OZil IP With a Grade 4+ Cataract

OZil Torsional Ultrasound with Intelligent Phaco (IP) is the most effective method for removing a dense cataract.

To watch a video of this case, visit CRSTodayEurope.com and enter the keyword "RTBEspiritu" in the search bar.

BY CESAR ESPIRITU, MD

OZil IP Torsional ultrasound, which is unique to the INFINITI Vision System (Alcon Laboratories, Inc., Fort Worth, Texas), has been proven to remove all grades of cataract more effectively than traditional phacoemulsification with longitudinal ultrasound.[1] OZil Torsional ultrasound moves the phaco tip in a shearing motion for nuclear disassembly, in contrast to the forward-and-backward jackhammer action of the phaco tip in traditional longitudinal phacoemulsification. The shearing motion is more effective at emulsifying nuclear material because each stroke of the phaco tip consumes material. In longitudinal ultrasound, only the forward motion of the phaco tip fragments the nucleus. In fact, the backward movement of the phaco needle is considerably disadvantageous, because it tends to release the needle's hold on the fragment. Because OZil Torsional ultrasound is twice as efficient as longitudinal ultrasound, it requires less total energy to fully emulsify a nucleus.[2]

LESS ENERGY AND FLUID IN THE EYE

Because the OZil phaco tip does not thrust forward, it does not repel nuclear material. Therefore, the surgeon does not need to set vacuum and fluid flow to neutralize this repulsive force. The ability to reduce the total volume of fluid in the eye increases the protection of the endothelium. Furthermore, using lower vacuum settings prevents post-occlusion surge.[3] Because surgeons can use lower settings with OZil Torsional phacoemulsification, the anterior chamber remains stable.

When OZil Torsional ultrasound was first introduced, many practitioners wondered whether the technology would be able to emulsify dense nuclei. Experience has demonstrated that OZil is able to sculpt hard cataracts quite efficiently with the addition of the Intelligent Phaco (IP) software, as the following case illustrates.

OZil IP

OZil IP applies intermittent pulses of longitudinal power when the vacuum reaches a level preset by the surgeon. These longitudinal pulses reposition lens fragments before they can occlude the OZil phaco tip, thus allowing the tip to oscillate efficiently (the OZil handpiece's shearing action works best when the phaco tip's bevel remains on the outer edge of the fragment. It is less effective when the tip becomes buried in the lens fragment).

For example, the surgeon may set the vacuum at 400 mm Hg and set the OZil IP feature to activate at 95% (the default setting). With OZil Torsional phacoemulsification, I have never needed to set vacuum higher than 400 mm Hg, even for the hardest of cataracts. When the vacuum reaches this level, the OZil IP software triggers a pulse of longitudinal ultrasound at the tip that will reposition the fragment. The vacuum level then drops so that the tip may continue its torsional shearing motion. In my opinion, the OZil IP feature increases the efficacy of what already was an incredibly efficient emulsification technology.

I only use the IP feature during emulsification; it is not necessary during the sculpting phase of cataract surgery. Also, I only use OZil IP with harder-grade cataracts; OZil Torsional ultrasound on its own is more than effective enough to emulsify cataracts of grade 3 and softer. Furthermore, with OZil IP, I no longer need to use my second instrument to disengage and reposition nuclear fragments when the phaco tip becomes embedded.

CASE EXAMPLE

Presentation and First Steps

A 59-year-old man presented with a BCVA of 20/80 in his left eye due to a grade 4+ nuclear sclerotic cataract. He also desired spectacle independence at distance.

I began by administering topical anesthesia and injecting preservative-free 1% lidocaine intracamerally. I instilled DisCoVisc ophthalmic viscosurgical device (OVD; Alcon Laboratories, Inc.) into the anterior chamber. DisCoVisc is

Figure 1. The author creates a pothole with a vertical wall in the nucleus.

