Evaluation of a Fractional Laser With Optical Compression Pins

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Background and Objective: Non-ablative fractional lasers have been used in skin rejuvenation procedures with some success. In general, the optimum area coverage and depths of the fractional thermal injury zones depend on the specific indications of interest. For all fractional devices, depth is adjusted with energy that also determines the coagulation area at the dermal/epidermal junction. Microbeams (mB) of a 1,540 nm laser are co-aligned with optical pins in a device designed to provide skin compression during treatment to remodel the deeper reticular dermis and hypodermis while minimizing epidermal damage. The device is characterized in ex vivo and clinical studies.

Materials and Methods: Ex vivo porcine skin was treated with a compression-pins optic connected to an Er:Glasslaser hand piece. Nitroblue tetrazolium chloride (NBTC) cell viability staining of horizontal radial and vertical sections of post-treatment skin was used to assess coagulation profiles. A pilot clinical study was also performed to evaluate the effects of compression on epidermal injury.

Results: The compression-pins optic provided deeper coagulation to 1.5 mm depths and less epidermal injury than without compression. Coagulation depth was increased further with stacked pulses.
Conclusion: The ability to de-couple depth of treatment from area coverage provides greater flexibility of treatments. The results promise greater possibilities to vary dermal injury patters which may offer increased benefit in treating a variety of cutaneous conditions.
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Key words: fractional non-ablative; pin-point compression; optical clearing; dermis remodeling; dermis/hypodermis; coagulation; epidermal preservation