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Combined reflectance confocal microscopy/optical coherence tomography imaging for skin burn assessment.

Iftimia N, Ferguson RD, Mujat M, Patel AH, Zhang EZ, Fox W, Rajadhyaksha M.; Biomed Opt Express. 2013 Apr 8;4(5):680-95. doi: 10.1364/BOE.4.000680.

ABSTRACT

A combined high-resolution reflectance confocal microscopy (RCM)/optical coherence tomography (OCT) instrument for assessing skin burn gravity has been built and tested. This instrument allows for visualizing skin intracellular details with submicron resolution in the RCM mode and morphological and birefringence modifications to depths on the order of 1.2 mm in the OCT mode. Preliminary testing of the dual modality imaging approach has been performed on the skin of volunteers with some burn scars and on normal and thermally-injured Epiderm FTTM skin constructs. The initial results show that these two optical technologies have complementary capabilities that can offer the clinician a set of clinically comprehensive parameters: OCT helps to visualize deeper burn injuries and possibly quantify collagen destruction by measuring skin birefringence, while RCM provides submicron details of the integrity of the epidermal layer and identifies the presence of the superficial blood flow in the upper dermis. Therefore, the combination of these two technologies within the same instrument may provide a more comprehensive set of parameters that may help clinicians to more objectively and noninvasively assess burn injury gravity by determining tissue structural integrity and viability.