How to Master Small-Incision Lenticule Extraction


Why I choose SMILE for my patients.

BY SONNY GOEL, MD, AND BRUCE A. RIVERS, MD

In recent years, small-incision lenticule extraction (SMILE) has gained greater adoption as an alternative to LASIK. At a recent ZEISS Lunch Forum, Sonny Goel, MD, and Bruce A. Rivers, MD, shared their clinical experiences with colleagues—from how they started with SMILE to how they now approach complications and patient selection. What follows is a condensed version of that discussion.

Sonny Goel, MD: SMILE is no longer an emerging technology. Over 12 million procedures have been performed worldwide, by more than 3,000 surgeons across 80 countries.[1] In the US, where corporate surgical centers still dominate with LASIK, SMILE represents a crucial differentiator for independent practices. In my clinic, SMILE is my first recommendation for eligible patients. Its safety record and long-term outcomes speak for themselves.[2-6]

CLINICAL BENEFITS OF SMILE OVER LASIK AND PRK

Dr. Goel: I had performed LASIK with excellent results for over 20 years, but when I left a corporate practice in 2019, my non-compete prevented me from performing LASIK or PRK within a 30-mile radius. That was my entry point into adopting the SMILE procedure. Like many experienced LASIK surgeons, I ran into early frustrations—particularly with dissections—and I remember thinking that I would return to LASIK as my primary procedure after 18 months. As I gained familiarity with SMILE, though, I couldn't deny its great outcomes and high patient satisfaction rates, and as I stated, it has remained my primary surgery.

Once you cross the learning curve, SMILE becomes a seamless, elegant procedure with consistent results. Its minimally-invasive nature, lack of a corneal flap, and immediate recovery make it a compelling choice versus LASIK. In particular, its freedom from next-day activity restrictions resonates with many patients.[7] In my opinion, SMILE delivers LASIK precision with PRK stability (and less postoperative worry for the surgeon).

Bruce A. Rivers, MD: I started performing SMILE about 7 years ago while serving in the US military, beginning with the VisuMax 500 femtosecond laser and later upgrading to the VISUMAX 800 (both by ZEISS). I participated in studies with John Cason, MD, that helped expand SMILE parameters within the Department of Defense (unpublished data).

Now, in my private practice in Washington, DC, many of my refractive patients arrive requesting SMILE or SMILE Pro (performed with the VISUMAX 800) because they've read about the procedure's advantages. I often describe SMILE as "the best of both worlds," combining the recovery of LASIK with the biomechanical stability of PRK.

I love to share the story of when I performed SMILE on a college basketball player one evening. He was poked in the eye at practice the next morning and texted me in a panic. When he said his vision was fine, I told him, "You're good to go." His case is a perfect example of SMILE's safety profile.

OVERCOMING THE INITIAL LEARNING CURVE FOR NEW SMILE SURGEONS

Dr. Goel: Every new SMILE surgeon eventually encounters the same initial hurdles: (1) identifying the surgical planes, (2) managing sticky dissections, and (3) treating low myopes. To help our colleagues resolve these complications, I'll present here a case study, a clinical paper, and my own real-world experience.

Case Studies: Identifying the Surgical Plane

Dr. Goel: The key to identifying the correct surgical plane is understanding that the bubbles are your friends. They help define the interface before you enter the eye. My current technique is straightforward: I open the incision and find the deeper plane with a single motion, then sweep to locate the superior plane using a "rescue" maneuver. Once I've identified both planes, I confirm resistance in each before starting the dissection. Precision here eliminates 90% of potential complications. I create a central tunnel in the anterior plane, then fully dissect the posterior plane before returning to the anterior plane to finish the dissection and remove the lenticule.

Dr. Rivers: In my case, I take a similar approach. I prefer to dissect the anterior plane first, then the posterior plane halfway through, confirming resistance on both sides. Tactile feedback tells me that I'm where I need to be. I also stopped securing the eye during dissection and now use a small drop of BSS on the spatula. It smooths the motion and reduces resistance, especially in thin lenticules.

