

Kerato-lenticule Extraction (KLex) surgeries – Current perspectives

Corneal lenticule-related surgeries include refractive lenticule extractions^[1-3] and stromal lenticule addition corneal lenticule addition keratoplasty.^[4-6]

Non-flap femtosecond laser refractive surgeries, earlier referred to as femtosecond lenticule extraction (FLE or FLEx) and later modified to modified to refractive lenticule extraction (ReLEx) (Carl Zeiss Meditec AG), finally came to be recognized as small-incision lenticule extraction (SMILE).^[3,7] The SMILE procedure offered for advanced refractive correction by other manufacturer refractive platforms has now brought in more new terminologies such as CLEAR (Ziemer), SMART SIGHT (SCHWIND Eyetech Solutions), and SILK (Johnson and Johnson).^[7-9] Neologisms in refractive surgery now make comprehensive compilation of related literature and analysis of the knowledge level in the field more difficult.^[10] Editors of the leading refractive journals have addressed this concern of varied nomenclature that has risen based on the manufacturer trademarks and recommend the use of common terminologies to relate to the corneal lenticule refractive surgeries in ophthalmic scientific literature.^[7-9]

In order to avoid the current proprietary names that have been introduced for the SMILE corneal refractive lenticule procedure and provide an exclusive and accurate description for the related procedures under this umbrella, the recent joint editorial statements have coined and suggested the use of the new terminology kerato-refractive lenticule extraction (KLEx) be followed for use in scientific literature. It has now been recommended to use KLEx to describe the corneal lenticule extraction refractive procedure, encompassing the reference to the tissue altered, which is the cornea, the purpose for which the procedure is being performed being refractive and the type of refractive correction being achieved by lenticule extraction.^[7,9] Indian refractive literature contribution is significant in SMILE in recent times,^[11] with some of the well-cited research enabling a better understanding on the evolution of the refractive outcomes of this procedure in Indian patients.^[12-15] Current concerns on KLEx surgeries involve variation in the surgical technique, addressing complications that can arise at the stage of lenticule creation, dissection or extraction, increasing proficiency on handling these complications, and availability of enhancement procedures such as repeating the lenticule extraction procedure below the cap, surface ablation (PRK) augmented by mitomycin-C (MMC), or the thin-flap LASIK CIRCLE approach. Intra-ocular pressure measurement, interface-associated problems, Bowman's layer irregularity, inflammation, wound healing, altered corneal biomechanics, and corneal infection remain the main concerns following KLEx surgeries complications.^[16] KLEx is not yet available for hyperopic refractive correction and is expected to be available soon.

According to the existing reports in the literature, post-refractive ectasia following the KLEx procedure shows the lowest rates among all refractive procedures. However, the number of cases reported till date despite KLEx being a recent

introduction shows that the watch for ectasia is required in these eyes as well.^[17-19] With the current evidence of the knowledge level, refractive surgery and simultaneous prophylactic collagen cross-linking (CXL) is considered a safe intervention in borderline corneas undergoing refractive surgical correction surgery; more studies are required to validate its long-term predictability, safety, and stability.^[20,21] There is a lack of consensus on a standard protocol for the same, and with occurrence of interface haze, central toxic keratopathy, diffuse lamellar keratitis, and ectasia, careful patient selection becomes imperative.^[20]

Recent advances in clinical applications in KLEx-derived lenticules include the uses in hyperopic correction, presbyopia correction, lenticule addition keratoplasty in keratoconus, and ectasia treatment for tectonic reconstruction in corneal perforation and in glaucoma drainage device implantation.^[22-24] Current consensus on lenticule addition keratoplasty places it as an alternative procedure in management of keratoconus with the need for more studies to evaluate its long-term effects on corneal stability and induced morphological changes. In conclusion, the evolution of KLEx surgeries has revolutionized the portal of corneal refractive and transplantation techniques with more to come in the recent future.

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