Femtosecond laser flap creation may enhance visual outcome and shorten recovery time of wavefront-guided LASIK

Cheryl Guttman
in Washington, DC

REFRACTIVE surgery performed with the femtosecond laser (IntraLase) appears to offer an advantage over the mechanical microkeratome of faster recovery time, suggests a preliminary analysis from a study comparing outcomes of wavefront-guided LASIK performed using different approaches to flap creation.

The prospective, randomised, parallel group-controlled trial is being conducted at the Naval Medical Centre, San Diego, California. It was reported by David J Tanzer MD, surgical director, refractive surgery centre, who received the “Best Paper of Session” award for his presentation at the annual ASCRS Symposium on Cataract, IOI, and Refractive Surgery.

The study enrolled 300 subjects who underwent wavefront-guided LASIK performed with the Star S4 CustomVue platform (version 3.07, VIX) and either the femtosecond laser (IntraLase), the Amadeus microkeratome (AMO), or Hansatome (Bausch & Lomb) microkeratome.

Staged treatment may yield benefits with femtosecond laser

In the standard treatment portion of the study, the eyes in each of the microkeratome groups were well matched with respect to mean age (32 to 34 years old), mean sphere (-2.54 to -2.89 D), mean cylinder (-0.61 to -0.72 D), and mean MSE (-2.87 to -2.20 D).

Intended thickness for the IntraLase flaps was 100 microns. The Amadeus procedures were performed with the 140 micron plate, and with a few exceptions, the Hansatome flaps were created using the 160 micron plate.

UCVA better in femtosecond group

Patients treated with the femtosecond laser had more symptoms on the first postoperative day relative to the mechanical microkeratome groups. However, the femtosecond laser was also associated with significantly better UCVA outcomes at that visit with 68% of eyes seeing 20/16 or better compared with 49% of Amadeus eyes and 42% of eyes in the Hansatome group.

A significant difference favouring the femtosecond laser over both of the mechanical microkeratomes was maintained in the UCVA at one week and one month. By three months, however, UCVA outcomes were not significantly different between any groups.

The mean manifest refraction results at one week, one month and three months consistently favoured the IntraLase relative to both mechanical microkeratomes, although in predictability analyses of proportions of eyes corrected to within 0.50 D of intended, a significant difference was seen only at one week when comparing the IntraLase (93%) versus the Amadeus (81%).

The best-corrected acuity results at three months showed no losses of more than one line in any group, although 45% of IntraLase eyes compared with only 33% of eyes in either mechanical microkeratome group experienced a gain of one line.

Contrast acuity testing was performed under both photopic and mesopic conditions. Compared with their preoperative status, eyes in both the IntraLase and Hansatome groups experienced a slight gain (0.04 and 0.01 logMAR units, respectively). These outcomes were significantly different compared with the Amadeus group that manifested a slight loss (0.03 logMAR units). Similar results were achieved in photopic contrast acuity testing.

Aberrations not induced with femtosecond and increased with mechanical microkeratomes

For the staged procedures, comparisons of wavefront data obtained in eyes with 6.0 mm pupils prior to flap creation and one month later showed mean increases in total higher order aberration RMS in the Amadeus (+0.03 microns) and Hansatome (+0.03 microns) groups and no induction of aberrations in the IntraLase eyes (0.00 microns). Paired comparisons showed no significant differences comparing the femtosecond laser group with both mechanical microkeratomes and also between the two mechanical microkeratome groups.

Comparisons of the staged and standard procedure groups showed that only statistically significant difference was in photopic contrast acuity that favoured the staged procedure, but only in the Amadeus group. Comparisons of mean manifest refraction at three months showed all differences between the staged and standard procedures were within 0.50 D, although the standard deviations were consistently tighter in the staged microkeratome groups.

In designing this study, we hypothesised that a staged approach taking into account the aberrations induced by creation of the flap might result in better outcomes. Based on the results so far, that technique doesn’t appear to make any difference,” Dr Tanzer said.

djtanzer@nmccl.med.navy.mil

“In designing this study, we hypothesised that a staged approach taking into account the aberrations induced by creation of the flap might result in better outcomes. Based on the results so far, that technique doesn’t appear to make any difference,” Dr Tanzer said.

djtanzer@nmccl.med.navy.mil