

THE POWER OF THE STELLARIS ELITE



Taking performance further.

BY RUI CARVALHO, MD



Figure 1. Dr. Carvalho performing surgery with the Stellaris Elite (right); a close-up of the machine is to the left.

For nearly 2 decades, the trend in vitrectomy has been toward a microincisional technique. Twenty-five gauge vitrectomy was first introduced in 2002,¹ and some surgeons questioned the safety and efficacy of the use of smaller instrumentation due to increased vitrectomy times and excessive instrument flexibility. Shortly thereafter, 23-gauge vitrectomy systems were introduced as an alternative for microincisional vitrectomy,² and many surgeons responded positively to the smaller size and noticed improvements in the instrumentation. Since that time, 25-gauge surgery and even 27-gauge surgery have become more accepted practices, mainly due to the availability of better, more reliable equipment.

For the past 10 years, I have been using Bausch + Lomb machines designed for vitrectomy, starting with the Millennium, and progressing to the Stellaris PC, and just recently to the Stellaris Elite (Figure 1). Throughout my experience with these devices, I have come to believe in the value

of performing vitrectomy with smaller vitrectomy packs. I believe that 27-gauge vitrectomy is the next chapter in patient care, and in this article I detail why.

NEW TOOLS, BETTER RESULTS

I haven't always been a big fan of a smaller calipers for vitrectomy. Further, I had historically found that 25-gauge vitrectomy made my surgery slower. But that changed with the introduction of the Bi-Blade (Bausch + Lomb), and this technology has drastically improved my surgical technique with calipers as small as 25- and even 27-gauge.

The goal for any surgeon who performs vitrectomy is to have a tool that can accomplish safe and efficient high-speed cutting. What I like about the Stellaris Elite is that it offers a variety of cutting options, including single-port vitrectomy cutters with the traditional 20, 23, and 25 gauges; the Vitesse Hypersonic Liquefaction (Bausch + Lomb); and the Bi-Blade vitrectomy cutter (Figure 2). Having so many options allows me to adapt to a wide

range of procedural needs. The single-port cutters now offer the possibility to use 7,500 cuts per minute (cpm) for efficient vitreous removal.

But the most impressive cutting option, in my opinion, is the Bi-Blade dual-port vitrectomy cutter because it allows me to use the smallest calipers possible, both very effectively and efficiently. The design of the Bi-Blade is quite genius and simple. In short, the innovative dual-blade design cuts in two directions per cycle—both forward and backward—allowing us to achieve a cut a rate of 15,000 cpm, rather than the typical 7,500 cpm with single-port cutters.

Further, because the port of the Bi-Blade is constantly open, the duty cycle is increased to 100%. As shown in Figure 3, the dual-blade cutter achieves a constant flow of water and vitreous, and even when the number of cuts is increased to a maximum of 15,000 cpm, that flow is not restricted. In fact, as it cuts through the vitreous, the flow will increase with the number of cuts as the viscous fluid will look more like water.



Figure 2. The Stellaris Elite works with single-port vitrectomy cutters (left), the Bi-Blade (center), and Vitesse (right).

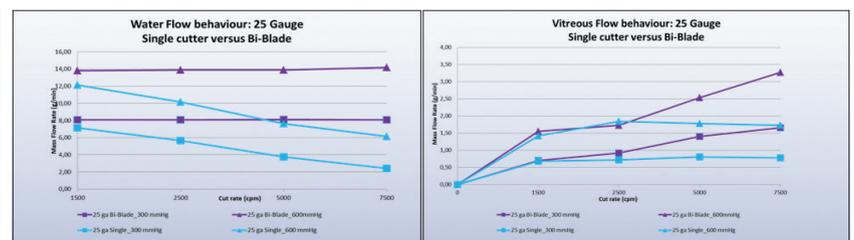


Figure 3. Rates of water flow (left) and vitreous flow (right) with the Bi-Blade compared with 25-gauge vitrectomy.

*Indications and approvals may vary by country

CASE STUDIES

Here I share four cases that I have performed with the Stellaris Elite, the first two using 25 gauge and the last two using 27 gauge.

