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Application of reflectance confocal microscopy to evaluate skin damage after irradiation with an yttrium-scandium-gallium-garnet (YSGG) laser.

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ABSTRACT

The objective of this study was to observe the characteristics of the skin after irradiation with a 2790-nm yttrium-scandium-gallium-garnet (YSGG) laser using reflectance confocal microscopy (RCM). A 2790-nm YSGG laser was used to irradiate fresh foreskin (four doses, at spot density 3) in vitro. The characteristics of microscopic ablative columns (MAC), thermal coagulation zone (TCZ), and microscopic treatment zones (MTZ) were observed immediately after irradiation using digital microscope and RCM. The characteristics of MAC, TCZ, and MTZ with variations in pulse energy were comparatively analyzed. After irradiation, MAC, TCZ, and MTZ characteristics and undamaged skin between MTZs can be observed by RCM. The depth and width of MTZ obviously increased with the increase in pulse energy. At 80, 120, and 160 mJ/microbeam (MB), the MTZ actual area and proportion were about two times that of the theoretical value and three times at 200 mJ/MB. With increases in depth, the single MAC gradually decreased in a fingertip-shaped model, with TCZ slowly increasing, and MTZ slightly decreasing in a columnar shape. RCM was able to determine the characteristics of thermal injury on the skin after the 2790-nm YSGG laser irradiation with different pulse energies. Pulse energy higher than 200 mJ/MB may have much larger thermal injury and side effect. RCM could be used in the clinic in future. **KEYWORDS:** Micro ablative columns; Microscopic treatment zones; Reflectance confocal microscopy; Thermal coagulation zone; Yttrium-scandium-gallium-garnet laser PMID:27858258 DOI:10.1007/s10103-016-2106-5