

Frequently Asked Questions About Small Incision Lenticule Extraction (SMILE)

INTERVIEW WITH DAVID REX HAMILTON, MD, MS, FACS, WHO PRACTICES AT SANTA MONICA EYE MEDICAL GROUP IN CALIFORNIA.



With the introduction of any new technique or technology, eye surgeons are anxious to drill down past the headlines to find out about the practicalities of incorporating the new concept into practice. Here, David Rex Hamilton, MD, MS, FACS, the first surgeon west of the Rockies to perform small incision lenticule extraction (SMILE), answers questions his colleagues ask frequently.

My LASIK results are near-perfect, why should I buy another laser to incorporate SMILE?

We have incredible technology to perform LASIK and PRK, but for certain patients in certain situations, SMILE appears to have some advantages. For example, SMILE may be advantageous for a patient who wants to avoid the post-operative discomfort and healing time of PRK, but does not want a LASIK flap that could potentially interfere with their hobbies or work related activities. I feel it is important to have the full line of equipment available to customize my treatments for different types of patients.

Is SMILE a better procedure than LASIK?

SMILE is another option in addition to LASIK and PRK for treating myopia and astigmatism. When we have more options, we can choose which procedure makes the most sense for an individual patient. For example, SMILE may have some advantages with regard to corneal biomechanics, as there is a smaller incision cut with SMILE compared to a LASIK flap and with SMILE the anterior stroma remains mostly intact as opposed to PRK where the anterior stroma may be ablated by the laser.

How will adding the VisuMax femtosecond laser system (ZEISS) for flaps and SMILE grow my practice?

As surgeons, we know how safe LASIK and PRK are, but fear can be a barrier for some patients when deciding if they want refractive surgery. They may be concerned that a flap will move after

surgery. They may be fearful of the sound of the laser or uncomfortable with the odor emitted during the excimer ablation.

SMILE has a huge advantage in terms of addressing these concerns. I can reassure patients that we do not create a flap, and that during the procedure they will hear no loud sounds or experience any unpleasant odors that are common with an excimer laser ablation. This knowledge has helped many patients overcome their fears and proceed with surgery.

In addition, there is very little discomfort associated with the VisuMax laser, even for creating LASIK flaps. Consequently, I have found the overall LASIK patient experience much more comfortable with the VisuMax laser compared to previous femtosecond lasers I have worked with. Because the VisuMax interface does not touch the conjunctiva, there is no subconjunctival hemorrhage following LASIK, and the eye looks as if nothing was done.

With no pupil tracking and no cyclotorsional alignment, how can SMILE be as good as LASIK?

As LASIK and PRK surgeons, we are very much interested in alignment of astigmatism and centering the treatment. We are accustomed to having pupil trackers and iris registration to help us.

For SMILE, we do not need a pupil tracker because we control the eye throughout the entire laser portion of the procedure.

Centering a SMILE treatment is critical, however, and we use certain techniques to ensure centration. A corneal topography system that shows the visual axis relative to the pupil is critical to assist the surgeon in centering the SMILE treatment. Several such systems are currently available. I use the Galilei system (Ziemer) for this purpose. I print the picture of the visual axis relative to the pupil and hang the picture upside down next to the oculars of the VisuMax laser. A quick glance at this picture before engaging suction helps me center the interface and, thus, the SMILE treatment.

What is the typical learning curve for first SMILE cases?

The VisuMax femtosecond laser is an amazing laser. It is much gentler on the eye, compared to other femtosecond

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lasers, because the curved interface touches only the cornea and not the conjunctiva during the procedure. With the VisuMax, the curved interface produces very little increase in the IOP, and typically no visual blackout, and little to no discomfort to the patient. The learning curve for SMILE varies depending on the experience of the surgeon, repetition of the procedure, and experience with previous femtosecond laser platforms. As previously mentioned, the VisuMax laser utilizes a curved interface to contact the cornea, this results in a different experience for a surgeon who may be used to docking a femto laser that applanates the cornea. I recommend that a new VisuMax user create 50 LASIK flaps prior to moving forward with the SMILE procedure. Performing 50 LASIK flaps prepares the new surgeon for docking with the VisuMax laser, centering the SMILE treatment, and knowing how the patients react to a laser that is much gentler on the eye. When the new surgeon is ready to start SMILE cases, the learning curve can be as few as 10 cases or as many as 50. Most of the learning curve relates to the actual removal of the refractive lenticule, which is a skill any new SMILE surgeon must acquire. I have found that the nomogram factor is very easy to adjust compared to starting a new treatment on an excimer laser, so the learning curve is defined by how long it takes a new surgeon to refine their technique in managing the lenticule.

Is SMILE as reliable and predictable as LASIK?

Predictability is hugely important to refractive surgeons, and those of us who perform PRK and LASIK use nomograms based on previous results to ensure the best outcomes.

In my opinion, SMILE is an extremely predictable procedure. I would argue that it is more predictable in many situations than LASIK, particularly with higher myopic treatments, as there is no variability introduced from corneal dehydration, atmospheric conditions, or excimer laser cosine effect to alter the performance of the laser pulses. A small nomogram adjustment may be required based on a surgeon's individual laser.

What if a secondary treatment is required after SMILE?

Outside the United States, surgeons have several options for retreatment following SMILE, but we are somewhat limited here, as the SMILE cap thickness is locked at 120 microns.

I have found that with the SMILE procedure my enhancement rate is very low. I believe part of this is due to the SMILE treatment not being dose-dependent or impacted by the

cosine effect that we see with many excimer laser ablations. If I am faced with the need to enhance a patient after SMILE, I would likely perform PRK. To date, having performed more than 300 SMILE procedures, I have had to enhance only a single eye.

How should I position SMILE to optometrists in my referral/comanagement network?

Optometrists may not be familiar with the SMILE procedure, because it is relatively new in the United States. I would explain to them that we use the same laser that we use to create LASIK flaps, but instead of one pass, we make two passes within the cornea. We create a lens-shaped piece of tissue that we remove through a small incision. SMILE is less invasive than LASIK or PRK in the sense that disruption of the surface is limited to a small tunnel incision. This has advantages related to the corneal nerves, as there is less resection of the nerves with a small incision as opposed to a larger incision used for a LASIK flap. The corneal nerve plexus is responsible for corneal sensation and maintenance of a healthy tear film, so less disruption to these nerve fibers is ideal. Also, the small incision associated with SMILE results in less disruption to the anterior corneal stroma. The anterior stroma is thought to be responsible for playing an important role in the biomechanical integrity of the cornea.

How is the patient's WOW factor for SMILE compared to LASIK after surgery?

The WOW factor for SMILE is significant on day one. Patients often comment that the eye feels as if it had nothing done to it. This is an improvement from the dryness or scratchy feeling that patients may report on day one after LASIK and a significant improvement over the prolonged discomfort often experienced following PRK. Recently, we have been able to adjust the laser energies on the VisuMax to match those used outside the United States. This has had a profound impact on the vision recovery to the point that now I expect 20/20 vision on day 1, just like LASIK. ■

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