## Commentary: Surface ablation: Renewed interest

Surface ablation (SA) is a generic term referring to the application of excimer laser directly onto the anterior stromal surface. Photorefractive keratectomy (PRK) was the first type of surface treatment introduced in the early 1990s.[1] Within a few years after PRK was introduced, laser *in situ* keratomileusis (LASIK) was developed, and it quickly became the refractive surgery procedure of choice for most surgeons. However, SA is now enjoying a resurgence of interest as it evades the side effects of lamellar laser techniques like flap-related complications, diffuse lamellar keratitis, and epithelial ingrowth. SA is the procedure of choice in certain conditions like thin corneas (475–500 μm), flat and steep corneas, deep sockets, narrow palpebral fissures, and epithelial basement membrane dystrophy.[2]

The SA techniques include PRK, laser-assisted sub-epithelial keratomileusis (LASEK) epi-LASIK (and variant epi-LASEK), and transepithelial PRK (tPRK). The basic technique involves the removal of the epithelium in order for the excimer laser to be applied to the stroma. The epithelial separation can be done as a layer and replaced after laser as in LASEK (with dilute alcohol) and epi-LASIK (with a special microkeratome). In PRK, the epithelium is manually debrided and discarded. Although, LASEK and epi-LASIK appear to have an advantage over PRK, studies have shown no significant difference in the efficacy, predictability, pain scores, or incidence of stromal haze between these procedures.[3,4] In tPRK, the ablation of both the corneal epithelium and stroma is performed using an excimer laser rather than mechanical or chemical debridement techniques. This two-step procedure was first reported in 1999, but it gained widespread acceptance more recently because of its integration into a one-step all laser platform which minimizes stromal dehydration and prevents the hyperopic shift seen in the earlier lasers. Transepithelial PRK has shown a faster re-epithelization and less pain scores than the conventional PRK, though the visual acuity results have been similar.[5]

PRK has proven to be highly predictable, accurate, reproducible, and safe over the years. However, it has its own set of complications. The short-term complications include pain and delayed visual recovery and the long-term complications include regression and haze. The possible development of a corneal haze is one of the major limiting factors for performing PRK.[6] The treatment of higher myopia needing greater ablation depth increases the incidence of haze formation.[7] A reduction in the haze to some extent can be achieved by the intraoperative use of mitomycin C and post-operative modulation of topical steroid drops.[6] Severe pain lasting for up to 3–5 days is another factor which makes PRK less favorable among surgeons and patients. Several strategies have been described to reduce the pain to some extent, but they have not been able to make PRK a painless procedure. Barring these few side effects, the patients undergoing PRK enjoy their vision and quality of life for a long period as demonstrated in the current study too.[8]

To conclude, PRK has similar efficacy with a better safety profile as compared to LASIK. However, the acute pain and delayed recovery make it a procedure reserved for cases where LASIK is contraindicated. However, improvements in pain-control strategies, therapeutic approaches toward haze reduction, and all laser transepithelial PRK are bringing SA back to the forefront. The ease and long-term safety of the procedure have the potential to make it the primary surgical technique for laser vision correction.

***Abhishek Dave***

Consultant Cornea and Refractive Surgery Services, Centre for Sight, Safdarjung Enclave, New Delhi, India

Correspondence to: Dr. Abhishek Dave, Consultant Cornea and Refractive Surgery Services, Centre for Sight, B-5/24, Safdarjung Enclave, New Delhi - 110 029, India.
E-mail: abhishek_dave@yahoo.co.uk

## References

1. Gartry DS, Kerr Muir MG, Marshall J. Excimer laser photorefractive keratectomy. 18-month follow-up. Ophthalmology 1992;99:1209-19.
2. Reynolds A, Moore JE, Naroo SA, Moore CB, Shah S. Excimer laser surface ablation-A review. Clin Exp Ophthalmol 2010;38:168-82.
3. Li SM, Zhan S, Li SY, Peng XX, Hu J, Law HA, *et al*. Laser-assisted subepithelial keratectomy (LASEK) versus photorefractive keratectomy (PRK) for correction of myopia. Cochrane Database Syst Rev 2016;2:CD009799.
4. Wu W, Wang Y, Xu L. Epipolis-laser *in situ* keratomileusis versus photorefractive keratectomy for the correction of myopia: A meta-analysis. Int Ophthalmol 2015;35:757-63.
5. dib-Moghaddam S, Soleyman-Jahi S, Sanjari Moghaddam A, Hoorshad N, Tefagh G, Haydar AA, *et al*. Efficacy and safety of transepithelial photorefractive keratectomy. J Cataract Refract Surg 2018;44:1267-79.
6. Spadea L, Giovannetti F. Main complications of photorefractive keratectomy and their management. Clin Ophthalmol 2019;13:2305-15.
7. Moller-Pedersen T, Cavanagh HD, Petroll WM, Jester JV. Corneal haze development after PRK is regulated by volume of stromal tissue removal. Cornea 1998;17:627-39.
8. Bokhary KA, Alshamrani ES, Fahmy R. Visual outcomes and quality of life before and after photorefractive keratectomy. Indian J Ophthalmol 2022;70:65-70.



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