

Laser Platforms: One is Better Than Two



The versatility of the Femto LDV Z8 to perform both corneal and cataract surgeries improves workflow and eases surgical logistics.

BY OZANA MORARU, MD

As anyone who performs cataract and corneal refractive surgeries knows, it is crucial today to have a plethora of procedures and technologies available to patients. This is because there is not one single procedure that fits the needs of every patient. The benefit to offering a variety of corrective procedures, from refractive cataract surgery, to refractive lens exchange, to LASIK, to corneal transplantation, is that you can appeal to a larger patient base. The drawback, however, can be that your practice requires a lot of different instrumentation in order to carry out the variety of procedures you offer.

One reason our center decided to purchase the Femto LDV Z8 (Ziemer) is because it is a versatile platform capable of performing both corneal and cataract surgeries. Due to the Ziemer femtosecond laser's relatively small size, we are able to house it in our OR the whole day, during all procedures—even the ones we perform without femtosecond assistance.

In this regard, not only do we eliminate the loss of time wheeling equipment in and out of the OR, but it is more comfortable for the patient because we avoid the need to change ORs or even for patients to move between surgical beds in the same OR. Moreover, it allows us to perform both standard cataract surgeries and laser cataract surgeries on the same day, in the same OR, and, in terms of scheduling patients for surgery, it doesn't matter who has phacoemulsification cataract surgery and who has laser cataract surgery. In other words, we can schedule surgeries in any order, according to the patient's appointment.

WORKFLOW WITH THE FEMTO LDV Z8

For laser cataract surgery, the patient comes into the OR, we drape him or her, and then we initiate the laser part of surgery. Immediately afterward, we wheel the Femto LDV Z8 a few centimeters away and continue with the manual portions of the cataract procedure. We lower the surgical microscope (which hangs from the ceiling) and start with phacoemulsification; the phaco machine is already close to the surgeon, and the patient is already draped.

For corneal transplant surgeries, our workflow is very similar in that all aspects of the procedure can be done in the same OR. First, we prepare the donor cornea with the Femto LDV Z8, and then we perform the transplantation on the recipient cornea with the Z8.

For refractive surgery, most specifically LASIK, we do still need to move the patient to another OR after the Femto LDV Z8 is used to cut the flap, as our excimer laser is housed in another OR. In this scenario, we have one surgeon perform the corneal flap with the Z8 in our main OR and another surgeon immediately afterward perform the LASIK procedure in a secondary OR. This is our typical LASIK workflow because the excimer laser is quite large and cannot fit in our main OR, where we perform cataract and other anterior segment surgeries, and where we have our Z8. In our new clinic, which is about to be finished next year, we will then be able to update our workflow and house all of our machines in the same OR: one Femto LDV Z8, one excimer laser, and two phaco machines. Thus, all of the cataract and corneal procedures that we perform will be done in the same OR, with a better workflow for all the procedures and for all patients. Right now, we use the Femto LDV Z8 for the following procedures: cataract surgery, penetrating keratoplasty (mushroom and top-hat designs), deep anterior lamellar keratoplasty (DALK), corneal flaps in LASIK procedures, and tunnel creation for implantation of intrastromal corneal ring segments for keratoconus and corneal ectasia.

MAJOR BENEFITS

Having the possibility to use only one laser machine for all types of procedures has two major benefits: First, the initial investment can be allotted for several patients and surgeries, thus being easier to cover in time and more justifiable, and, second, the laser's small footprint allows us to be more organized in the OR, in comparison with having several different lasers for different surgeries.

I don't have clinical experience with every femtosecond laser on the market, but, between the experience I have had with a couple of other platforms and as far as I have seen during presentations and read in articles, the Femto LDV Z8 seems to be the most versatile femtosecond laser available today worldwide. I previously used the LenSx femtosecond laser (Alcon) for 5 years, but because it can be used for cataract surgery only, such an expensive machine was not feasible in our practice, and we could not justify the investment. Moreover, it is a big machine and it requires permanent air conditioning, a continuous low temperature, and a certain humidity, all of which made our surgical costs even higher.

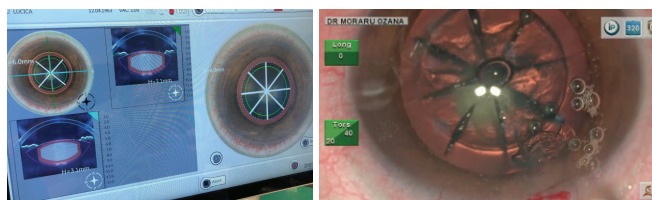


Figure 1. The Femto LDV Z8 used during nucleus fragmentation (left and right).

