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ADAPTIVE FLUIDICS: A COMPLETE GAME CHANGER

Automated aspiration control, dynamic infusion compensation, and a controlled surgical environment.

BY BJÖRN JOHANSSON, MD, PHD, FEBO

Figure 1. The Stellaris Elite features Adaptive Fluidics.

Over the years, as a high-volume cataract surgeon in Sweden, I have found myself involved with a variety of surgical innovations. Being entrusted with the use of a new product or device is humbling, and I find it extremely rewarding to work with any technology early in its history. With that said, every once in a while, a technology comes along that excites me a little more than usual.

I have been using the Stellaris Vision Enhancement System (Bausch + Lomb) for more than 10 years with excellent outcomes. One of the things I like about the Stellaris is that it accommodates my coaxial microincision cataract surgery technique, with an incision size of 1.8 mm, while providing excellent chamber stability, due to the system's StableChamber Fluidics and Digiflow pressurized infusion capabilities.

When I learned about the latest advancement, the Stellaris Elite (Figure 1), I was most excited to incorporate the system's Adaptive Fluidics feature into my workflow. This new function integrates automated aspiration control with dynamic infusion compensation, creating the opportunity for not just a more responsive and controlled surgical environment but also for stabilization of IOP throughout the procedure. In this article, I review the benefits of the Stellaris Elite and share some tips for overcoming the learning curve and for incorporating the technology into routine practice.

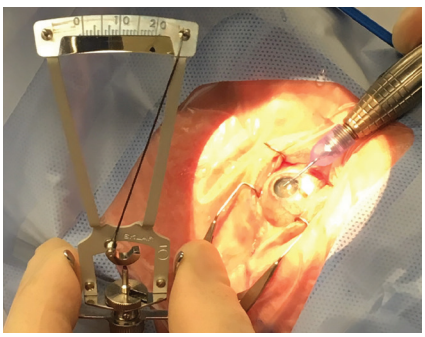

Figure 2. Dr. Johansson measures the IOP with a Schiotz tonometer.

THE NOTICEABLE ADVANTAGES OF THE STELLARIS ELITE

In terms of design, the Stellaris Elite has leveraged the success from the previous generation system. It has the same physical appearance and the same footprint, with an enhanced user interface. But what is a very interesting development, and what I am most excited about, is the Elite's Adaptive Fluidics function. The key benefit of Adaptive Fluidics is that it continuously tracks variations in the vacuum level and compensates for the flow by automatically adjusting infusion pressure to maintain anterior chamber stability.

Working in conjunction with Adaptive Fluidics is the system's phaco handpiece, which uses Attune energy management. This works synergistically with the chamber stability and vacuum efficiency of Adaptive Fluidics to ensure that low-power emulsification is delivered to the eye.

Another component of the Elite that I find especially useful is its wireless dual-linear footpedal, which is also available on other Stellaris models. The design of the footpedal allows me to maintain better surgical control and immediately adapt to changes in the intraocular environment throughout all stages of the procedure. Unlike phaco machines that feature a vertical footpedal with three settings, this dual-linear footpedal enables me to manage both pitch and yaw planes and to simultaneously control irrigation, ultrasound, and aspiration. The Stellaris footpedal can also be programmed to a vertical-only, three-step setting; however, I would encourage surgeons to try the dual-linear function to fully appreciate the capacity of the Stellaris system.

LOWERING IOP

In my clinic, we recently compared intraoperative IOP during the infusion portion of cataract surgery with the Stellaris Elite with Adaptive Fluidics to that with the Stellaris without

* Indications and approvals may vary by country

TIPS AND TRICKS FOR BETTER SURGERY

Transitioning to the Stellaris Elite (Bausch + Lomb) requires only small tweaks to your surgical technique. Being prepared for operating under stable pressure conditions, as opposed to the varying pressure levels that cataract surgeons are used to, will help to expedite the learning curve with this new system.

With the Stellaris Elite, one of the bigger steps in the learning curve is to get comfortable with what happens when the lens material is extracted from the eye. In short, during infusion, the Stellaris Elite keeps pressure more stable. When the surgeon depresses the footpedal to increase the vacuum, fluid and lens material are extracted through the I/A handpiece. The machine's Adaptive Fluidics system adjusts the infusion pressure up when increased vacuum levels are employed, compensating for the increased extraction of fluid and lens material. This in turn facilitates stable IOP. This can take some getting used to.

