A Video Tour of the Anterior Segment

Novel surgical techniques and devices address the complex nature of this part of the eye.

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This installment of Inside Eyetube.net features videos that focus on the anterior segment. Each highlights the complex nature of the anterior segment and the innovation it inspires among ophthalmologists and the ophthalmic industry. We begin with a video about an innovative training tool developed in Japan for practicing cataract surgery. The videos that follow highlight skills and techniques that experienced ophthalmologists use to safely address complications that occur during cataract surgery. Also covered is a novel technique for removing foldable lenses, ultrasound-free laser cataract surgery, and a new anterior phakic IOL. Additionally, Richard A. Lewis, MD, talks to cataract surgical pioneer Robert M. Sinskey, MD, about his decision to undergo canaloplasty.

FROM THE LABORATORY TO THE OPERATING ROOM

The Kitaro DryLab and WetLab kits (Frontier Vision Co., Ltd), invented by Junsuke Akura, MD, PhD, are innovative training tools that allow ophthalmologists to practice cataract surgery using artificial nuclei and lenses. In his video (eyetube.net/?v=sawoo), Dr. Akura demonstrates how the beginning surgeon can practice techniques repeatedly without the added complication of long preparatory times and costly live tissue samples. The training tools simulate the stages of cataract surgery using wet and dry laboratory environments to allow new surgeons to practice basic surgical techniques repeatedly. Beginners can learn to manipulate instruments with the dry lab and then move on to the wet lab to learn the intricacies of machine operations before performing actual surgeries.

In a clinical video, Alin Stefanescu-Dima, MD, PhD, manages intraoperative complications due to a morgagnian or hypermature cataract. His patient presented with a fibrous anterior capsule, extreme zonular weakness, and a hard, brown nucleus that moved freely in the capsular bag. During the nuclear fracture, as Dr. Stefanescu-Dima attempts to crack the posterior nuclear plate, zonular dehiscence occurs and evolves quickly into a full-blown rupture of more than 180°. Dr. Stefanescu-Dima implants a capsular tension ring to support the bag. At the end of phacoemulsification, he notices a small posterior capsular tear. He prevents vitreous from prolapsing by injecting a highly dispersive ophthalmic viscosurgical device (OVD), both inside the bag and posterior to the capsule in the Berger space, and he uses intraocular forceps to turn the tear into a posterior capsulorrhexis. No vitreous loss occurs, and Dr. Stefanescu-Dima implants a foldable lens in the sulcus for long-term stability (eyetube.net/?v=fivil; Figure 1). Dr. Stefanescu-Dima also describes this case in a recent article in CRST Europe (Morgagnian Cataract: A Surgical Challenge; March 2012; pages 50-54).

Cynthia Matossian, MD, describes her flip-and-slice technique for cataract surgery. First, using a flattened hydrodissection cannula, she pops the nucleus through the capsulorrhexis. She injects Healon5 (Abbott Medical Optics Inc.) to protect the endothelium and uses a Koch spatula (Katena Products, Inc.) to partially slice the cataract. After flipping it with the cannula, Dr. Matossian bisects the cataract at the fault line created by the Koch spatula with the phaco handpiece on sculpting mode. For a video demonstration, visit eyetube.net/?v=brere; read Dr. Matossian’s article on page 46 of this issue.
Michael A. Lawless, MD, uses the LenSx Laser (Alcon Laboratories Inc.) to remove a grade 3+ to 4+ cataract. First, Dr. Lawless describes how he determined the placement of the incision, and then he programs the laser to perform the primary incision and a corneal intrastromal incision on the axis of astigmatism (eyetube.net/?v=gupuh; Figure 2). After removing the lens and cortical material, Dr. Lawless uses wound-assisted insertion to implant an AcrySof IQ ReStor IOL (Alcon Laboratories, Inc.). Throughout the procedure, he shares pearls on how to use the laser for removal of a cataract of these grades, and he explains the differences between conventional and laser cataract removal.

Vikas Shankar, MD; Muhammad Amer Awan, MD; and William Wykes, MD, describe a technique for explanting a posterior chamber IOL without enlarging the incision or cutting the haptic and optic. First, the lens is floated into the anterior chamber with an OVD after being freed of capsular attachments. A Sinskey hook supports the lens from behind, and the surgeon uses folding forceps to fold the lens in the anterior chamber. The IOL can then be explanted through the original incision. The lens remains intact, and the original incision is unaltered. This technique can be used to exchange damaged IOLs or in cases of a refractive surprise. For a video demonstration, visit eyetube.net/?v=pohib.

M. Javier Gonzalez Rodriguez, MD, demonstrates canalo-plasty with the Glaucolight device (DORC International BV). He begins by providing an excellent view of the dissection of the scleral flap. The Glaucolight device allows precise visualization of the probe as it advances 360° through Schlemm canal (eyetube.net/?v=lulig; Figure 3). Once the canal suture is fixed in place and tied, the flap is sutured closed. Gonioscopy is used to visualize the suture and flap.

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**ULTRASONIC-FREE CATARACT SURGERY**

Ming Wang, MD, uses the LenSx Laser (Alcon Laboratories, Inc.) to remove a cataract without using ultrasound. First, the lens is prechopped and partially fragmented with the laser (eyetube.net/?v=dewaw; Figure 4). Dr. Wang then elevates the lens into the anterior chamber with OVD. A chopper and a large-bore phaco tip partition the lens into numerous small pieces. In suction mode, the phaco probe aspirates these pieces. Avoiding ultrasound during this portion of cataract surgery offers many advantages in terms of safety and speedy visual recovery, Dr. Wang says.

**ZSAL-4/PLUS PHAKIC REFRACTIVE LENS**

The ZSAL-4/Plus Phakic Refractive Lens (Morcher GmbH) is a fifth-generation, phakic angle-supported lens. Jorge L. Alió, MD, PhD, helped design the implant with Juan Perez-Santonja, MD, and Fernando Zapata, MD. In his video, which can be viewed at eyetube.net/?v=shimo, Dr. Alió demonstrates how to insert the IOL into the anterior chamber of a phakic patient. The lens has a specialized haptic design and an enlarged optical zone with refined edges. The hope for this lens is that its unique design will reduce the complications associated with anterior chamber IOLs.
A PATIENT’S PERSPECTIVE

Richard Lewis, MD, an innovative canaloplasty surgeon, interviews Robert M. Sinskey, MD, about his personal experience with glaucoma and his decision to undergo canaloplasty. Speaking as a patient and an eye surgeon, Dr. Sinskey discusses the advantages of this surgery compared with filtering surgery or the use of multiple medications, and he shares his outcome and the impact that surgery has had on his life. Dr. Sinskey also speculates about the future of canaloplasty and its potential as an early treatment for glaucoma. To watch the interview with Dr. Sinskey, visit eyetube.net/?v=gavel.

CONCLUSION

The videos in this month’s Inside Eyetube.net demonstrate that the anterior segment continues to be an area of diverse innovation. Novel surgical techniques continue to advance well-tested procedures, and new devices treat conditions more effectively.