ReLACS – My First Experience with Refractive Laser Assisted Cataract Surgery.

By John Berdahl.

First of all, I want to say that I have no financial interest in the topic below.

We are lucky enough to be one of the first sites to be performing refractive laser assisted cataract surgery (ReLACS) with the LenSx laser. Recently, we had our first day and I wanted to describe my first 4 cases. The first patient was a 76-year-old family friend with 2.5 diopters of astigmatism who wanted a monofocal lens. The second patient was a 62-year-old with 1.5 diopters of astigmatism with a ReSTOR 3.0 multifocal lens. The third was a 47-year-old with a posterior polar cataract and a Tecnis multifocal lens. The final patient was a 14-year-old traumatic cataract who also was going to receive a Tecnis multifocal lens.

As I stepped on the pedal for the very first case it felt like I was operating in the future. The quality of the imagery and the precision of the laser was incredible. I am sure like most technologies there will be room for ReLACS to evolve, but straight out of the box this is an impressive technology that I think is already an improvement over standard cataract surgery, particularly the ability to perform astigmatic keratotomies and beautiful, perfectly centered, and round capsulorrhexes.

My very first patient was a 72-year-old with 2.5 diopters of astigmatism who was hoping to decrease her need for glasses and was interested in having laser assisted surgery. The patient laid underneath the laser, looked at the fixation light. The docking system was applied effortlessly. The parameters were adjusted on the laser to position the astigmatic keratectomy in the main corneal wound so that they were more than 1 mm away from the astigmatic keratectomy (AK). The AK was calculated for a 9 mm optical zone. After using the real-time OCT image to determine the proper plane of the capsulorrhexis in addition to the sectioning of the lens the treatment was confirmed and finalized and approximately 1 minute later the treatment was complete. The patient was brought to the operating room and the paracentesis was opened, intracameral lidocaine was instilled and viscoelastic was instilled, the main wound was opened, the capsulotomy was removed, the lens divided easily and was removed and the rest of the cataract surgery was completely typical. Afterwards, I opened up the AK’s and was very impressed to see how the astigmatism decreased with ORange intraoperative aberometer. Prior to opening the AK’s, I had checked the astigmatism, which was about 2.25 diopters and after opening the incisions the astigmatism decreased to about 0.3 diopters.

Postoperative day 1, the patient was 20/30 uncorrected with very little corneal edema. At postoperative week 1, the patient was seeing 20/25 uncorrected with 0.5D of astigmatism. Her refraction was the same at 3 weeks.

The second case was a 62-year-old with 1.5 diopters of astigmatism and we were placing the ReSTOR 3.0 lens. This case went identical to the first as the laser took the most critical steps of surgery out of my hands and completed them with incredible precision. The cataract surgery went beautifully and the vision on postoperative day 1 was 20/25 uncorrected with J2 near vision and minimal astigmatism. The patient was 20/20 J2 at 3 weeks.

The third case was a 47-year-old with a posterior polar cataract. For this case, I did not do the lens sectioning because I was worried that if she did have a congenital defect in her posterior capsule that any pressure induced by bubbles in the lens could cause a premature blowout of the posterior capsule. So for her, I just used the laser to create the wounds in a capsulorrhexis. She did not have a significant astigmatism that required correction. The laser again performed beautifully correcting the capsulorrhexis and the clear corneal wounds. Fortunately, her posterior cataract was not completely fused with the capsule and after the lens was removed, I was able to rub the posterior plaque off the capsule and she had successfully had her Tecnis multifocal placed perfectly centered in the capsular bag. I was always impressed with how perfectly centered the lens is with the ideal mount of a half-millimeter overlap around the optic.
The final, and what I expected to be the most challenging case, was the 14-year-old with a traumatic cataract. Two years prior he got hit in the eye with a pellet from a soft air gun. He did not have any phacodonesis preoperatively, but he had developed a 2+ posterior subcapsular cataract. Because his other eye was emmetropic and because of the challenging nature of pediatric capsules, I felt that he could benefit from a laser created capsulotomy. I was worried whether or not the suction from the laser would be too difficult for him and if he would be able to hold still through the procedure. Much to my relief, the patient did beautifully as he laid under the laser and felt that the pressure induced by the laser was minimal. I performed only the capsulotomy in this case because he had very little astigmatism and I wanted to limit the amount of time underneath the laser for him. The capsulotomy was created perfectly. When I brought him into the operating room it initially appeared that the capsulotomy may be decentered, but upon further inspection the capsulotomy was perfectly centered on the visual axis and he had an asymmetrically dilated pupil, which gave the impression that the capsulotomy was decentered. The capsulotomy removed easily within the eye and very little phacoemulsification energy was used to remove the lens. The Tecnis multifocal lens was centered nicely in the eye and on postoperative day 1 the patient was 20/30 J1 and at 1 week he was 20/20 -1 with J1 vision and noticed a dramatic improvement in the quality of his vision. At 3 weeks he was 20/20 J1

I am happy the LenSx laser performed beautifully despite the challenging cases I presented the laser with on our first day of surgery. It is clear to me that laser cataract surgery is going to usher in an unprecedented level of precision to one of the most common surgeries performed in the United States. As patients are demanding more and more spectacle independence and specific refractive outcomes, I think that the ReLACS will be an indispensable part of the cataract surgeon’s armamentarium.

As I discussed ReLACS with patients they intuitively seem to grasp the concept of having the laser perform the most critical portions of cataract surgery that previously were performed manually. They understand that creating a 5-1/2 mm perfectly round capsulorrhexis by hand isn’t 100% reproducible even in the most experienced hands. We have been very careful not to over promise the capabilities of the laser yet patients seem to naturally seem to feel that this would be the best procedure for their eyes in their situation.

Specifically on postoperative day 1, I was happy with the minimal amount of residual astigmatism that patients had and how quiet the eyes were. The patients were happy with their vision and the incisions were completely sealed on the first day.

Few, if any, technologies have had the hype that ReLACS has enjoyed. I was curious to see with my own eyes if the hype was justified and if data would ultimately support it. I can say confidently with my initial experience that the hype is justified and that the laser in its current form is an improvement over what we can do with manual cataract extraction. I am not sure how the technology could evolve to a higher level, but I am sure that it will. Particularly, I am excited with the melding of refractive surgery and cataract surgery and how multiple technologies such as the ORange intraoperative aberrometer, ReLACS, improved IOL’s will come together to improve the refractive outcomes of our patients.