

# From LASIK to SMILE

One practice's easy and rewarding experience adopting this minimally invasive laser refractive procedure.

BY KEITH RASMUSSEN, OD



In the last 25 years, my colleagues and I have had the honor of comanaging a great deal of surgery, bridging the gap between referring doctors' general vision care and surgery at Vance Thompson Vision. Our surgical options recently expanded to include the first minimally invasive laser refractive surgery, small incision lenticule extraction (ReLEx SMILE; ZEISS). This procedure has been performed outside the United States more than 750,000 times since 2011,<sup>1</sup> and 5-year data show it is safe and effective.<sup>2</sup> In our practice, which was a part of the FDA-monitored trial leading to approval of this procedure, SMILE has demonstrated value to both patients and the practice, with a virtually seamless adoption.<sup>1</sup>

## SMILE Pros and Cons

SMILE combines some of the best attributes of both LASIK and PRK in a minimally invasive surgery. The SMILE procedure is performed entirely with a femtosecond laser (VisuMax; ZEISS). The surgeon creates a lenticule within the corneal stroma and removes it through a small 60° to 90° incision, reshaping the cornea to achieve the target visual acuity. Unlike LASIK, there is no flap and much less of a side-cut. Having less of a side-cut through the stronger anterior corneal collagen and its nerves is believed to be a positive for SMILE. And, unlike PRK, there is no corneal abrasion.

When our practice was involved in SMILE clinical trials, patients had LASIK in one eye and SMILE in the other. At day 1, visual acuity for LASIK patients was slightly sharper for some patients, but it was comparable at 1 week.<sup>1</sup> Due to the smaller incision with SMILE compared to LASIK, less corneal nerves were disrupted, and patients experienced less induction of dry eye and greater comfort.<sup>1,3</sup> Also, because the lenticule is removed from the deeper stroma and less anterior stroma is disrupted compared to LASIK, research has shown that patients who have SMILE may leave a stronger residual cornea after surgery.<sup>4</sup>

We have noted minimal risks, very similar to those seen with LASIK or PRK. In the SMILE clinical trial, less than 1% of our patients' required fine-tuning of vision with PRK.<sup>1</sup>

Patients respond very positively to the fact that SMILE requires smaller incisions and generally has an easier recovery. We compare SMILE versus other laser refractive options to laparoscopic surgery versus open surgery, and patients immediately understand its value.

## The Best Candidates

One of the nice things about SMILE is that our evaluation of candidacy is very similar to LASIK and PRK. We take the same measurements, and we look at topographies, corneal regularity, corneal thickness, corneal resistance factor, and hysteresis. It is also important to assess the ocular surface and treat a patient's tear film prior to surgery. While it is a new procedure, we are all very familiar with this evaluation because we have been doing it for years with LASIK and PRK.

Currently, the FDA indication range for SMILE is between a -1.00 D and -8.00 D with astigmatism of 0.50 D or less. If these patients wear spherical contact lenses, we ask them if they are happy with their visual quality with their contact lenses. If the answer is "yes" and the patient has a thick enough cornea (at least 500 µm), then we likely have a great candidate for the SMILE procedure.

It is also important to make sure patients are not eye rubbers before suggesting SMILE. Although researchers have shown through a mathematical model that the tensile strength of the cornea following SMILE is stronger than that of LASIK or PRK, it is still a tissue-removing procedure and we have to be aware of the possibility of ectasia.<sup>4</sup> It is important to obtain a wavefront to make sure the patient does not have many higher-order aberrations before recommending SMILE.

Patients referred to us for refractive surgery usually know a lot about LASIK and PRK, so when we talk about SMILE as a minimally invasive option for vision correction, they are very open to the procedure. In terms of comanagement, the simplicity of the SMILE procedure and the similarities of its preparation and follow-up to LASIK and PRK mean that the process is immediately familiar, with minimal need to learn any new technologies or change patient flow. As a result, adding SMILE to our practice has been a seamless transition.

## Happy Patients

Like the preoperative procedures, the postoperative patient experience after SMILE surgery is very similar to both LASIK and PRK. In our practice, patients have felt very comfortable when they come back the very next day. Sometimes their vision is not quite as crisp as LASIK on day 1, but it catches up very quickly thereafter. At 1 or 2 weeks, the visual acuity is crisp and comparable to LASIK. Postoperative treatment mirrors LASIK as well, with patients taking antibiotic

and steroid drops for 1 to 2 weeks. There are no major changes in postoperative procedures for SMILE versus LASIK,

which has contributed to the seamless transition to performing SMILE in our practice. ■

## Case Study

**The patient:** A 27-year-old woman was referred to us by her optometrist for laser vision correction. She had been wearing glasses and contacts all her life and wanted to free herself from them as she increased her participation in triathlons, where the combination of running, cycling, and swimming made glasses and contacts a challenge.

