

Dermal/hypodermal junction as a new target for deep fractional thermal treatment
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Background and Objectives: Fractional hyperthermia of deep dermal layers has been recently introduced as a tool of light-based dermatology. Up to now, however, the depth and intensity of the hyperthermia zones were limited by both the instrumental abilities of the devices and by safety concerns. Combination of fractional light delivery with recent advances in optical technology allows overcoming both limitations and creating controlled islets of elevated temperature at the dermal/hypodermal junction and subcutaneous tissue. We have conducted a detailed in vitro investigation of this treatment regime and started initial clinical tests. **Study Design/Materials and Methods:** A broadband infrared light source (modified LuxIR fractional handpiece, Palomar) with fractionated delivery and extra contact surface cooling capacity down to 2°C, was employed to prevent epidermal damage and shift the lattice of high temperature islets into deeper layers of tissue. **Results:** Feasibility of creating a pattern of well-defined islets of elevated temperature and resulting thermal damage into reticular dermis and hypodermis has been confirmed in in vitro (pig skin) experiments. Islets of thermal damage at depths up to 5 mm were produced. Clinically, the treatments were tolerated well with observations of skin tightening. **Conclusions:** Results suggest that a pattern of hyperthermal islets can be created in the reticular dermis and hypodermis using a fractionated filtered IR source with extra contact cooling capabilities.