

255

**NON-ABLATIVE FRACTIONAL
PHOTOTHERMOLYSIS WITH NEAR
INFRARED LAMP**

**Hans J. Laubach,¹ James Childs,² Gregory
Altshuler,² Andrei Erofeev,² Ilya Yaroslavsky,²
and Dieter Manstein¹**

¹*Wellman Center for Photomedicine, Harvard Medical School,
Boston, MA*

²*Palomar Medical Inc, Burlington, MA*

Background and Objective: Using a newly developed near infrared lamp device (LuxIR prototype, Palomar Medical, Burlington, MA) that provides a spatially non-uniform light distribution, we investigated the possibility of simultaneously generating multiple, spatially-confined thermal lesions without epidermal damage.

Materials and Methods: Post mortem procured human skin samples were exposed to the LuxIR prototype. This device employs a near infrared halogen lamp (adjusted emission spectrum 850–2300 μm) with skin surface cooling and a patterned optical window. The window includes a dielectric mirror mask with an array of 21 apertures, allowing for a patterned irradiation profile. Various exposure parameters were tested in combination with different cooling periods. Thermal damage was assessed by NBTC staining.

Results: We demonstrated individual, separated thermal lesions with complete loss of NBTC staining with epidermal sparing. The lesions were elliptically shaped with a the maximum diameter axis parallel to the skin surface measuring approximately 2 mm and a center depth of 1.5 mm. The preferred range of fluences to create such lesions was approximately between 60 and 100 J/cm^2 , 2–4 seconds exposure time in combination with pre-, parallel and post cooling. Longer exposure times resulted in confluent thermal damage.

Conclusions: A broadband near infrared lamp, in combination with a patterned irradiation profile and surface cooling is capable of providing non-ablative fractional photothermolysis.