### Current vision correction:

OD: -2.25 sphere, OS: -2.00 sphere

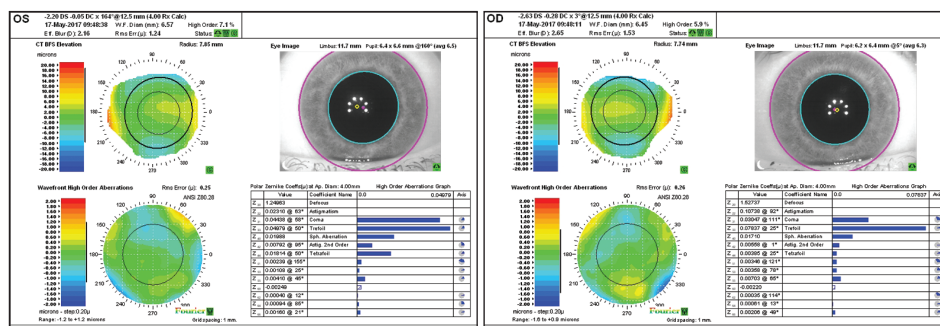
### Preoperative measurements:

The patient had a relatively clean wavefront with minimal higher-order aberrations (Figure 1). Her topography showed good regularity and good corneal thickness (Figure 2).

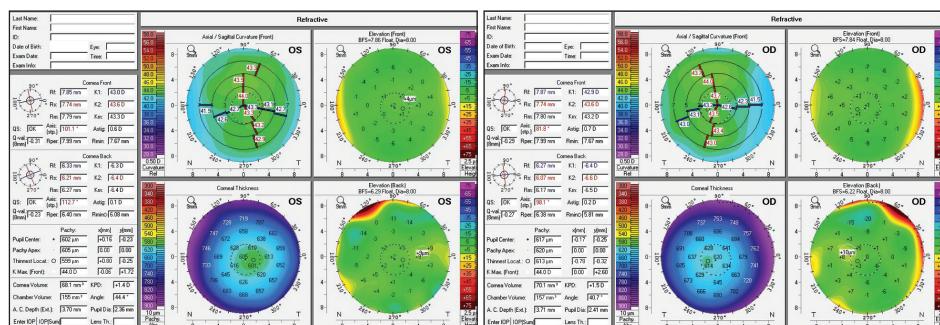
**SMILE candidacy:** This patient was happy with her vision in her spherical contact lenses, and her prescription fell within the FDA indication range for SMILE (-1.00 D and -8.00 D with astigmatism of 0.50 D or less). The patient told us that she does not rub her eyes.

**Discussion:** We presented the patient with all of her options. In this case, her options were LASIK, PRK, and SMILE. We recommended SMILE because she was such a good candidate. She was pleased to hear about a less invasive option with a faster recovery period, so she chose SMILE. She was aware of the small chance of needing a PRK fine-tune postoperatively.

**Procedure:** The SMILE procedure proceeded uneventfully. The surgeon used the femtosecond laser (VisuMax; ZEISS) to reshape



**Figure 1.** The patient's wavefront aberrometry showed minimal higher-order aberrations, a requirement for SMILE.



**Figure 2.** Topography showed good corneal surface regularity, as well as corneal thickness above the requirement for SMILE.

the cornea by making a lenticule and removing it through the small incision. The patient was prescribed prednisolone/gatifloxacin combination drops, four times a day for 1 week and two times a day for 1 week.

**Outcome:** The SMILE procedure met the patient's refractive goals. Her visual acuity was OD: 20/25, OS: 20/20 at day 1 and OD: 20/20, OS: 20/20 at week 1. The patient's eyes appeared healthy. She reported that her eyes felt comfortable at all visits, with no acquired dry eye symptoms. She was approved to swim in a pool at 2 weeks and in ocean, lakes, or rivers within 1 month. She was very happy to enter her next triathlon without contact lenses.

### Keith Rasmussen, OD

- Vance Thompson Vision in Sioux Falls, SD
- keith.rasmussen@vancethompsonvision.com
- financial interest: none acknowledged

1. Data on file. Carl Zeiss Meditec, Inc.  
2. Blum M, Täubig K, Gruhn C, et al. Five-year results of small incision lenticule extraction (ReLEx SMILE). *BJO*. 2016;100:9:1192.  
3. Denoyer A, Landman E, Trinh L, et al. Dry eye disease after refractive surgery: comparative outcomes of small incision lenticule extraction versus LASIK. *Ophthalmology*. 2015;122(4):669-676.  
4. Reinstein DZ, Archer TJ, Randleman JB. Mathematical model to compare the relative tensile strength of the cornea after PRK, LASIK, and small incision lenticule extraction. *J Refract Surg*. 2013;29(7):454-460.