Dr. Goel: For newer surgeons, I can't stress this enough: schedule your training for several full days, not just a handful of cases. Comfort develops from repetition and feedback, not a few isolated attempts.

Dr. Rivers: I agree, premature overconfidence is what leads to mistakes. Follow the recommended steps for your

Identifying the Surgical Plane

PEARL #1 - Before you start the dissection, understand the bubbles will help you to identify the planes and incision*
*Once you pierce the incision, escaping bubbles can obscure the view

PEARL #2 - Use one motion to open the incision and identify the inferior plane on the left side, while the bubbles can assist you

PEARL #3 - Use the "rescue" technique (Figure) to point the instrument's tip up and over the lenticule on the right side

PEARL #4 - Identify both planes before starting the dissection*
*Confirm the two planes do not intersect by overlapping them centrally

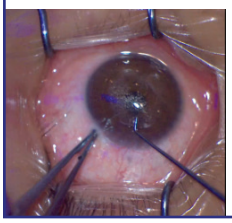

Figure. The "rescue" technique uses the Sinskey hook to identify and separate the corneal plane.

first 30 to 40 eyes. Once you're confident, then individualize your approach.

A Sticky/Difficult Dissection: Evidence-Based Guidelines for KLEx

Dr. Goel: To resolve a sticky/difficult dissection, I'll summarize the evidence-based guidelines for keratorefractive lenticule extraction surgery (KLEx) from a paper published earlier this year.[2]

Preventative Measures

- Prevent and avoid improper laser energy, severe opaque bubble layer, and black spots at all costs.
- Inexperienced surgeons should avoid performing KLEx on low myopes.
- Differentiate the upper and lower surgical planes at the incision site before dissection.
- Avoid excessively thin caps.

Management Principles

- Identify and dissect the lenticule carefully.
- If you cannot find the lenticule, use a sharp dissector to search for its edge and increase the microscope's magnification.
- Apply OCT if necessary.
- If you still cannot find the lenticule, postpone the procedure.
- In the event of a cap perforation or tear, the cornea must be tightly aligned, and a bandage contact lens is recommended.

Following these guidelines will help you prevent and manage difficult lenticule dissections.

Treating Low Myopes: Real-World Experience

Dr. Goel: My personal pearls for treating low myopes is to start with higher prescriptions before lower ones. I find it easier to dissect the posterior plane first (it's more resistant), then peel off the anterior. This approach has virtually eliminated tissue tags for me. For very low corrections, patience is critical. The lenticule is thin, so any aggressive movement risks a tear or incomplete extraction.

If you see a lenticular fragment, don't be heroic. If the residual fragment is small and peripheral, it's rarely visually significant, and attempting to chase it can cause more harm than leaving it. A calm, methodical approach is always better than a forceful one.

Treating Low Myopes

PEARL #1 - Dissect the posterior plane first before the anterior

PEARL #2 - Thin lenticules require a slow, steady hand to avoid tears and incomplete extractions

PEARL #3 - If residual fragments are small and peripheral, it may be best to leave them

SUMMARY

Dr. Goel: I hope this article has given you some pearls on how to master SMILE. Even with over 12 million SMILE procedures performed globally, most patients still come in asking for LASIK. Education changes everything. During consultations, I use the ZEISS "Z Refractive App," which helps me to walk patients through PRK, LASIK, and SMILE visually. When they see the differences, nearly everyone says, "If I can have SMILE, why would anyone choose LASIK?" That moment reframes the conversation entirely.

Dr. Rivers: Exactly. Patients are more informed now, but they still need translation. I explain that SMILE combines the recovery speed of LASIK with the biomechanical stability of PRK. When a patient understands that they can play contact sports, rub their eyes, and resume activity almost immediately, with no flap to worry about, they get it. The SMILE learning curve is real, but so is the satisfaction. Once you master it, you'll wonder why you ever did it any other way. ■

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