Figure 2. OZil IP kept the phaco tip from burying into the nuclear fragments.

my favorite OVD, because its unique chondroitin sulfate formula protects the endothelium during surgery, maintains the anterior chamber, and keeps the intraocular structures in place without obstructing the surgery. Next, I made my main incision using a 2.4-mm, single-beveled steel keratome (Alcon Laboratories, Inc.). I created the capsulorrhexis using a Utrata forceps. I always target a diameter of 5 to 5.5 mm and center the capsulorrhexis so that it will overlap the IOL and keep it stable inside the capsular bag.

Nuclear Fragmentation and Emulsification

After clearing the anterior cortex to expose the nucleus, I initiated OZil Torsional ultrasound and created what I call a *pothole* in the center of the cataract. This step is an adaptation of a technique that was popularized locally by Richard Kho, MD. Essentially, I carved a small, 1.5- to 2-mm-diameter central crater in the densest portion of the cataract to debulk it. My phaco parameters were set relatively low while I sculpted the pothole. The vacuum was fixed at 150 mm Hg, which was all I needed to keep the phaco needle clear of the dense material. I set the flow at a minimum of 15 mL/min, which was just enough to keep the anterior chamber stable.

I constructed the pothole to have a distal vertical wall, which creates a lock-and-key fit with the bevel of the OZil phaco needle. This wall, with the bevel properly apposed to it, effectively counteracted the force of the horizontal chopping maneuver I used to fragment the nucleus (Figure 1). I prefer to finish fracturing the nucleus in the capsular bag before I begin removing the pieces one at a time, because the bag keeps the fragments contained and gives me greater control during disassembly. I have routinely observed that, if I proceed with the usual stop-and-chop technique, emulsifying nuclear fragments immediately after each chop, then disassembling the remaining half of a hard nucleus oftentimes becomes less controlled with the tumbling movement, and fragments can enter the anterior chamber and increase the risk of endothelial trauma.

Once I am satisfied with the number and size of the nuclear fragments, I turn the bevel of the phaco tip on its side (horizontally) with the irrigating ports positioned so that fluid is not directed toward the endothelium. In this case, my vacuum setting was a maximum of 350 mm Hg (linear), and my aspiration was set at 30 mm Hg (linear) during emulsification (Table 1). I programmed the OZil IP to come on whenever the vacuum exceeded 95% of 350 mm Hg (the preset maximum; Table 2). The OZil IP kept the phaco tip from burrowing into the nucleus (Figure 2). The video shows that I was able to keep the tip on the surface of the fragments, where its shearing action is most effective.

TABLE 1. CASE PARAMETERS

Procedure Step	Chop	Fragment Removal
Bottle Height cm H_2O	80	110
Energy Amplitude min%/max%	Torsional, Linear Continuous 70/100	Torsional, Linear Continuous 70/100
Vacuum mm Hg	Fixed 150	Linear 350
Aspiration cc/min	Linear 15	Linear 30
Dynamic Rise	0	0
OZil IP	Off	On

TABLE 2. OZil IP PARAMETERS

Procedure Step	Chop	Fragment Removal
Vacuum Threshold % of Vacuum Limit	-	95
Phaco Pulse On Time Msec	-	10
Longitudinal/ Torsional Ratio	-	1.0

Capsular Polishing and IOL Implantation

After aspirating the remaining cortex and polishing the capsule, I reinflated the capsular bag and anterior chamber with DisCoVisc OVD. I implanted a monofocal, aspheric AcrySof Natural lens (SN60WF; Alcon Laboratories, Inc.) and then aspirated all of the OVD out of the capsular bag. I am always careful not to leave any OVD behind the optic so that the lens may adhere to the posterior capsule and provide long-term centration and stability in the bag. This step also helps to ensure that I achieve the targeted refraction.

The final steps involved aspirating any remaining OVD from the anterior chamber and re-establishing the anterior chamber's depth and the eye's IOP with BSS PLUS solution (Alcon Laboratories, Inc.). In this particular case, I made a Wong incision, which is an additional small incision above the main incision that I hydrated to improve the wound's seal. I also hydrated the stab incision. Finally, I intracamerally injected 500 µg in 0.1 mL of the fourth-generation fluoroquinolone VIGAMOX solution (Alcon Laboratories, Inc.). ■

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