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International Society For Cataract And Refractive Surgery

Clinical Ablation Control by online Topometry during LASIK

Purpose:

Online monitoring of the ablation process is vital to guarantee the quality of refractive procedures. A device which is feasible to assess stromal topographies during refractive surgery was built. First clinical trials were performed.

Methods:

An ultraviolet fringe pattern is projected onto the stromal tissue during the treatment. This excites a fluorescence pattern of the outer stromal layer which is observed under a tilted angle with a digital CCD camera. Topologic information is contained in the distorted pattern according to the principle of triangulation.

Results:

High contrast fringes of 50 microns width were observed clinically under the flap for the first time. Topographies with sufficient lateral and height resolution to evaluate this clinical data were calculated. The actual amount of ablated tissue was visualized with an accuracy in the order of one micron.

Conclusion:

Exact topographies of stromal tissues were obtained clinically using excimer laser based UV fringe projection. The new method provides an online control of refractive corneal laser surgeries. It serves as a quality control for individual corrections of any corneal shape. Treatments of higher order aberrations as currently proposed by leading researchers will become feasible using this online control method.