

Use of orthokeratology (OK) in post-Smile surgery, a case report.

Alba Peñacoba-Baroja OD¹, Diego Arlanzón-Lope MSc, Sergio Díaz-Gómez PhD¹.

1. Miranza COI, Centro oftalmológico integral de Bilbao.

BACKGROUND

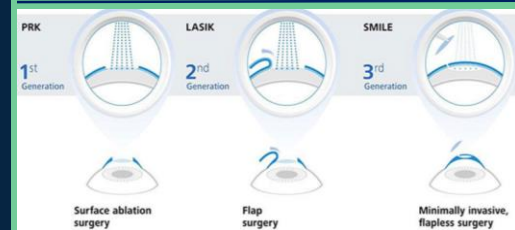


Figure 1: Differences between the mechanism of action of the laser in refractive surgery techniques. <https://www.aao.org/young-ophthalmologists/ye-inf/article/introduction-to-smile>

A corneal lenticule is carved with the assist of a femtosecond laser and through a 2 mm incision it is extracted. It is a minimal invasive technique as it does not act on the superficial layers of the cornea.

Relex-SMILE (Small Incision Lenticule Extraction) is a recent surgical laser technique for the correction of refractive errors.

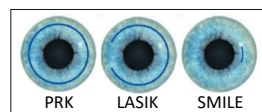


Figure 2: Incisions of refractive surgery techniques. <https://www.chesapeakeeyecare.com/services/smile-link-prk-laser-vision-correction>

Although this refractive surgery method is considered to be a safe technique in general terms, medium to long term refractive stability is the main issue. In these cases, it is necessary to discuss options to manage unsatisfactory visual acuities (VA), leaving aside surgical options, where photorefractive keratectomy (PRK) would be the best technique to perform retreatments. Contact lenses are an ally for the optometrist to satisfy the demands of these patients. Among them, OK avoids the need to wear contact lenses during the day, simulating the effect of a refractive surgery.

CASE REPORT

A 30-year-old caucasian male, who underwent SMILE surgery in 2018 with a prior refraction of $-8.00 (-0.50) \times 155^\circ$, VA 0.0 on the right eye (OD) and $-7.50 (-0.75) \times 5^\circ$ on the left eye (OS) VA 0.0 LogMAR scale.

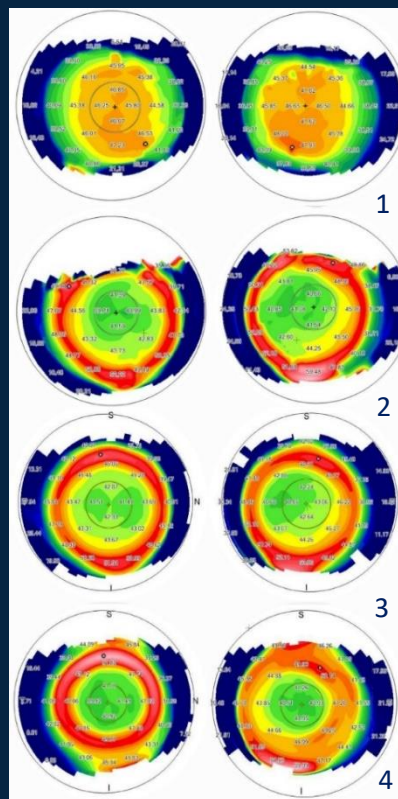


Figure 3. Tangential topographies of the patient in the different refractive stages.

1. Healthy cornea, before smile surgery (2018).
2. 6 Months after surgery, successful post-operative outcome (0.0 VA both eyes).
3. Before OK (2023).
4. Finished OK treatment.

He attended our centre in April 2023 reporting blurred distance vision. This blurred vision was caused by a myopic shift after the surgical process. Our patient showed a spontaneous VA of 0.3 OD and 0.2 OS. We found a manifest refraction of OD $-0.75 (-0.75) \times 180^\circ$ and OS -1.0 . To obtain a successful OK fitting we provided him with two pairs of lenses. With the second pair, and after two weeks of night use, our patient reached a spontaneous VA of -0.05 and -0.10 respectively. The patient does not report changes in vision throughout the day or other visual complaints.

CONCLUSIONS

As seen in this case report, it is possible to fit OK lenses in patients after SMILE surgery. Our patient's VA and comfort values throughout the day are comparable to non-operated patients. Up until the date of publication of this case, the ocular surface shows no alterations, and topographic stability of the treatment area is observed. To our knowledge, this is the second case published successfully on an OK fitting in a post SMILE cornea surgery on a global level. Long-term follow up of these patients is necessary to guarantee the safety of the technique, but the results are promising.

REFERENCES

1. Liang, C., Zhang, Y., He, Y., & Wang, S. (2022). Research Progress on Morphological Changes and Surgery-Related Parameters of Corneal Cap in Small-Incision Lenticule Extraction. *Ophthalmic research*, 65(1), 4–13. <https://doi.org/10.1159/000520241>
2. Lau, Y. T., Shih, K. C., Tse, R. H., Chan, T. C., & Jhanji, V. (2019). Comparison of Visual, Refractive and Ocular Surface Outcomes Between Small Incision Lenticule Extraction and Laser-Assisted In Situ Keratomileusis for Myopia and Myopic Astigmatism. *Ophthalmology and therapy*, 8(3), 373–386. <https://doi.org/10.1007/s40123-019-0202-x>

Fitting post-rx corneas with OK can be challenging because of their oblate shape. An accurate centration and the compensation of the desired myopia is the main achievement. Fluorescein pattern can be uneven due to a bigger tear meniscus, caused by the oblate morphology of the cornea. Successfully, we finally reached a good VA and a centration of the lenses with the customization of a model of Paragon CRT® OK lenses.

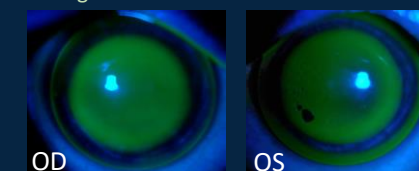


Image 1 and 2. First pair of OK lenses.

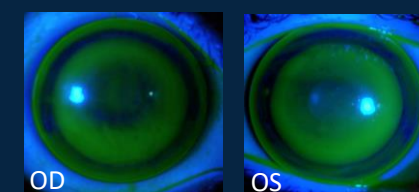


Image 3 and 4. Final lenses fitted.

Our initial lenses selection was based upon the pre-surgical topographic measurements. The desired effect was not achieved after two weeks of use. A manifest refraction of $-0.50 (-0.25) \times 180^\circ$ OD and -0.25 OS to reach 0.0 LogMar VA was found. We decided to change only the base curve to reduce the myopia residual.