Staying on the Cutting Edge: Incorporating a New Laser Platform


Experience and outcomes with the SCHWIND ATOS.

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As a specialty, corneal refractive surgery is no longer limited to basic LASIK surgery. Today, many other laser vision correction (LVC) options exist, including a variety of presbyopic LASIK and lenticule extraction procedures. The availability of myriad surgeries has expanded the reach of refractive correction and increased the potential for patient satisfaction after surgery.

Getting involved with novel procedures and technologies helps us stay on the cutting edge. We have had the opportunity to be among the first surgeons in the world to use the ATOS femtosecond laser (SCHWIND eye-tech-solutions) for both LASIK and lenticule extraction procedures. In our experience, this platform is helping to build a renaissance in corneal refractive surgery. For us to be involved with a technology so early in its lifecycle has been exciting. It's like a dream come true. Often, you read about individuals who are working to develop a technology. Now, we can say that we have taken part in the development process for this new platform.

We have experience with a variety of excimer and femtosecond laser platforms, including the AMARIS excimer laser (SCHWIND eye-tech-solutions) and the ATOS femtosecond laser. The outcomes we have amassed with these two lasers are promising and, in our opinion, point to a paradigm shift in refractive correction. This article details our experience and early clinical results with the ATOS specifically (Figures 1–3).

BACKGROUND

Svejtlost Eye Clinic is a fully private, high-volume refractive surgery center with six locations. Three of our locations are femtosecond-only centers. We are a teaching hospital, and our surgeons have a lot of academic and research experience. In just one of our centers (Zagreb), we perform between 50 and 100 procedures per week and roughly 3,500 procedures annually. Over the past 20 years, we have invested a lot of time and energy into mastering patient flow and enhancing the patient experience. We are careful when integrating new technology—any technology we introduce in the practice is hand selected because we feel it will benefit both these missions.

We began using the ATOS as our primary keratorefractive femtosecond platform in September 2020 and have performed more than 500 LASIK flaps and almost 200 SmartSight procedures.

ATOS FOR FLAP CREATION

The learning curve for flap creation with the ATOS was nearly nonexistent. Thanks to the intuitive user interface of the device, we were able to dock the patient interface and achieve the same efficiency in flap creation as we had after years of experience with other femtosecond laser platforms. This was true regardless of the surgeons' level of experience. After five or six procedures, all surgeons were able to complete the flap in just a few minutes.

One special thing about the ATOS is the next-day postoperative results. The flap edge is smooth on postoperative day 1—similar to the quality achieved with

Figure 1. The patient is positioned under the ATOS.

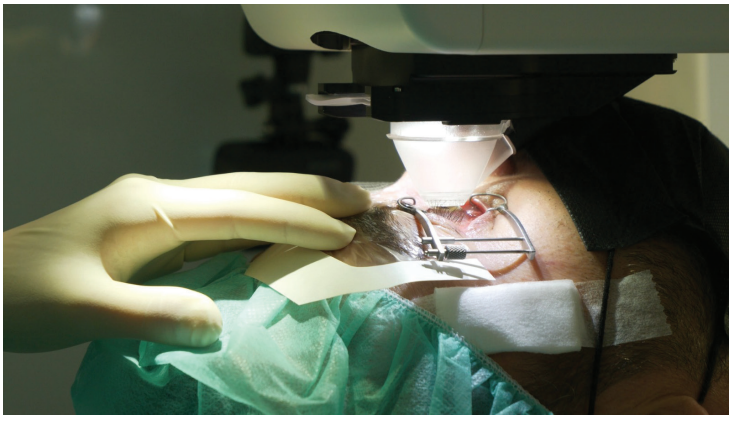

Figure 2. The eye is docked to the patient interface.

a microkeratome—and there is minimal to no inflammation. This is because of the low energy dose (and total energy) being delivered to the corneal lamellae. Further, ATOS allows such granular customization, including spot/track distances and energy fine-tuning, so that each surgeon can determine their own favorite settings. With ATOS, it is possible to fine-tune the energy to ensure that every flap is easy to dissect. The level of adjustment is virtually infinite.

ATOS FOR SMARTSIGHT

SmartSight is a minimally invasive lenticule extraction procedure that combines intelligent eye tracking, pupil recognition, and cyclotorsion compensation. During the procedure, the ATOS is used to create a predefined lenticule in the intrastromal corneal tissue and a small peripheral incision in the epithelium to access the lenticule. The lenticule is then removed through the same microcut to achieve the refractive correction. There is no need for a corneal flap, and there is no excimer laser ablation.

All our surgeons were comfortable performing SmartSight within a few weeks of experience with the ATOS. After three or four lenticules, even the less-experienced surgeons felt secure enough to perform the procedure independently. Compared with other lenticule extraction procedures we have experience with, SmartSight felt easier to perform almost instantaneously due to the device's torsion control, eye tracking, pupil recognition/centration, and positioning technologies.

It is typical for patients who undergo SmartSight to experience about 90% to 95% visual recovery on the first day postoperatively. Contrast sensitivity may fluctuate within the first month. In our first case, a 29-year-old woman presented with -5.50 D myopia. Her main motivation for vision correction was to be able to see her kids on the beach. After counseling the patient and explaining her options to her, she decided to undergo SmartSight.

We created a 3-mm incision to enter the eye and extracted a lenticule. The procedure lasted a total of 10 minutes for one eye. On postoperative day 1, her uncorrected distance visual acuity was 20/20 and she was thrilled with her results. Seeing this patient's results gave us confidence to perform more cases.

The time commitment of SmartSight and the postoperative day 1 results are comparable to femtosecond LASIK, and in our opinion this is an important selling point for the procedure. Patients can experience the same *wow* factor as LASIK with a fast visual recovery, minimal risk of inducing or exacerbating dry eye disease, and no flap. Further, after SmartSight, we don't have to impose any safety limitations on patients' daily activities.

Our results with SmartSight have changed our outlook on lenticular surgery. Previously with lenticular surgery procedures, it took longer for patients to recover and they did not see 20/20 or better on postoperative day 1. The *wow* factor was missing, and patients' vision was hazy and blurry immediately postoperatively. We had to take extra time to explain to them that their contrast sensitivity and visual acuity would improve over time. We did not always feel it was best to recommend a lenticular procedure to patients. With SmartSight, however, it is becoming a procedure we perform more often, and we believe that lenticular surgery will become the procedure of the future.

ADVANTAGES

Docking with the ATOS is seamless (Figure 2). This is key: If you have a successful dock, you will have a successful surgery and the best chance for excellent postoperative outcomes. Docking is also gentle, and there is no blackout phase as with other devices. This promotes a better patient experience and eases patient fears.

The ATOS can potentially treat higher amounts of astigmatism with better precision than other laser platforms. This is in part due to the device's built-in torsion control, which compensates for rotation during the docking procedure. In our experience, results with SmartSight for astigmatism are superior to the results with other lenticule extraction procedures. We have found that refractive correction with SmartSight is comparable to LASIK with less chance for regression. We feel the biggest advantage of the ATOS compared to competing devices is the eye-tracking and cyclotorsion compensation, which makes sure you are treating on the right axis. Other advantages include that the ATOS can penetrate corneal residue and that the edge of the lenticule is zero. This simplifies lenticule dissection and extraction on the periphery.

Figure 3. Dr. Bohac performs a procedure with the ATOS.

CONCLUSION

One of our jobs as surgeons is to individualize treatment plans for our patients to ensure not only the best postoperative outcomes but also to meet their needs. A device like the ATOS increases the range of patients we can treat, including those with large pupils, thin corneas, and dry eyes, because it is infinitely adjustable. ■

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