



CASE SERIES NO. 1

Successful Cataract Refractive Surgery With the Help of an Advanced OVD System

This dual viscoelastic system takes advantage of the benefits of both cohesive and dispersive properties.

BY LAWRENCE WOODARD, MD



I would like to share with you a cataract refractive surgery case where I placed an AcrySof IQ ReSTOR IOL (Alcon). During the surgery, I used the LenSx Laser (Alcon) and the DuoVisc Viscoelastic System (Alcon).

DuoVisc Viscoelastic System offers both the endothelial protection of chondroitin sulfate in VISCOAT ophthalmic viscosurgical device (OVD) with the proven mechanical protection and space maintenance found in ProVisc OVD.¹⁻⁶

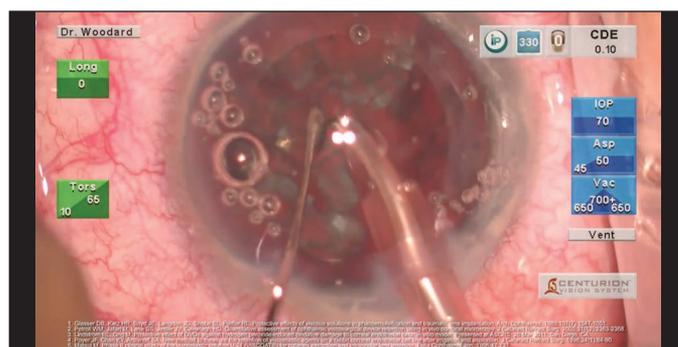
Once in the operating room, I turned on the Verion Image Guided System (Alcon) that registers the eye according to limbal vessels. I use a spatula to open the paracentesis and inject lidocaine into the eye's anterior chamber for anesthesia.

I inject VISCOAT to coat the endothelium and maintain space in the anterior chamber,¹⁻⁶ as those bubbles that had been elicited by the femtosecond laser procedure were expressed peripherally. The triple negative properties of the VISCOAT enable it to coat the endothelium while also maintaining its place on the endothelium.^{1,2,4}

I remove the transected anterior capsule, which was complete and free floating. Then, I perform gentle hydrodissection, and inject BSS into the center of the nucleus. Next, I add more VISCOAT, because you do express some during hydrodissection, and I think it is important to maintain complete stability in the anterior chamber prior to going in with the phaco instrument.^{1,3-6}

I use the Centurion Vision System (Alcon) with the balanced tip. I go through my 2.2-mm incision, and I am solely under vacuum with the intent to aspirate as much of the nucleus as possible without using any ultrasound energy. I use a small amount, if any, cumulative dissipated energy throughout the case.

I remove the center 3 to 4 mm of the nucleus with the intent of clearing space in the center so that I can divide the nucleus into various quadrants. I use the matrix pattern all the way out to 6 mm with a 5-mm capsulorhexis.⁷ I am able to extend the fracture lines of the laser with my second instrument and then

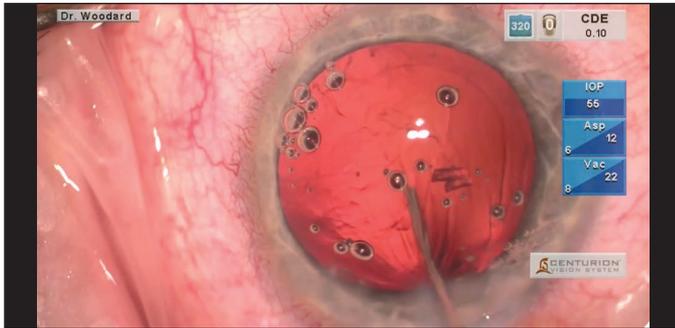


remove the quadrants.

The VISCOAT maintained its place on the endothelium, which is indicated by the presence of multiple peripheral bubbles that are present in the viscoelastic.¹⁻⁶ If there was no viscoelastic protecting the endothelium, those bubbles would have moved to the apex of the cornea. Throughout this case, I removed all the nuclear material and the bubbles did not move, which I think is an excellent demonstration of how beneficial the VISCOAT is, and how it retains its adherence to the endothelium.^{1,2,4}

I polished the posterior capsule with the polymer I/A tip, which is gentle and gives me excellent ability to remove the cortical material in a femtosecond laser case,⁸ which may be difficult for inexperienced surgeons. I am able to safely remove all of the cortical material with this polymer tip.⁸ I also use this tip to remove as many endothelial cells as possible from the anterior capsule.

