VISUMAX 800 – Why speed matters
Evolution in Femtosecond Laser Technology raising Laser Vision Correction to the next level

By Detlev R.H. Breyer, MD

I acquired the VisuMax femtosecond laser (Carl Zeiss Meditec AG; Jena, Germany) 13 years ago and have used it with great satisfaction and success to perform femto-LASIK and Lenticule Extraction with SMILE. Once I saw the next generation VISUMAX 800 showcased in the technical exhibition hall at the 2019 ESCRS Congress and learned about its features, however, I immediately placed my order for this upgraded system.

Faster speed, which I believe brings benefits for surgeons and patients, is one of the most striking enhancements found on the VISUMAX 800. In addition, the laser is equipped with a number of new capabilities that make it a state-of-the art platform for refractive surgery now and into the future.

What was your experience with the VisuMax and what motivated you to transition to the VISUMAX 800?

I was always pleased with the results I achieved using the VisuMax and with the excellent support and service provided by ZEISS. At the same time, I strongly believe in providing the best care possible for my patients, and so I am interested in using the highest level available in diagnostic and surgical equipment. Naturally, therefore, I was interested in the next generation of what for me was a time-tested laser.

In particular, I expected that the incredible speed of the VISUMAX 800 would raise SMILE to a new level. Although it might sound trivial, even the physical presentation and appearance of the VISUMAX 800 speak a language of sophistication, combining design and functionality.

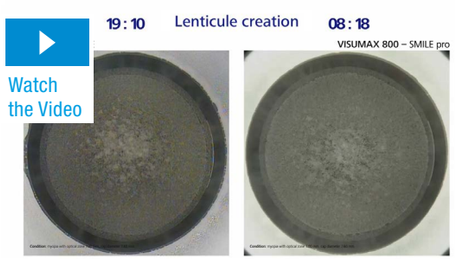
Other companies are developing laser platforms for Lenticule Extraction, but after evaluating them, I felt confident with my decision to trust the Lenticule Extraction pioneer and now market leader in Laser Vision Correction. The number of SMILE performed is increasing exponentially, and the fact that the VisuMax has been used in more than 5 million SMILE treatments worldwide is a striking argument to me for staying with ZEISS technology.

What is new about the VISUMAX 800?

Faster speed is its foremost feature. The VISUMAX 800 also allows for quick cyclotorsion alignment through digital rotation of the laser pattern, which is important for astigmatism correction and a very helpful feature for beginning surgeons. A computerassisted centration aid included in the VISUMAX 800 is another valuable addition. This feature gives surgeons full control of centration during the docking phase, and I think that it will be especially helpful when performing SMILE for treating hyperopia patients becomes available in the near future. SMILE pro provides benefits of a flap-free procedure and seems to have more durable results than LASIK[1,2] Therefore, I truly believe that the VISUMAX 800 will be a gamechanger in the field of Laser Vision Correction surgery as was the VisuMax, now enabling surgeons to perform Lenticule Extraction for myopic and hyperopic patients with and without astigmatism.

The VISUMAX 800 is also designed to be part of a comprehensive refractive workflow system, being integrated with other devices and software platforms from ZEISS. Data management capabilities with with VISULYZE (Carl Zeiss Meditec AG; Jena, Germany) provide surgeons an excellent tool for refining and personalizing their nomograms so that the nomograms match the surgeon's unique surgical environment and techniques. This customization has great potential to further optimize results.

How exactly does the speed of lenticule creation and flap creation compare between the VISUMAX 800 and VisuMax, and could you describe the potential benefits of the differences?



* Conditions for VisuMax and VISUMAX 800: myopia with optical zone 6.5 mm, flap diameter ≈ 8.0 mm, spot distance 4.5 µm, track distance 2.0 µm

The VisuMax operates at 500 kHz. Using it, flap creation takes under 20 seconds and a lenticule creation for SMILE takes under 30 seconds. With the VISUMAX 800, flaps are created in under 7 seconds and a lenticule takes less than 10 seconds.*
The difference in the time for lenticule creation is especially noteworthy because docking time is probably the most critical and stressful time for both patients and surgeons during a procedure. Almost all of my patients are at least slightly nervous undergoing a Laser Vision Correction procedure. I have a prepared short speech that I use to help patients remain calm and keep fixated during lenticule creation. For me it makes a huge difference to only have to keep them comfortable and relaxed for less than 10 seconds rather than almost 30 seconds. In fact, when performing my first SMILE treatment with the VISUMAX 800, I was surprised that I had barely finished the first sentence of my relaxation talk by the time the lenticule cut was done.

The faster speed of the VISUMAX 800 has other potential benefits. Head and eye movements due to patient anxiety are the most common direct causes of suction loss. The relationship between docking time and risk of suction loss is inverse. Even though the rate of suction loss with the VisuMax was already low[3,4] and suction loss has never been an issue in my practice, I´d assume that the faster creation of the lenticule with the VISUMAX 800 might even help shortening the learning curve in terms of suction stability management for surgeons starting with SMILE.

The faster cutting time with the VISUMAX 800 also lessens any discomfort patients might experience from increased IOP during docking. Because of its curved patient interface docking merely to the cornea, the VisuMax was already associated with less IOP increase, less patient fear, pain and subconjunctival hemorrhage compared to other femtosecond laser systems.[5-7] Nevertheless, any improvement in comfort and stress may lead patients to feel more satisfied with their entire surgical experience.

Lenticule Extraction was also very good with the VisuMax, but the latter step seems even easier with the VISUMAX 800, which I attribute to what seems to be near elimination of opaque bubble layer formation due to an optimized energy per area and a faster laser source.

What are your impressions from your initial experience using the VISUMAX 800?

I have used the laser for flap and lenticule creation in approximately 300 procedures and am completely enthusiastic about my experience. I am not exaggerating when I say that it is a fantastic piece of engineering.

What would you say to other refractive surgeons about acquiring the VISUMAX 800?

I might start with an analogy relating to phacoemulsification units. Just as cataract surgery has become safer, more efficient, and more effective over the years thanks to revolutionary advances in phacoemulsification units comparing the first machine invented by Dr Charles Kelman and modern platforms, so too is the VISUMAX 800 a huge step forward in technology for refractive surgery.

Speaking specifically about Lenticule Extraction with SMILE, the VISUMAX 800 does not change the basic steps of this time-proven procedure, but it raises the experience to a new level for patients and surgeons. I expect that the upgraded features of the VISUMAX 800 will be appreciated by expert surgeons who will be able to treat their corneal refractive patients with a high level of comfort, precision, safety and efficacy. Surgeons who are new to SMILE, however, will especially benefit from using the VISUMAX 800 because its increased speed and surgeon-supporting functions might enable a shorter and smoother learning curve. Nevertheless, SMILE pro is still much more corneal surgery than femto-LASIK. We should not neglect this fact in our euphoria for the new VISUMAX 800.

Finally, the new VISUMAX 800 is not just the entry card into the leading SMILE system, but it is also the heart of a comprehensive assembly of ophthalmic devices comprising a seamlessly, digitally integrated workflow system for gold standard refractive surgery and patient care.

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Detlev R.H. Breyer, MD
is partner and senior surgeon at PremiumEyes and Breyer, Kaymak & Klabe Eye Surgery, Düsseldorf.
He is a paid consultant to Carl Zeiss Meditec AG.

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