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Corneal architecture of femtosecond laser and microkeratome flaps imaged by anterior segment optical coherence tomography

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Purpose

To assess and compare the morphology of laser in situ keratomileusis flaps (LASIK) created by a 60 kHz femtosecond laser and a mechanical microkeratome.

Setting

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Methods

Anterior segment optical coherence tomography (AS-OCT) (Visante) was used to assess 1 week postoperatively the morphology of 20 LASIK flaps created with the IntraLase femtosecond laser or the Zyoptix XP microkeratome. The flap diameter and flap thickness were assessed at 20 measuring points across each flap. First, the repeatability of the AS-OCT flap measurement was evaluated. On this basis, the dimensions of femtosecond laser flaps and microkeratome flaps were tested and their regularity, reproducibility, and accuracy compared.

Results

The method was approved with a repeatability of maximum 8.9 μm . The femtosecond laser flaps were more regular than the microkeratome flaps ($P = .02$). The reproducibility of flap morphology was not different in the central 1.0 mm radius area ($P = .26$); however, the femtosecond laser was significantly more precise than the microkeratome in the peripheral area ($P = .001$). The mean thickness of the femtosecond laser flap was significantly more accurate than the mean thickness of the microkeratome flap ($P = .01$), with a mean deviation of +16.9 μm and 40.8 μm , respectively.

Conclusions

The flap architecture created with the femtosecond laser was more regular and accurate than the flap architecture created with the microkeratome.

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