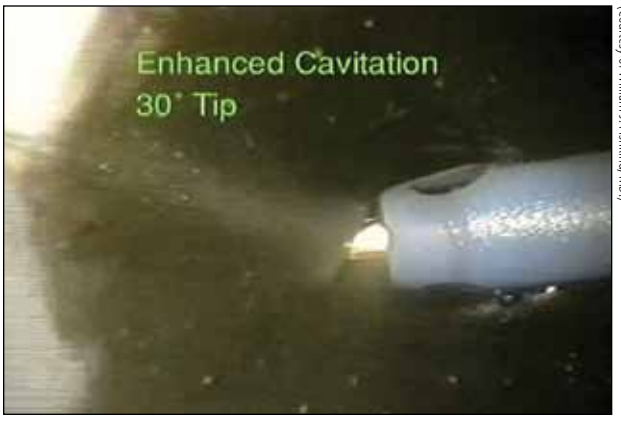
One of the most critical steps for these cases is the construction of a large, continuous capsulorhexis. I use trypan blue and make my capsulorhexis 5.5 to 6 mm. A small capsulorhexis will pose resistance to the removal of nuclear pieces and make the entire case more difficult than it has to be.

To remove the nucleus, I recommend a chopping technique. I begin by making a deep groove in the central 3 mm of the nucleus. I then apply a series of short phaco bursts into the wall of the nucleus, accompanied by what I call a *diagonal chop*. I place the nucleus chopper halfway between the groove and the periphery and then chop down and left while lifting up the engaged nucleus slightly with the phaco tip. This hybrid of vertical and horizontal chopping has proven to be effective and safe. Once I complete a series of six to eight chops, it is easy to remove the nuclear pieces.

R. BRUCE WALLACE III, MD

When I encounter a small pupil, I usually enhance pupillary dilation with an intracameral injection of 1:10,000 epinephrine. I generally strive for a 5- to 6-mm pupil. With the combination of epinephrine and a dispersive viscoelastic, I am successful in over 95% of cases.

If dilation is inadequate, I will stretch the pupil with two instruments. I will place a Lester hook through a 0.8-mm sideport incision and a Graether Collar Button (Howard Instruments, Inc.) retractor through the phaco incision. I will stretch the pupil nasally, temporally, superiorly, and inferiorly, which usually expands the pupil to at least 5 mm. On



(Courtesy of William J. Fishkind, MD.)

Figure 1. Direction of phaco energy from a 30º phaco tip.

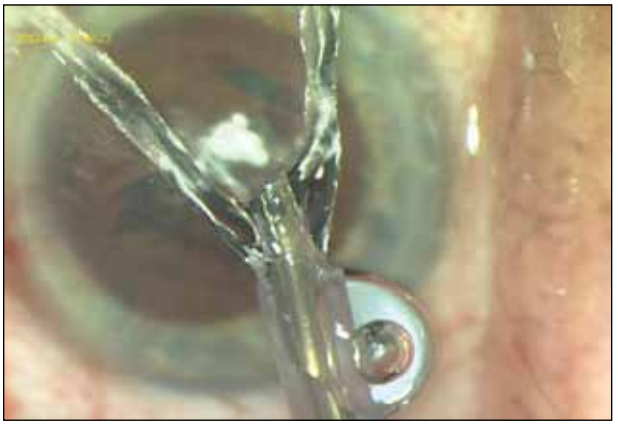


Figure 2. Alignment of the irrigation ports of the phaco sleeve to the 30º bevel of the needle.

Figure 3. Orientation of the phaco bevel during nuclear removal. The second instrument is a blunt chopper (Wallace Guardian; Bausch + Lomb Storz Ophthalmics).

rare occasions, I will consider using a Malyugin Ring if the aforementioned steps are not effective.

Brunescent nuclei present another challenge, particularly in the presence of a small pupil. I employ a procedure I have termed *burst hemiflip*, which I can successfully per-

form on most nuclei, including the most brunescent of lenses. I take extra steps, however, to make a deeper initial groove than usual and then consider a separate groove (as with the four-quadrant divide-and-conquer technique developed by John Shepherd, MD) to reduce the amount of phaco energy traumatizing the corneal endothelium. William J. Fishkind, MD, has shown the direction of phaco energy as it exits a 30° tip (Figure 1). I purposely turn the phaco tip sideways to prevent phaco energy from going toward the endothelium. I will reinject a dispersive viscoelastic at certain points during the procedure for additional endothelial protection (Figures 2 and 3). ■

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