Why I Favor a Full-Sized Phaco Platform

The ideal phaco machine can be continually upgraded as technology advances.

BY DAVID ALLEN, FRCS, FRCOPHTH

Upon adopting phacoemulsification in 1991, our unit tried various systems before deciding which to buy. At that time, we were already using an automated I/A system for extracapsular cataract extraction, and we were able to add a small phaco module to that device to make it a compact phaco machine. Although we were complete novices with phaco, we quickly realized that this system had poor performance characteristics. This experience has, to some extent, influenced my judgments about compact phaco machines.

Ultimately, we decided to purchase the Ocusystem device manufactured by Surgical Design Corporation, a company established by Anton Banko, a physicist-engineer and the coinventor of phacoemulsification along with Charles D. Kelman, MD. We felt this system had good fluidics performance by the standards of the day, was robust and reliable, and had a particularly powerful phaco handpiece-tip combination. It was not like a modern compact unit, being linked to its own large trolley; however, the main unit itself was compact, and, like most compact units, not really built to be flexible or easily upgraded.

Six years later, I was an early evaluator of the Millenium phaco machine (Bausch + Lomb), while other surgeons in our unit continued using the Ocusystem. That was when I began to realize the benefits of a full-sized phaco machine, particularly that we were able to change and/or upgrade individual modules as developments came along. Since then, I have had the pleasure of being one of the first surgeons to use the Infiniti Vision System (Alcon) and, in 2012, the first to use the Centurion Vision System (Alcon; Figure 1) in a living human eye—both full-sized phaco machines.

ADVANTAGES OF FULL-SIZED PLATFORMS

There are several reasons I prefer to use large, full-system phaco machines. First and foremost is because of the advanced technologies they include. In my view, the Centurion Vision System has changed the paradigm of cataract removal. We have much lower postocclusion surge than with earlier machines. Also, more innovatively, the active fluidics system allows the surgeon to select a target intraocular pressure (IOP), which the machine works to maintain during the various fluidics scenarios encountered, even in routine surgery. Combined with reduced postocclusion surge, this means that surgeons can operate with IOPs much closer to physiologic levels (and with much reduced fluctuation of pressure) than with a gravity-based system.

A full-sized phaco machine allows the surgeon to have a large touchscreen interface, which is more user-friendly than having to adjust switches and dials. On the Centurion, the touchscreen also includes detailed animations showing the staff how to connect different pieces of equipment at various surgical stages. For example, we all hope that anterior vitrectomy is a rare event; however, when it occurs, it is helpful to have an option that gives detailed animated instructions on setting up the vitreous cutter when anterior vitrectomy is selected (Figure 2).

Another advantage of the touchscreen interface compared with simple dials is that it is easier to quickly see how the linearly variable parameters are set. The Centurion allows linear values in both footpedal positions 2 and 3, and adjustments can be linearly up or down. An example of this is shown in Figure 3; this does not illustrate my exact settings, but it shows how a simple graphic can convey a sense of these settings in the event I get confused during surgery and need to glance at the screen.

A full-sized system also has a lot of space inside for other features to be added; that is not possible with a compact unit. The Centurion, for example, has a large battery in the base. Whenever the unit is plugged into the main power supply, this battery is charged up and has two functions. First, it...
acts as a backup power supply. If loss of power occurs, the battery allows the surgeon to come out of the eye safely and with control, with inflow still working, even though lack of microscope lighting will severely limit how much can be done before power is restored. The second function of the battery is to act as a charging supply for the wireless footpedal. At the end of a surgery session, the machine can be unplugged from the main supply, and, when the footpedal is put onto its storage cradle at the back of the unit, its internal batteries are recharged by induction from the battery in the main unit.

Another advantage of the large box is that there is space for several modules. Therefore, if the manufacturer has developed an upgrade or new functionality, it is much easier to implement with a change of the module for that function only. I assume that it is also easier for companies to test these new modules, such as when working to meet regulatory requirements. For example, although the Infiniti system was launched in the second half of 2003, by early 2006 a totally new phaco modality had been developed: torsional phaco. This required a new ultrasound driver board and a change of the connectors on the front of the console. Then, in 2011, there was another significant development with the addition of the AutoSert motorized IOL injector (Alcon). In addition to a new module, there was also a need for an extra connector on the console. A compact unit probably would not have had space for this.

Integration of the Centurion into our working environment has been surprisingly easy. Although the unit looks big, it has a small footprint (66 X 55 cm) and takes up little floor space. Additionally, the adjustable instrument table attached to the machine is large enough to hold all of the required accessories, including tubing and handpieces. The tray is easily maneuvered into a comfortable place for the surgeon and scrub nurse, and, because it is attached to the main unit, which has a low center of gravity, there is no danger of table tipping or becoming unstable when being moved or when heavy instrument trays are put onto it. Having the footpedal operate wirelessly is a significant step forward in helping to declutter the operating room floor, removing tripping hazards, and facilitating the movement of trollies and the surgeon’s chair.

The AutoSert motorized IOL injector, fully integrated into the Centurion, significantly enhances IOL injection.

CONCLUSION

For my practice, the most efficient phaco machine is a full-featured system with the ability to upgrade or add new features. The system should be physically stable in the operating room (OR) but easily maneuvered into position. It is an added bonus if the device looks nice and has good industrial design. The Centurion fulfills these needs and provides an excellent surgical environment for the surgeon and a safe environment for the patient, with stable anterior chamber and less fluctuation in IOP.

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