On the other hand, the Z8 has a smaller footprint, it is easy to handle, it is mobile, and there are no environmental necessities. Above all, it allows better cutting precision and safety during surgery. Therefore, it can be used as often and for as many procedures as possible. We have found that it is easy to dock; there are few patient complaints; it produces perfect corneal incisions and capsulotomies; and we have experienced no vacuum loss, no miosis, nor conjunctival hemorrhages. In terms of corneal surgery, we noticed precision in cutting the clear corneal tissue, both in LASIK cases and in corneal transplant procedures.

CASES IN POINT

White cataracts. Nuclear fragmentation is very well performed with the Femto LDV Z8, even in hard nuclei and white cataracts (although the fragmentation pattern is not always visible from the beginning). For this reason, we almost exclusively perform laser cataract surgery in white cataracts, as it brings a lot of advantages. First, most of these cataracts are intumescent, with a flat anterior chamber and liquefied cortex.

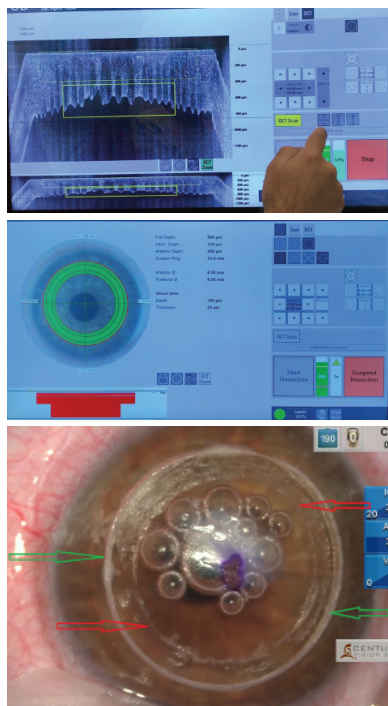


Figure 2. Mushroom keratoplasty with the Femto LDV Z8 (top, center, and bottom).

With the subsequently narrow angle, an accidental puncture of the iris or anterior capsule is more likely with conventional phacoemulsification cataract surgery requiring limbal or clear corneal incisions; this complication is avoided using the femtosecond laser, where OCT technology warns of this possibility and helps the surgeon set proper incision placement.

Second, the prominent dome of the anterior capsule and the liquefied pressurized cortex in the white intumescent cataract often predispose capsular run-out (ie, Argentinian flag

syndrome) in conventional phacoemulsification with manual capsulotomy. On the contrary, by performing the capsulotomy with the Femto LDV Z8, we can avoid the high possibility of an Argentinian flag syndrome, and we also can safely create the capsulotomy in the desired size and position.

Third, the Femto LDV Z8 brilliantly cuts the nucleus of a white cataract. This can easily be seen when attempting to split the nucleus into pieces: The nucleus pieces exhibit a straight and vertical cut and are very easy to separate during phacoemulsification, which is a sign of an efficient laser precut.

Posterior polar cataracts (PPC). When fragmentation is already done by the laser (Figure 1), it avoids the necessity to chop or sculpt the nucleus manually by rotating and splitting it. The surgeon is no longer required to separate the fragments with lateral movements; thus, we avoid the dangerous rotational and lateral forces needed for manual nucleus fragmentation and separation—forces that would put the weakened central zone of the posterior capsule in PPC eyes at risk for major complications.

In these cases, I recommend use of a femtosecond laser pattern with several radial cuts in the nucleus (16, for example). This results in several smaller fragments that can easily be emulsified and aspirated, without any dangerous force exerted on the posterior capsule. Moreover, because the polar posterior opacities can be seen on OCT, the surgeon can precisely set the depth of the radial nucleus cuts, very close to the posterior capsule, making fragmentation even more complete and efficient.

Lamellar keratoplasty. I consider femtosecond technology very useful in corneal transplant surgeries. In DALK, the Femto LDV Z8 brings more precision in performing the circular cut at the correct depth and in tunnel creation in the big-bubble technique. However, it is equally useful in penetrating keratoplasties. For example, in very advanced keratoconus, central leucomas, and scars, or in an eye with hydrops, the Femto LDV Z8 allows one to make a large graft to better cover the ectasia and to reduce postoperative astigmatism. How can we obtain all these requirements? By performing a mushroom keratoplasty with the Femto LDV Z8, which can be safely tailored to the patient's ectatic cornea (Figure 2) and by the use of integrated intraoperative OCT.

CONCLUSION

The Femto LDV Z8 is a versatile, compact, and precise platform capable of performing both cataract and corneal refractive surgeries. We have found it to be a welcomed addition in our OR as well as useful in not just routine cases but also complex cases as well. ■

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