The bubbles that were present in the beginning of the surgery remain in place as I go back in with the cohesive ProVisc viscoelastic, which I use to fill the capsular bag and the anterior chamber in preparation for the IOL delivery.^{4,9-12} I am using an AcrySof IQ ReSTOR IOL. As I inject this lens, the anterior chamber remains stable and there is no expression of viscoelastic through any of the incisions. I think that highlights how well we are able to maintain the chamber throughout this case.^{4,9-12}



As I put the lens into position, I use the polymer I/A tip to go under the lens to remove all viscoelastic. This is an important step, especially in a toric lens or a ReSTOR lens case, because the lens can rotate postoperatively if viscoelastic is left behind the lens. The benefits of the cohesive properties of the ProVisc are obvious as I easily remove all of the viscoelastic from the anterior chamber. Those bubbles that were previously so adherent to the endothelium now come out easily, especially using the improved fluidics of the Centurion Vision System.^{13,14} I complete the surgery by hydrating the incisions. In my opinion, the DuoVisc Viscoelastic System's cohesive and dispersive properties are significant factors contributing to the success of this case.

In summary, I was very pleased with the patient's clear cornea at the 1-day postoperative visit. Excellent outcomes are important when performing a femtosecond laser procedure with a premium IOL. The use of a premium viscoelastic system helps surgeons provide patients with excellent outcomes.^{1,3-6} ■

1. Glasser DB, Katz HR, Boyd JE, et al. Protective effects of viscous solutions in phacoemulsification and traumatic lens implantation. *Arch Ophthalmol*. 1989;107(7):1047-1051.
2. Petroll WM, Jafari M, Lane SS, et al. Quantitative assessment of ophthalmic viscosurgical device retention using in vivo confocal microscopy. *J Cataract Refract Surg*. 2005;31(12):2363-2368.
3. Lindstrom RL, Ong M. Protective effect of OVDs against hydrogen peroxide-induced oxidative damage to corneal endothelial cells: in vitro model. Presented at: American Society of Cataract and Refractive Surgery; March 26, 2011; San Diego, Ca.
4. Poyer JF, Chan KY, Arshinoff SA. New method to measure the retention of viscoelastic agents on a rabbit corneal endothelial cell line after irrigation and aspiration. *J Cataract Refract Surg*. 1998;24(1):84-90.
5. Matsui M. Phase II clinical study of the viscoelastic solution V-24 (VISCOAT) for cataract extraction and intraocular lens insertion. *Folia Ophthalmol Jpn*. 1996;47:737.
6. Koch DD, Lui JF, Glasser DB, et al. A comparison of corneal endothelial changes after use of Healon or Viscoat during phacoemulsification. *Am J Ophthalmol*. 1993;115(2):188-201.
7. LenSx Users Manual. Fort Worth, TX: Alcon Laboratories, Inc.
8. Davis D, Ness P, Maddula S, et al. Analysis of intraoperative capsular trauma induced by a new single-use polymer irrigation/aspiration tip during posterior capsule polishing. Presented at: American Society of Cataract and Refractive Surgery; April 9-14; Boston, Mass.
9. DuoVisc [package insert]. Fort Worth, TX: Alcon Laboratories, Inc.
10. Arshinoff SA, Norman R. Tri-soft shell technique. *J Cataract Refract Surg*. 2013;39(8):1196-1203.
11. Labiris G, Sideroudi H, Rousopoulos K, Kozobolis VP. Cohesive versus dispersive-cohesive ophthalmic viscosurgical device in torsional intelligent phaco. *J Cataract Refract Surg*. 2015;41(3):681-682.
12. Lehmann R, Brint S, Stewart R, et al. Clinical comparison of ProVisc and Healon in cataract surgery. *J Cataract Refract Surg*. 1995;21(5):543-547.
13. Sharif-Kashani P, Fanney D, Injev V. Comparison of occlusion break responses and vacuum rise times of phacoemulsification systems. *BMC Ophthalmol*. 2014;14:96.
14. Solomon KD, Lorente R, Fanney D, Cionni RJ. Prospective, randomized clinical study using a new phaco system with intraocular system target pressure control. Presented at: ASCRS-ASOA Symposium and Congress; April 25-29, 2014; Boston, Mass.

