

# Confronting rock-hard cataract: Femtosecond laser brings benefit for surgeons, patients

Approach may allow for gentler surgery, reduce amount of ultrasound energy needed for nucleus removal

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By Cheryl Guttman Krader

## TAKE HOME:

Use of a femtosecond laser for capsulotomy and lens fragmentation can facilitate cataract surgery in eyes with a rock-hard cataract.

By Cheryl Guttman Krader; Reviewed by Juan F. Batlle, MD

**Santo Domingo, Dominican Republic**—[Femtosecond laser-assisted cataract surgery](#) is not only feasible in eyes with rock-hard [cataracts](#), but it can make the procedure safer and therefore may be the preferred technique, according to Juan F. Batlle, MD.

Dr. Batlle, who practices in Santo Domingo, Dominican Republic, noted that his professional time is divided between working at the Elias Santana Charity Hospital and private practice. For socioeconomic reasons, Morgagnian white cataracts and black cataracts are common among the patients he serves.

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“Femtosecond laser pre-treatment of the lens in these cases allows for gentler surgery and reduces the amount of ultrasound energy needed for nucleus removal,” said Dr. Battle, director, Centro Laser, and director, Elias Santana Charity Hospital, Santo Domingo. “Then the patient is the winner. Gentle maneuvers protect the zonules and capsule, and reduced energy use means reduced likelihood of damaging the endothelium.

“I firmly believe that the future management of these ‘catarocks’ lies with the femtosecond laser-assisted cataract surgery technique, and as more femtosecond lasers become available, I expect the cost will fall so that my charity patients will also be able to benefit from its use,” he said.

### **Applying the technology**

Though Dr. Battle has been involved in the development of one of the available femtosecond laser platforms (Catalys Precision Laser System, Abbott Medical Optics), he noted his comments on the role of this technology for assisting in procedures involving mature cataracts would also apply to the other laser systems.

He cited a paper by Palanker et al. [*Sci Transl Med.* 2010;2:58ra85] in which it was reported that Catalys pre-treatment of the lens in a series of 29 eyes decreased the perceived hardness of a nuclear sclerotic cataract by two grades, from LOCS IV to LOCS II, and reduced ultrasound energy use (measured as cumulative dispersed energy) by almost 40% relative to a control group undergoing conventional cataract surgery.

Discussing other issues pertaining to the use of femtosecond laser-assisted cataract surgery in cases of rock-hard cataract, Dr. Battle noted that the first question surgeons need to consider is whether the laser’s imaging technology will be able to visualize the posterior capsule so that the fragmentation can be done with an adequate safety zone.

In a clip from an intraoperative video of a case with a black cataract, Dr. Batlle showed how the optical coherence tomography system of the Catalys laser was able to detect the posterior capsule, which was not visible preoperatively on slit lamp exam.

He also pointed out that when operating on hard cataracts, surgeons should choose a fragmentation pattern that divides the nucleus into smaller pieces. Using the Catalys, he recommended creating 200 or 300  $\mu\text{m}$  cubes. Hydrodissection should then be done particularly carefully, since there may be gas in the capsular bag.

Even with the use of a femtosecond laser for lens fragmentation, surgeons should be prepared to use additional techniques, such as the “onion-peeling” technique described by Lisa Arbisser, MD, to separate the hard, leathery posterior surface of the black nucleus as the laser will not cut through it.

## **General tips for the ‘catarock’**

Sufficient pupil dilation is important when working in these difficult cases, whether operating with a manual or femtosecond laser-assisted cataract surgery technique. In eyes with small pupils, surgeons should first try topical phenylephrine, then subconjunctival epinephrine, and use of an ophthalmic viscosurgical device for viscodilation.

However, if the pupil cannot be opened to at least 3.5 to 4 mm, mechanical expansion with iris retractors or a Malyugin ring is needed. Use of a Malyugin ring to allow for femtosecond laser-assisted cataract surgery in eyes with small pupils has been reported in the literature.

Whether or not surgeons are performing femtosecond laser-assisted cataract surgery, Dr. Batlle advised making the capsulorhexis larger than average, up to 7 mm, and using trypan blue to enhance visualization of the anterior capsule in eyes with mature cataracts.

Juan F. Battle, MD

E: [jbattle@gmail.com](mailto:jbattle@gmail.com)

This article was adapted from Dr. Battle's presentation during the 2014 meeting of the American Academy of Ophthalmology. Dr. Battle is a consultant to Abbott Medical Optics.

