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Titel des Beitrags: Precision, morphology, and histology of corneal flap cuts using a 200-kHz femtosecond laser.

Abstract: Laser-assisted in situ keratomileusis (LASIK) requires precise corneal flap cutting. Especially the creation of thin flaps has recently gained importance for thin-flap LASIK. Currently, there is a trend towards faster femtosecond lasers that can produce flaps in a short period of time. We analyzed flaps created with a 200-kHz femtosecond laser concerning their cut precision, morphology, and histology. Femtosecond laser flap cutting was performed on 36 porcine cadaver eyes using the prototype 200-kHz femtosecond laser UltraFlap (WaveLight GmbH, Erlangen, Germany). The eyes were assigned to 3 thickness groups, with a cut depth of 100 µm, 130 µm, or 180 µm, respectively. Additionally, flap diameters were varied, ranging from 8.0 mm to 9.5 mm. Flap thicknesses were determined with a micrometer gauge. Flap diameters were measured with a sliding caliper. Furthermore, flaps were created for histologic examination. There were no complications during flap creation. The mean flap thickness and standard deviation was (in micrometers) 96.33 ± 7.45 (intended thickness: 100), 134.67 ± 4.96 (intended thickness: 130), and 174.59 ± 9.35 (intended thickness: 180), respectively. The flap diameter revealed a mean (in mm) of 8.03 ± 0.15 (intended diameter: 8.0), 8.56 ± 0.10 (intended diameter: 8.5), 9.09 ± 0.10 (intended diameter: 9.0), and 9.54 ± 0.15 (intended diameter: 9.5), respectively. Histologic examination showed very little to
almost no changes in the structure of the corneal stroma. Flap creation could be performed easily without any complications. The morphology and accuracy of the cuts were very reliable and precise. Histology showed a smooth cut.