Lawrence Woodard, MD

- board-certified ophthalmologist and medical director of Omni Eye Services of Atlanta
- lwoodard@omnieyatlanta.com
- financial disclosure: consultant to and clinical investigator and speaker for Alcon

DUOVISC® OVD IMPORTANT PRODUCT INFORMATION

DESCRIPTION: DUOVISC® Viscoelastic System is designed to give two Viscoelastic materials with different physico-chemical properties that can be used differently and/or sequentially to perform specific tasks during a cataract procedure. DUOVISC® Viscoelastic System consists of VISCOAT® Ophthalmic Viscosurgical Device and PROVISC® Ophthalmic Viscosurgical Device.

CAUTION: Federal (USA) law restricts this device to sale by, or on the order of, a physician.

DESCRIPTION: VISCOAT® (Sodium Chondroitin Sulfate – Sodium Hyaluronate) Ophthalmic Viscosurgical Device **INDICATIONS:** VISCOAT® OVD is indicated for use as an ophthalmic surgical aid in anterior segment procedures including cataract extraction and intraocular lens (IOL) implantation. VISCOAT® OVD maintains a deep anterior chamber during anterior segment surgeries, enhances visualization during the surgical procedure, and protects the corneal endothelium and other ocular tissues. The viscoelasticity of the solution maintains the normal position of the vitreous face and prevents formation of a flat chamber during surgery. **WARNINGS:** Failure to follow assembly instructions or use of an alternate cannula may result in cannula detachment and potential patient injury. **PRECAUTIONS:** Precautions are limited to those normally associated with the surgical procedure being performed. Although sodium hyaluronate and sodium chondroitin sulfate are highly purified biological polymers, the physician should be aware of the potential allergic risks inherent in the use of any biological material. **ADVERSE REACTIONS:** VISCOAT® OVD has been extremely well tolerated in human and animal studies. A transient rise in intraocular pressure in the early postoperative period may be expected due to the presence of sodium hyaluronate, which has been shown to effect such a rise. It is therefore recommended that VISCOAT® OVD be removed from the anterior chamber by thorough irrigation and/or aspiration at the end of surgery

to minimize postoperative IOP increases. Do not overfill anterior chamber.

ATTENTION: Please refer to the directions for use for a complete listing of indications, warnings and precautions.

DESCRIPTION: PROVISC® (Sodium Hyaluronate) Ophthalmic Viscosurgical Device **INDICATIONS:** PROVISC® OVD is indicated for use as an ophthalmic surgical aid in the anterior segment during cataract extraction and intraocular lens (IOL) implantation. Ophthalmic viscoelastics serve to maintain a deep anterior chamber during anterior segment surgery allowing reduced trauma to the corneal endothelium and surrounding ocular tissues. They help push back the vitreous face and prevent formation of a flat chamber during surgery. **PRECAUTIONS:** Postoperative increases in intraocular pressure have been reported with sodium hyaluronate products. The IOP should be carefully monitored and appropriate therapy instituted if significant increases should occur. It is recommended that PROVISC® OVD be removed by irrigation and/or aspiration at the close of surgery. Do not overfill anterior chamber. Although sodium hyaluronate is a highly purified biological polymer, the physician should be aware of the potential allergic risks inherent in the use of any biological material; care should be used in patients with hypersensitivity to any components in this material. Cannula assembly instructions should be followed to prevent patient injury. **ADVERSE REACTIONS:** Postoperative inflammatory reactions such as hypopyon and iritis have been reported with the use of ophthalmic viscoelastics, as well as incidents of corneal edema, corneal decompensation, and a transient rise in intraocular pressure. It is therefore recommended that PROVISC® OVD be removed from the anterior chamber by thorough irrigation and/or aspiration at the end of surgery to minimize postoperative IOP increases. Do not overfill anterior chamber. **ATTENTION:** Please refer to the directions for use for a complete listing of indications, warnings and precautions.

LENSX® LASER IMPORTANT PRODUCT INFORMATION FOR CATARACT TREATMENT CAUTION

Federal Law restricts this device to sale and use by or on the order of a physician or licensed eye care practitioner.

INDICATION

The LenSx® Laser is indicated for use in patients undergoing cataract surgery for removal of the crystalline lens. Intended uses in cataract surgery include anterior capsulotomy, phacofragmentation, and the creation of single plane and multi-plane arc cuts/incisions in the cornea, each of which may be performed either individually or consecutively during the same procedure.

RESTRICTIONS

- Patients must be able to lie flat and motionless in a supine position.
- Patient must be able to understand and give an informed consent.
- Patients must be able to tolerate local or topical anesthesia.
- Patients with elevated IOP should use topical steroids only under close medical supervision.

