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Confocal laser scanning microscopy and optical coherence tomography for the evaluation of the kinetics and quantification of wound healing after fractional laser therapy.

Sattler EC, Poloczek K, Kästle R, Welzel J.; *J Am Acad Dermatol.* 2013 Oct;69(4):e165-73. doi: 10.1016/j.jaad.2013.04.052.

ABSTRACT

BACKGROUND: Information on the course of wound healing after fractional carbon-dioxide laser therapy has so far been gathered by histopathology. Confocal laser scanning microscopy (CLSM) and optical coherence tomography (OCT) allow the visualization of the upper layers of the skin in vivo over time. **OBJECTIVE:** The aim of this study was to determine whether CLSM and OCT can be used to quantify the kinetics of the dynamic wound-healing process. **METHODS:** Twenty healthy probands were treated with fractional carbon-dioxide laser with 8- and 16-W laser power, respectively. Optical follow-ups using CLSM and OCT were performed right after laser application and during the next 3 weeks. **RESULTS:** Although wound healing seems to be completed after day 7 to 14 clinically, on day 21 in 89.5% of the 8 W-treated areas and in 100% of the 16 W-treated areas subepidermal skin damage was still visible using CLSM and OCT imaging. **LIMITATIONS:** The maximal penetration depth of CLSM is limited to the papillary dermis, whereas OCT can visualize deeper but with lower resolution. **CONCLUSION:** In vivo CLSM and OCT are able to visualize changes after fractional laser treatment noninvasively. They allow especially the detection and quantification of substance defects and thereby help to elucidate the therapeutic effects.