Another part of the learning curve is using the dual-linear footpedal. Most surgeons use a straight vertical-only footpedal with three steps: Step one is irrigation/infusion into the eye, step two is aspiration or vacuum, and step three adds ultrasound energy. With this design, ultrasound and vacuum cannot be adjusted independently, and the surgeon has to trust that the machine and the patient's eye will behave as expected. In most cases, this technology is sufficient; however, during complex cataract surgery, not having independent control of the ultrasound and vacuum can sometimes cause problems. It is in these situations that the dual-linear system is really valuable because it allows the surgeon to adjust and activate the ultrasound and vacuum independently in each moment of the surgery.

Surgeons who have prior experience with the Stellaris may have already learned how to use the dual-linear footpedal. Those who have not, and those transitioning to the Stellaris Elite from other phaco systems, might find it a little tricky to figure out the dual-linear foot control. Having worked more than 10 years with a vertical three-step pedal, I needed between 30 and 50 surgeries to get the feel for the new footpedal. On the other hand, now when I train new surgeons they tend to familiarize themselves with the dual-linear technique in five to 10 procedures.

To summarize, in comparison with other phaco systems the Stellaris Elite has a slightly different process for achieving a stable anterior chamber. Maintaining a stable anterior chamber is a basic necessity in every cataract surgery. The less stable the chamber, the higher the chance for intraoperative complications. Surgeons are used to manually adjusting their vacuum and infusion as needed to maintain a stable anterior chamber, but the Stellaris Elite does so automatically. It can take a few cases for the surgeon to trust the technology. My advice is to be patient, remain calm, and trust that all levels will be adjusted to ensure the safest and most effective surgical environment.

Adaptive Fluidics (Figure 2). What we found is that, on average, IOP with the Stellaris Elite appeared to be lower than it was without Adaptive Fluidics.

Adaptive Fluidics provides the physician with additional surgical settings to set the desired maximum bottle infusion pressure threshold as compared to the base bottle infusion pressure. In my experience when working with lower IOP, Adaptive Fluidics could be especially beneficial in glaucoma patients because it helps to protect the fragile optic nerve.

I have used other phaco systems that incorporate a pressurized irrigation system to control IOP, but, in my experience, pressure is the lowest with the Stellaris Elite. The difference is noticeable—the eye is softer—so it does require slightly more attention to how the instruments are inserted through the incisions and positioned within the eye, in order to avoid inadvertent distortion on the cornea. But with the pearls I share in *Tips and Tricks for Better Surgery*, the learning curve is very short.

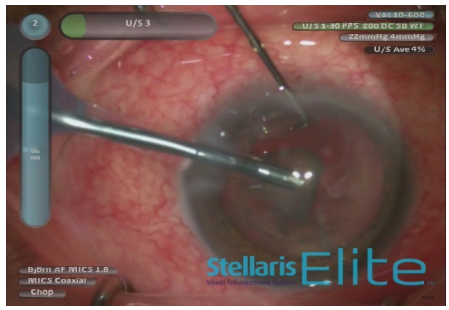

Figure 3. The Adaptive Fluidics feature of the Stellaris Elite maintains low IOP and a stable chamber despite high vacuum (600 mm Hg). The nucleus quadrants can be emulsified with low ultrasound levels.

DECIDE FOR YOURSELF

I would base a decision to acquire a Stellaris Elite system (Figure 3) upon the belief that it would help me to better manage difficult cases and to generally be happier doing cataract surgery. During the period I have used the system, it has done both.

With that said, every surgeon must decide for him or herself what works best in the OR. This exercise requires evaluation of current equipment and research into new equipment. When the decision has been made to purchase new equipment, changes in processes and handling will inevitable necessitate some kind of learning curve while incorporating the technology into the workflow.

With the Stellaris Elite, in my opinion, that brief learning curve is well worth the precise control, excellent outcomes, and peace of mind that the technology brings into my OR. ■

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