► Case No. 1: Dropped nucleus and retinal vein occlusion.

I recently performed combined cataract surgery and vitrectomy in a patient with a dropped nucleus and retinal vein occlusion. During the procedure, I was able to easily remove the nuclear lens fragments with the 25-gauge Bi-Blade cutter. A big advantage of using this cutter during phacophagia is that, due to the Bi-Blade's 100% duty cycle, there is no repulsion. This is especially advantageous in eyes with retinal problems. In many cases during lens fragmentation, the surgeon will decrease the number of cuts per minute and increase the aspiration to avoid repulsion. With the Bi-Blade technology, however, the cutter never releases its hold of the fragments, and repulsion is therefore avoidable (Figure 4).

I can use a cutting speed of up to 10,000 cpm. After switching to shave mode, I continued to use the Bi-Blade to perform vitrectomy and finished the case with implantation of a posterior chamber IOL.



Figure 4. Lens fragmentation with the 25-gauge Bi-Blade.



Figure 5. Surgery for a retinal detachment performed with the 25-gauge Bi-Blade.



Figure 6. Dissection of retinal membranes with the 27-gauge Bi-Blade.

► Case No. 2: Retinal redetachment. In a patient with an inferior retinal detachment who had previously undergone vitrectomy, I inserted an encircling band and then proceeded to perform a second vitrectomy. The subretinal fluid was aspirated through the retinal tear, and laser photocoagulation was performed over the buckle. When I checked the periphery, there was some residual vitreous left, which I removed using the shaving mode with 15,000 cpm. The surgery was completed with gas tamponade. All steps of the surgery were steady and safe (Figure 5).

► Case No. 3: Proliferative diabetic retinopathy with tractional retinal detachment. In my experience, 27-gauge surgery could be ideal for two kinds of situations: simple macular surgery and extremely complicated cases with need of very delicate membrane dissection. Case No. 3 is an example of a complicated case in which 27-gauge surgery with the Stellaris Elite was extremely effective.

In a diabetic patient presenting with tractional retinal detachment, the 27-gauge cutter was perfect to dissect the retinal membranes because the cutter is so small and the port is so close to the tip. I searched for the bleeding points, cauterized them, removed the hyaloid remnants, and performed inner limiting membrane (ILM) peeling. The case was finished with panphotocoagulation and air-fluid exchange (Figure 6).

► Case No. 4: Vitreous amyloid. On the other side of the spectrum, 27-gauge surgery is equally effective in simpler cases. I recently treated a patient with familial amyloidotic



Figure 7. ILM peeling with 27-gauge forceps.

polyneuropathy type 1 and a recurrent vitreous amyloid. In recurrent cases, it usually adheres to the posterior capsule of the lens (pseudopodia lentis), the vitreous base, and the ILM. The patient presented with all of the above.

For those who do not have experience with amyloid material, it is very elastic, chewy, and difficult to remove. In this case, the 27-gauge cutter was effective enough to do the capsulectomy and remove all of the amyloid material. I then moved to the posterior segment to tackle the amyloid in the vitreous space and, finally, performed ILM peeling, removing with it a big plaque of premacular amyloid. I was apprehensive at first, as I was afraid the 27-gauge forceps would break the ILM and I would have to grasp it over and over again, but it proved to be a perfect device for this case (Figure 7).

CONCLUSION

After my experience with the Stellaris Elite, I am convinced that the Bi-Blade technology is a game-changer, allowing surgeons of all experience levels to step up their games in retinal surgery. I recommend beginning with 23-gauge surgery and advancing to 25-gauge surgery when appropriate. Finally, 27-gauge surgery is useful in selected cases. ■

1. Fujii GY, De Juan E Jr, Humayun MS, et al. A new 25-gauge instrument system for transconjunctival sutureless vitrectomy surgery. *Ophthalmology*. 2002;109(10):1807-1812.
2. Eckardt C. Transconjunctival sutureless 23-gauge vitrectomy. *Retina*. 2005;25(2):208-211.

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