



Steve Schallhorn

Faster visual recovery and better visual outcomes with femtosecond laser technique

Dermot McGrath
in Barcelona

CREATING LASIK flaps with the femtosecond laser resulted in faster visual recovery and better uncorrected visual acuity in a retrospective study of over 65,000 eyes, according to Steve Schallhorn MD.

“The patients whose flaps had been created by femtosecond laser had faster visual recovery, less chance of a loss of best-spectacle corrected vision and lower intraoperative and postoperative complications,” he told delegates attending the XXVII Congress of the ESCRS.

Dr Schallhorn’s multicentre study analysed 65,759 consecutively treated eyes for low to moderate myopia and astigmatism by 24 different surgeons. 41,762 eyes of 22,165 patients had their LASIK flaps created with the IntraLase FS60 femtosecond laser (AMO Inc.) and 23,997 eyes of 12,312 patients had flaps created with a Moria One Use-Plus mechanical microkeratome, with all eyes receiving wavefront-guided LASIK treatments performed with a Visx Star S-4 Advance CustomVue excimer laser (AMO).

The patients were differentiated according to which procedure they had requested and both groups were closely matched for age, gender, refraction and spherical equivalent.

The refractive accuracy was very similar for both groups, said Dr Schallhorn. At all time points measured – one day, one week, one month and three months – the percentage of eyes that achieved a postoperative uncorrected visual acuity (UCVA) of 20/20 or better was significantly higher in the femtosecond laser group than in the mechanical keratome group.

A higher percentage of eyes in the femtosecond laser group also achieved a postoperative UCVA of 20/16. A lower percentage of eyes in the femtosecond laser group also lost two or more lines of best-corrected visual acuity (BCVA) at the one week and one month postoperative time point.

In terms of refractive predictability, the results for both patient groups were very similar, said Dr Schallhorn. After one week, 94 per cent of femtosecond patients and 93 per cent of mechanical keratome patients were within 0.5 D of target refraction. At one month and three months’ postoperatively, the figure was 92 per cent and 91 per cent respectively for both groups.

Looking at the data in more detail, Dr Schallhorn noted that at one week, the patients with femtosecond-generated flaps had better uncorrected visual acuity compared to the mechanical keratome group.

He said that this was particularly evident at the 20/20 threshold of vision or better, with 59 per cent of patients achieving 20/16 in the mechanical

keratome group compared to 65 per cent for the femtosecond group, and 84 per cent attaining 20/20 for the mechanical keratome compared to 88 per cent for the femtosecond laser. The mean spherical equivalent was 0.06 for the mechanical group and 0.04 for the laser group.

This trend for better UCVA outcomes for the femtosecond laser group was sustained to the one month mark, but at three months the only statistically significant difference was at the 20/16 vision level, said Dr Schallhorn.

Surmising as to why the patients with the femtosecond-generated flap might have better postoperative vision than those treated with the traditional microkeratome, Dr Schallhorn said there might be a number of factors responsible.

“In the early postoperative time period, the flap created by femtosecond laser is very uniform and smooth. So when this flap is laid down, there is less chance of developing microstriae because the femtosecond flap is planar and beds down very precisely. That difference is visible to the surgeon if it becomes necessary to perform an enhancement at a later stage, because we are used to seeing microstriae with the keratome flaps and underneath the epithelium. I think that is part of the healing process that makes a difference in terms of postoperative quality of vision and that is why you see a slower visual recovery, in general, with the mechanical keratome,” he said.

The slight downside of the smooth flap adhesion, however, is the difficulty of re-lifting such flaps for enhancement procedures one or two years after the initial treatment, said Dr Schallhorn.

“It is difficult to lift a femtosecond-created flap two years out. That is why if that flap has been there for more than a year, I tend to do a PRK procedure on top,” he said

He noted that in terms of safety 1.0 per cent of eyes lost more than two lines of best-corrected vision in the femtosecond laser group compared to 1.5 per cent with the mechanical blade after one week. The statistical difference was maintained at all time-points said Dr Schallhorn (0.2 per cent for the laser group and 0.3 per cent for mechanical at one month, and 0.1 per cent for femtosecond and 0.2 per cent for mechanical keratome after three months).

The femtosecond laser group also scored better than the mechanical keratome group in terms of intraoperative complications relating to flap creation, said Dr Schallhorn.

