# A brief note on femtosecond laser-assisted cataract surgery.

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## Description

Femtosecond Laser-Assisted Cataract Surgery (FLACS) is an advanced modality for cataract surgery. Its advantage in cataract surgery in terms of reduction of ultrasound power is controversial. We believe this controversy is due to different techniques and different nuclear densities included in the studies. Our study evaluated the Effective Phacoemulsification Time (EPT) during phacoemulsification with or without Femtosecond laser technology in different nuclear densities. The study comprised two main groups: Conventional phacoemulsification and FLACS groups. We stratified all eyes included in the study into soft and hard cataracts, and we employed the vertical quick chop technique for nucleus disassembly in all cases. In the FLACS group, we used sextans in addition to 350 microns grid softening. We found a significant reduction of EPT in hard cataracts, which is most prominent in medium-density nuclear cataracts of N3+ (LOCS III). In cataracts of N1, the reduction was not statistically significant. This could be attributed to the fact that the N1 cataracts are already soft and require a low ultrasound for emulsification. Therefore, additional segmentation and femtosecond laser softening did not add a significant reduction of EPT. Consequently, the EPT in conventional phacoemulsification and EPT groups were comparable in soft cataracts.

We found that softening effect is more profound in the medium-density cataract of N3+, making the EPT significantly less than the traditional phacoemulsification group.

On the other end of the spectrum of nuclear density of N5+, we found EPT reduction in this subgroup was insignificant. We found that the dense brunescent lens opacity of N5+ impeded femtosecond-laser energy to reach the deeper layer of the nucleus.

Hence, we found laser patterns of softening seen in superficial layers of the nucleus only. Moreover, we did not have a complete segmentation in any eye despite increasing the rate of segmentation repetition up to 6 times. This can be credited to two factors. The first is that laser energy failed to reach the posterior layers of the nucleus for efficient cracking. The second factor is that Catalyst laser precision platform cannot extend the laser farther than 500 mm off the determined posterior capsule, leaving a dense epinuclear posterior sheet not touched by the laser. Hence, a mechanical chopping-like chop technique was utilized in this subgroup of brunescent cataracts with comparable ultrasound energy between FLACS and conventional groups. Probably, a significant reduction of effective phacoemulsification time in favor of FLACS would have been expected if the divide and conquer technique was applied.

Good to mention that FLACS has some limitations including high cost of procedure besides that it needs a cooperative patient. However, it is still beneficial to both the patient and surgeon for a better postoperative outcome.

Our recommendations are as follows; firstly, FLACS is of choice, whatever the nuclear density is, if premium intraocular lenses are to be implanted to achieve better centration in the capsular bag. Secondly, if ultrasound reduction is the main goal as in cases of low corneal endothelial cell count, FLACS will be superior to conventional phacoemulsification in case of medium nuclear density cataracts only, as long as the quick chop technique will be implemented.

## Conclusion

We concluded that FLACS is not superior to quick chop phacoemulsification in reducing EPT except for medium nuclear cataracts. However, FLACS has advantages like better centration and sizing of capsulotomy, nailing a low amount of corneal astigmatism by precise astigmatic keratotomy.

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