CONTRAINDICATIONS

- Corneal disease that precludes applanation of the cornea or transmission of laser light at 1030 nm wavelength
- Descemetocoele with impending corneal rupture
- Presence of blood or other material in the anterior chamber
- Poorly dilating pupil, such that the iris is not peripheral to the intended diameter for the capsulotomy
- Conditions which would cause inadequate clearance between the intended capsulotomy depth and the endothelium (applicable to capsulotomy only)
- Previous corneal incisions that might provide a potential space into which the gas produced by the procedure can escape
- Corneal thickness requirements that are beyond the range of the system
- Corneal opacity that would interfere with the laser beam
- Hypotony or the presence of a corneal implant
- Residual, recurrent, active ocular or eyelid disease, including any corneal abnormality (for example, recurrent corneal erosion, severe basement membrane disease)
- History of lens or zonular instability

- Any contraindication to cataract or keratoplasty
- This device is not intended for use in pediatric surgery.

WARNINGS

The LenSx® Laser System should only be operated by a physician trained in its use.

The LenSx® Laser delivery system employs one sterile disposable Patient Interface consisting of an applanation lens and suction ring. The Patient Interface is intended for single use only. The disposables used in conjunction with ALCON® instrument products constitute a complete surgical system. Use of disposables other than those manufactured by Alcon may affect system performance and create potential hazards.

The physician should base patient selection criteria on professional experience, published literature, and educational courses. Adult patients should be scheduled to undergo cataract extraction.

PRECAUTIONS

- Do not use cell phones or pagers of any kind in the same room as the LenSx® Laser.
- Discard used Patient Interfaces as medical waste.

COMPLICATIONS

- Capsulotomy, phacofragmentation, or cut or incision decentration
- Incomplete or interrupted capsulotomy, fragmentation, or corneal incision procedure
- Capsular tear
- Corneal abrasion or defect
- Pain
- Infection
- Bleeding
- Damage to intraocular structures
- Anterior chamber fluid leakage, anterior chamber collapse
- Elevated pressure to the eye

ATTENTION

Refer to the LenSx® Laser Operator's Manual for a complete listing of indications, warnings and precautions.

CENTURION® VISION SYSTEM IMPORTANT PRODUCT INFORMATION

CAUTION: Federal (USA) law restricts this device to sale by, or on the order of, a physician.

As part of a properly maintained surgical environment, it is recommended that a backup IOL injector be made available in the event the AutoSert® IOL Injector Handpiece does not perform as expected.

INDICATION: The CENTURION® Vision system is indicated for emulsification, separation, irrigation, and aspiration of cataracts, residual cortical material and lens epithelial cells, vitreous aspiration and cutting associated with anterior vitrectomy, bipolar coagulation, and intraocular lens injection. The AutoSert® IOL Injector Handpiece is intended to deliver qualified AcrySof® intraocular lenses into the eye following cataract removal.

The AutoSert® IOL Injector Handpiece achieves the functionality of injection of intraocular lenses. The AutoSert® IOL Injector Handpiece is indicated for use with the AcrySof® lenses SN6OWF, SN6AD1, SN6AT3 through SN6AT9, as well as approved AcrySof® lenses that are specifically indicated for use with this inserter, as indicated in the approved labeling of those lenses.

WARNINGS: Appropriate use of CENTURION® Vision System parameters and accessories is important for successful procedures. Use of low vacuum limits, low flow rates, low bottle heights, high power settings, extended power usage, power usage during occlusion conditions (beeping tones), failure to sufficiently aspirate viscoelastic prior to using power, excessively tight incisions, and com-

binations of the above actions may result in significant temperature increases at incision site and inside the eye, and lead to severe thermal eye tissue damage.

Good clinical practice dictates the testing for adequate irrigation and aspiration flow prior to entering the eye. Ensure that tubings are not occluded or pinched during any phase of operation.

The consumables used in conjunction with ALCON® instrument products constitute a complete surgical system. Use of consumables and handpieces other than those manufactured by Alcon may affect system performance and create potential hazards.

AES/COMPLICATIONS: Inadvertent actuation of Prime or Tune while a handpiece is in the eye can create a hazardous condition that may result in patient injury. During any ultrasonic procedure, metal particles may result from inadvertent touching of the ultrasonic tip with a second instrument. Another potential source of metal particles resulting from any ultrasonic handpiece may be the result of ultrasonic energy causing micro abrasion of the ultrasonic tip.

ATTENTION: Refer to the Directions for Use for the accessories/consumables and Operator's Manual for a complete listing of indications, warnings, cautions and notes.

CRST

Cataract & Refractive Surgery Today

Alcon A Novartis
Division