Flap Thickness in Femtosecond Laser

Recently, new femtosecond laser platforms have been developed to perform both corneal LASIK flaps and femtosecond laser-assisted cataract surgery. For this reason, we read with great interest the article by Juhasz et al.,1 which was the first study to evaluate the visual outcomes and flap thickness accuracy of the new LenSx multifunctional femtosecond laser system (Alcon Laboratories, Fort Worth, TX). Although the authors provided good visual results and a high flap thickness predictability with the LenSx device, it is noteworthy that they performed a targeted thick corneal flap of 140 µm in all cases. We have to take into account that the IntraLase femtosecond laser (Abbott Medical Optics, Inc., Santa Ana, CA), which is considered the gold standard of corneal femtosecond lasers, provides similar visual outcomes to mechanical LASIK by performing a thin corneal flap of only 100 µm.2 Moreover, femtosecond laser-assisted thin-flap LASIK has been proposed as an alternative to surface ablation in an effort to cause less impact on corneal stability than LASIK while maintaining LASIK’s advantages (ie, fast visual rehabilitation, painless postoperative period, and low risk for haze).

The importance of having a “thick enough” residual stromal bed after refractive surgery is widely accepted.4 Thus, a thin stromal flap (femtosecond laser-assisted sub-Bowman keratomileusis) or the absence of stromal flap creation (surface ablation) maximizes the residual stromal bed thickness and preserves as much as possible of the biomechanical stability of the cornea. Moreover, it was recently described that a high percentage of tissue altered (PTA) (derived from the formula PTA = flap thickness + ablation depth / central corneal thickness) is the main risk factor for the development of ectasia after LASIK in corneas with normal preoperative topography.5 Given the fact that a 140-µm flap results in more reduction of the residual stromal bed thickness and a higher increase in the PTA compared to a 100-µm flap, we do not understand the benefits of performing such a thick corneal flap and, for this reason, we invite the authors to explain why they performed a 140-µm flap with the LenSx multifunctional femtosecond laser system in every case.

REFERENCES

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Reply:
The LenSx laser system (Alcon Laboratories, Inc., Fort Worth, TX) has a programmable flap thickness range from 110 to 150 µm; thus it is capable of cutting thin flaps with well-known biomechanical benefits. During our initial clinical study,1 all flap thicknesses were set to 140 µm to avoid possible gas breakthrough or difficult flap lifts. Because the residual stromal bed thickness remained more than 350 µm in every case,2,3 there was no corneal ectasia observed in our study. After gaining an initial experience with the device, the flap thickness was set to the current depth of 110 µm for use in our everyday clinical practice.

REFERENCES

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