

My First Laser Cataract Surgery Cases

Notes on the learning curve.

BY STEVEN J. DELL, MD

I can recall the precise moment when I first learned that femtosecond lasers would be commercially developed for cataract surgery. The concept immediately made perfect sense from a clinical perspective, but I began to wonder how patients and surgeons would handle the financial implications. Although I quickly concluded that there would undoubtedly be controversy and debate over the finances, I could not think of a single example in ophthalmology when a safer, more precise, and more accurate technology did not eventually flourish.

Using my early experience with the laser cataract procedure, this article provides an idea of what you can expect in terms of the learning curve.

MENTAL PREPARATION

At the kind suggestion of Houston surgeon Stephen Slade, I was offered the opportunity to follow his lead and become the second surgeon in the United States to perform laser cataract surgery. We used an advanced prototype of the LenSx laser. Despite various improvements to the platform, the commercially launched version of the LenSx laser is very similar. After several discussions with Dr. Slade and the engineers at LenSx Lasers, Inc. (now owned by Alcon Laboratories, Inc., Fort Worth, TX), I mentally prepared myself for a completely new cataract surgical experience.

As I thought about performing these cases, it dawned on me that cataract surgery really had not changed in a fundamental way since I was a resident. Obviously, the incisions were a tiny bit smaller, and certainly phaco and IOL technologies had improved. At its core, however, the procedure remained the same.

WHAT IS DIFFERENT?

In General

Based on my experience, the first change you will notice when performing laser cataract surgery is that you now have the opportunity to specify an unbelievable array of parameters. I liken it to switching from a 1970s

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grocery store, where you only needed to specify green or black olives, to a modern gourmet grocery store, where you choose among more than 50 varieties of olives.

The Incisions, the Capsulorhexis, and Nuclear Division

Your first decision is where to place the incisions with the laser. That might seem like an easy determination, but the process is very different from simply sitting down and placing the paracentesis and the temporal clear corneal valve incision where your hands naturally feel they should go. I suggest creating a drawing of an eye to determine precisely at which clock hour you actually place these incisions currently. For example, if you are right-handed, you may be surprised to discover that, in right eyes, you tend to make your temporal incision at 8:30 o'clock. The paracentesis probably varies even more from surgeon to surgeon. Remember, you will be stuck with these incisions for the entire case, so during your learning curve, keep unnecessary changes to a minimum. The location of peripheral arcuate incisions for astigmatic reduction may alter your placement of incisions as well. You also have the opportunity to alter the width, length, and angulation of all your incisions. The software even allows for trapezoidal incisions. This is all a bit different from what you are accustomed to, and these decisions should be made in advance, not on the fly.

Next, you must specify the size of the capsulorhexis and upon what landmark to center it. It will soon become obvious that the capsular tear cannot be larger than the dilated pupil, but you can place the capsulorhexis almost exactly at the edge of the pupil. In



Figure 1. The LenSx laser system has a simultaneous video and optical coherence tomography view of the anterior segment, which allows the surgeon to fine-tune the location of all incisions.

some cases, it may be safer to create a smaller-than-ideal capsulorhexis, which you will subsequently enlarge by hand.

Finally, you will specify the pattern in which the lens is fragmented. Most early users have opted to divide the lens into quadrants, but the options are numerous.

Positioning the Patient and Using the Laser

After it has been programmed, the patient must be positioned under the laser. My experience is limited to using the LenSx laser in a holding area outside the operating suite, but you may decide to place your laser adjacent to the surgical microscope. If you have experience creating the LASIK flap with a femtosecond laser, you will find this part of the laser cataract procedure somewhat familiar, although there are important differences.

For example, with the IntraLase FS laser (Abbott Medical Optics Inc., Santa Ana, CA), a suction ring is placed on the eye, and a flat appplanation plate is docked to the ring. With the LenSx laser, a single-piece, curved patient interface with an integrated suction ring is docked to the eye. I have found the latter relatively easy to use, and the process is similar to placing a gonioscopy lens on the eye during surgery. Keeping the iris parallel to the floor and the patient interface properly positioned is essential. You will begin to notice the importance of things that might interfere with the suction ring or the ablation, including large pterygia, filtering blebs, corneal scars, and other anatomical challenges.

After the suction ring has been docked to the laser, the LenSx system will present you with a detailed optical coherence tomography image of the anterior segment and a heads-up display of the proposed treatment patterns superimposed over the image of the eye (Figure 1).

You will have the option to modify the placement of any of the proposed treatment patterns. All that remains, then, will be to step on the footswitch, after which the entire procedure will take about a minute.

On With the Case

Now, the fun begins. You sit down at the surgical microscope to a case that is already partially complete. The process of locating the incisions is very similar to the experience of performing an IOL exchange 1 week postoperatively. The previously created incisions open easily with a blunt instrument. If peripheral arcuate incisions have been created, you must open them as well to produce a refractive effect. Partial

opening of the arcuate incisions with subsequent titration is also possible. Although the laser has performed the capsulorhexis, I think it is wise to verify that this step is complete for 360° before removing the central capsular remnant. I have found the prefragmented lens very easy to remove. The remainder of the case proceeds in the usual fashion.

SPECIAL CONSIDERATIONS

Obviously, the added step of performing the laser ablation in a holding area requires some planning in terms of patient flow. Historically, I have punctuated my cataract surgery schedule with occasional YAG laser procedures. Cycling between my center's two operating suites and the femtosecond laser in a similar fashion uses the same scheduling principle.

Some surgeons have moved away from preoperative pupillary dilation and rely instead upon intracameral dilation. This is no longer an option with laser cataract surgery. Also keep in mind that white cataracts still present a challenge in terms of laser fragmentation of the lens.

Finally, your patients will likely experience some subconjunctival hemorrhages due to the placement of the suction ring. These may be more pronounced than in a typical LASIK case. As the time of laser ablation decreases, the phenomenon will become less pronounced. ■

Steven J. Dell, MD, is the director of refractive and corneal surgery for Texan Eye in Austin and chief medical editor of Cataract & Refractive Surgery Today's sister publication Advanced Ocular Care. He is a consultant to Abbott Medical Optics Inc.; Alcon Laboratories, Inc.; Allergan, Inc.; and Bausch + Lomb. Dr. Dell may be reached at (512) 327-7000.

