Surface Ablation Re-treatments After SMILE

We read with interest the article by Siedlecki et al. showing their results with surface ablation enhancement after myopic small incision lenticule extraction (SMILE). They treated a residual spherical equivalent (SE) refraction of -0.86 ±0.43 diopters (D) (range: -1.75 to 0.00 D) following SMILE by using surface ablation and mitomycin C (MMC), and obtained a mean residual SE of +0.03 ± 0.57 D 3 months after the enhancement. However, this residual SE ranged from -1.75 to +1.75 D, with 15% of patients showing more than +0.50 D of residual SE and 5% showing more than +1.00 D of SE.

Another report of surface ablation after SMILE also showed a good mean residual SE after the enhancement, but again with a range from -0.25 to +2.00 D. One of the 14 patients who received the enhancement (7%) was treated for a -0.75 D sphere -0.25 D cylinder and after the re-treatment he showed a +2.00 D sphere -0.25 D cylinder, with loss of uncorrected distance visual acuity.

Surface ablation nomograms are developed for use on corneas without previous lamellar incisions. When surface ablation and MMC are used over corneas with previous LASIK, several studies have reported a good mean residual refractive error, but with a wide range that includes cases of significant overcorrection. In one of these reports, 16.6% of patients had more than +1.50 D of residual sphere following the enhancement. This is in contrast with the high predictability obtained with surface ablation to correct low myopia in virgin corneas.

The results obtained by Siedlecki et al. and Liu et al. strongly suggest that the superficial lamellae of a cornea that has received SMILE still behave differently than the superficial lamellae of a virgin cornea, despite not having undergone a full flap cut, and that surface ablation enhancements following SMILE carry a similar risk of unexpected overcorrections as following LASIK. In other words, the SMILE “cap” seems to show the same kind of response to surface ablation as a “flap.” We believe that patients should be informed of the difficulties they may face if a residual refractive error is present after SMILE.

REFERENCES


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Reply

We read with interest the comments by Drs. Benito-Llopis and Teus concerning our study on surface enhancement after myopic SMILE. Indeed, surface ablation after previous refractive surgery, be it flap-based or flapless, produces results inferior to a primary procedure. In this context, the hypothesis by Benito-Llopis and Teus suggesting that the cap cut in SMILE induces similar alterations in the superficial stromal lamellae like a full flap cut is interesting, but it remains a hypothesis requiring further investigation to be proven. Many other variables have been shown to contribute to the accuracy of refractive re-treatment, for example postoperative fluctuation in stromal thickness, which, as Luft et al. have shown, can be detected up to 1 year after SMILE. In the case of early re-treatment, surface ablation is therefore performed in corneas still undergoing significant remodeling, which has a negative impact on predictability.

Therefore, as for any refractive treatment, a procedure-specific approach has to be established. Our study, being the largest cohort to date, provides evidence that the use of aspherically optimized (ASA) profiles is not recommended because it induces significant overcorrection. Excluding our two ASA cases, 84% and 97% of eyes in our study were within ±0.50 and ±1.00 diopters (D) of target refraction, which is similar to outcomes reported for surface ablation after LASIK (89% and 94%). Further improvements in predictability will be achieved by the establishment of specific nomograms.

Good clinical practice includes thorough preoperative information about the advantages and disadvantages of each refractive procedure available for ametropia correction, including all enhancement-related aspects. Because surface ablation produces comparable results after SMILE and LASIK and because complications associated with flap re-lift (eg, epithelial ingrowth) are absent in SMILE, there is a growing body of evidence...
indicating that enhancement after SMILE is not by any means more complicated than after LASIK. This is also confirmed by our preliminary data on the efficacy and safety of a CIRCLE conversion of a SMILE cap cut into a full flap, which in our hands produces results even superior to surface ablation re-treatment, especially concerning refractive predictability with less over-correction. As a primary flap procedure, CIRCLE after SMILE lacks the risks associated with re-lifting.

REFERENCES

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