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Laser skin rejuvenation: epidermal changes and collagen remodeling evaluated by in vivo confocal microscopy.

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ABSTRACT

Fractionated carbon dioxide (CO₂) laser resurfacing is an effective treatment of skin aging. Several studies investigated the morphologic changes due to this laser treatment by using skin biopsies or animal model. Recently, reflectance confocal microscopy (RCM) has emerged as a new tool that can "optically" scan the skin in vivo with a nearly histologic resolution and in a totally noninvasive modality. Our study aims to analyze the skin changes following the ablative fractional CO₂ laser sessions by using RCM. Ten patients were subjected to ablative fractional CO₂ laser sessions for skin aging. Confocal microscopic images were acquired at baseline (w0), 3 weeks (w3), 6 weeks (w6), and 12 weeks (w12) after laser session. Previously identified confocal parameters were used to assess the skin aging at baseline and after treatment. At w3, the epidermis showed a complete disappearance of the mottled pigmentation upon RCM along with the presence of few Langerhans' cells. The collagen type as seen upon RCM observed at baseline was replaced by a newly formed collagen type of long, bright and straight fibers (collagen remodeling). These fibers were parallel arranged and observed throughout the entire RCM mosaic. At w6 and w12 the confocal aspects of the skin was unchanged compared to w3. RCM confirmed the presence of an intense collagen remodeling following laser resurfacing. In line with previous studies, this collagen showed a peculiar arrangement and distribution. The collagen remodeling was still present after 3 months and confirms the long-term effect of the treatment. This is the first time that the skin can be analyzed in vivo at patient's bedside. In the near future, RCM can be an essential adjunct for Clinicians to measure the effects of laser treatment and possibly to gain new insights into the development of side effects.