Flap Thickness Using the Moria One Use-Plus and Moria M2 Microkeratomes

To the Editor:

In the June 2010 issue of the Journal of Refractive Surgery, Chen et al\textsuperscript{1} analyzed the accuracy and consistency of corneal flap thickness created using the Moria One Use-Plus microkeratome compared with the Moria M2 Single Use 90-µm microkeratome (Moria, Antony, France). The authors used anterior segment optical coherence tomography (AS-OCT; Visante, Carl Zeiss Meditec, Jena, Germany) to measure flap thickness at five locations on the first postoperative day. The authors found that central flap thickness was dramatically thinner in the One Use-Plus group (114.7±10.1 µm and 109.4±11.0 µm for right and left eyes, respectively) than in the M2 group (155.6±14.8 µm and 151.6±2.5 µm for right and left eyes, respectively). The authors should be commended on this well designed and important study.

We conducted a similar comparison on 632 consecutive eyes operated with the M2 microkeratome and 415 consecutive eyes operated with the One Use-Plus microkeratome. Both groups were operated between January 2010 and August 2010 at Care-Vision Center, Tel Aviv, Israel, by the same four surgeons (each surgeon used both devices equally). In all cases, flap thickness was measured introperatively by ultrasound pachymetry using the subtraction method. In contrast to Chen et al, we did not find a significant difference in central flap thickness between the microkeratomes (113±15 vs 111±22 µm in the Single Use-Plus and M2 groups, respectively [P=.1, t test]). Similar results were reported by Huhtala et al\textsuperscript{2} who found the mean flap thickness in 300 eyes operated with the M2 microkeratome to be 115.4±12.5 µm and by Aslanides et al\textsuperscript{3} who found a mean flap thickness of 109±18 µm (range: 67 to 152 µm) and 103±15 µm (range: 65 to 151 µm) for right and left eyes, respectively. Thus, we cannot determine why the flap thickness in the study by Chen et al\textsuperscript{1} was dramatically thicker with the M2 microkeratome (a mean thickness that is more suitable to the Moria M2 Single Use 130 head).

However, we noticed a significantly tighter distribution of flap thicknesses in the One Use-Plus group (Fig). This resulted in a significantly lower standard deviation in this group (15 vs 22 µm [P<.001, F test]). Similarly, the range of flap thicknesses in the One Use-Plus group was tighter (73 to 152 µm) than in the M2 group (52 to 174 µm).

Regarding complications, Chen et al reported no intraoperative flap complications using either microkeratome and a similar proportion of postoperative microstriae (6% and 4% in the One Use-Plus and M2 groups, respectively) and interface particles (4% in both groups). In our experience, we noted a slightly increased rate of buttonholes in the M2 group (0.24%, n=1 vs 0.47%, n=3; P=.9) and one incomplete flap and one free flap in the One Use-Plus group. We also noted a similar proportion of postoperative microstriae (2.7% vs 2.1%, respectively) and diffuse lamellar keratitis (1.2% vs 2.4%, respectively) in the One Use-Plus and M2 groups.

Overall, we agree with Chen et al that the Moria One Use-Plus is a safe and effective mechanical microkeratome, which has better predictability and accuracy than the Moria M2.

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Reply:

The question raised by Kaiserman and colleagues is related to differences in accuracy of central flap thicknesses obtained with the M2 Single Use 90-µm mechanical microkeratome (Moria SA, Antony, France) in LASIK surgery.

In our study, mean central flap thickness obtained with the M2 microkeratome was 155.6±14.8 µm and 151.6±12.5 µm in right and left eyes, respectively. In Kaiserman et al’s study, mean central flap thickness obtained with the M2 microkeratome was approximately 111 µm, similar to thicknesses reported by Huhtala et al.1

Kaiserman et al’s experience compared to our study presents some aspects that may explain the substantial differences in central flap thickness obtained with the M2 Single Use 90-µm microkeratome. In our study,1 we assessed central flap thickness using anterior segment optical coherence tomography (AS-OCT; Visante, Carl Zeiss Meditec, Jena, Germany) at postoperative day 1, whereas Kaiserman et al used intraoperative ultrasound pachymetry (subtraction method).

Technique as well as method of measurement has an impact on central flap assessment. In a study by Chen et al,4 it was demonstrated that central flap thickness progressively increased in the early postoperative period when using AS-OCT technology: 145.78±21.10 µm at 1 day postoperative to 159.34±17.82 µm at 3 months postoperative.

Patients in our study presented with mean keratometry readings of 43.43±1.31 diopters (D) and 43.36±1.15 D in right and left eyes, respectively. This information, however, was not provided by Kaiserman et al. Patients in our study presented with mean preoperative central corneal thicknesses of 559.30±22.15 µm and 555.85±22.48 µm in right and left eyes, respectively. This information was not provided by Kaiserman et al. These potential differences in anatomic preoperative data (preoperative keratometry and central corneal thickness) can influence the flap thickness.

Regarding surgical technique, Moria consoles offer the option of advance speed selection when using the M2 Single Use 90-µm as well as the One Use-Plus SBK microkeratomes: speed 1 is the slow speed and speed 2 is the fast speed. It has been established that the slower the speed, the thicker the flap. None of the studies report the speed, rings selected, or vacuum time during LASIK flap creation. These factors also could explain the differences among the studies.

We acknowledge the difference in flap thickness between the Moria One Use-Plus and M2 Single Use 90-µm microkeratomes, with the One Use-Plus providing thinner and more even flaps than the M2.

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