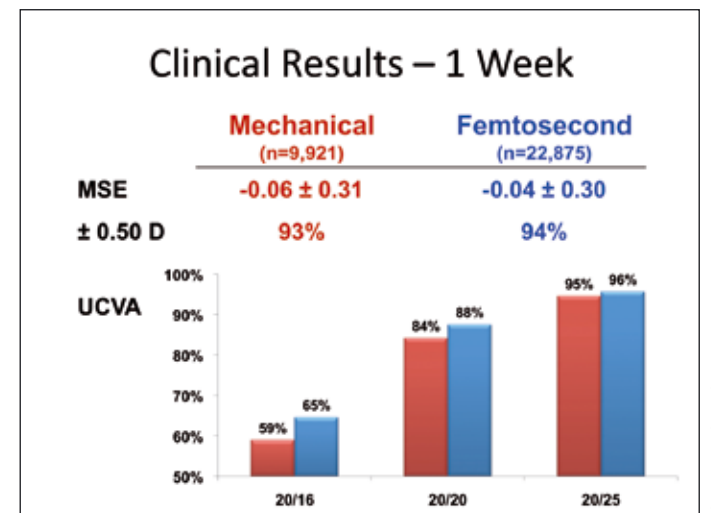
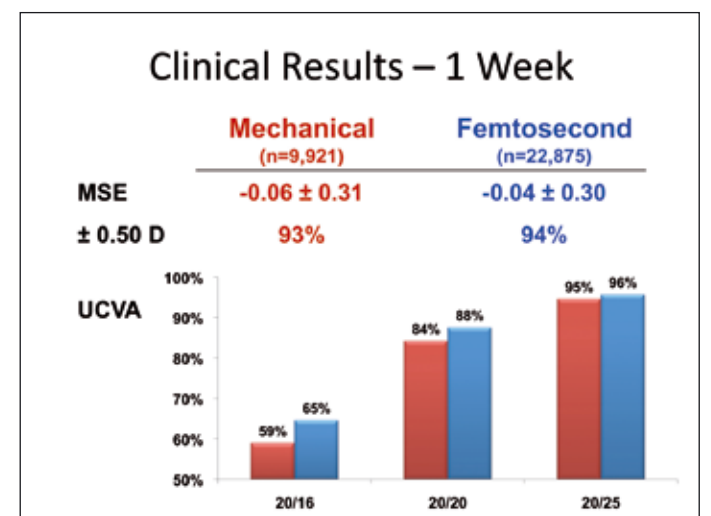
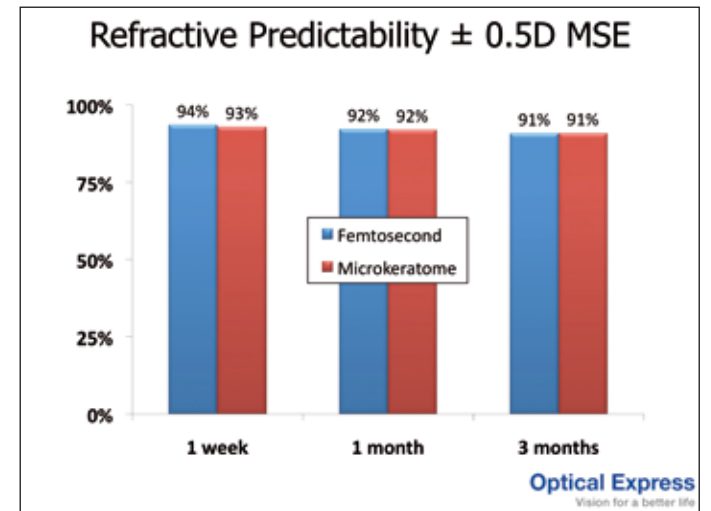
“The data favoured the femtosecond group by a factor of three to one. There were eight flap creation issues with the microkeratome group (0.03 per cent) in 3001 cases and seven with the femtosecond laser (0.01 per cent) in 8,184 cases. For all but one of the femtosecond procedures

the surgeon was able to complete the procedure on the same day, whereas all the microkeratome complications meant that the patients had to delay their surgery because of issues such as buttonhole, incomplete flap and loss of suction during the microkeratome pass,” he said.

In terms of postoperative complications, eight eyes in the mechanical keratome group had a flap displacement out of 2,205 cases (0.05 per cent), all of which occurred within the first two weeks postoperatively. There were two flap displacements with the femtosecond laser group out of 22,267 cases (0.004 per cent). There were four incidences of epithelial ingrowth out of 4,410 cases in the mechanical keratome group and five out of 8,907 cases (0.01 per cent) in the femtosecond laser group.

Summing up, Dr Schallhorn said that both the femtosecond laser and the mechanical microkeratome were safe and efficient for flap creation in LASIK procedures, but that the laser retained an edge in performance.

“I think the take-home message is that both procedures are safe, as the complication rate and loss of lines of BCVA for both groups of patients exceeds all the regulatory requirements for safety. However, the safest procedure for creating LASIK flaps is the femtosecond laser and because of the better UCVA, we



would expect a lower enhancement rate and ultimately happier patients,” he said.

Dr Schallhorn is a consultant to AMO and chief medical director for Optical Express.

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