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Reflectance confocal microscopy for the evaluation of acute epidermal wound healing.

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ABSTRACT

The dynamic process of wound healing is routinely evaluated by clinical or histological evaluation. Recently, a number of non-invasive imaging techniques have been evaluated for their clinical applicability in dermatology. Among them, reflectance confocal microscopy (RCM) represents a non-invasive imaging technique that allows the in vivo characterization of the skin at near-histological resolution. The aim of this study was to monitor epidermal wound repair using RCM in a model of tissue damage induced by cryosurgery. For this purpose, contact cryosurgery was performed at -32°C for 10 seconds on the volar forearm of five healthy volunteers. Clinical and RCM evaluations were performed at nine consecutive time points. RCM allowed the visualization of edema formation and blood vessel dilatation immediately after cryosurgery, as well as morphologic features of wound repair, including the formation of finger-like protusions of keratinocytes into the wound bed, the appearance of hairpin-like vessels, and inflammatory cells. This pilot study illustrates that RCM represents a promising technique for quasi-real-time monitoring the kinetics of wound repair non-invasively and over time, thus offering new insights into in vivo processes of cutaneous wound repair and angiogenesis, as well as potential effects of topically applied drugs on the process of tissue repair.