

Preclinical Report

Micro-fractional ablative skin resurfacing with two novel erbium laser systems

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ABSTRACT

Background and Objectives

Fractional ablation offers the potential benefits of full-surface ablative skin resurfacing while minimizing adverse effects. The purpose of this study was to evaluate the safety, damage profile, and efficacy of erbium fractional lasers.

Materials and Methods

Histology from animal and human skin as well as clinical evaluations were conducted with erbium YAG (2,940 nm) and erbium YSGG (2,790 nm) fractional lasers varying pulse width, microbeam (μb) energy, number of passes, and stacking of pulses.

Results

Single-pulse treatment parameters from 1 to 12 mJ per 50-70 μm diameter microbeam and 0.25-5 milliseconds pulse widths produced microcolumns of ablation with border coagulation of up to 100 μm width and 450 μm depth. Stacking of pulses generated deeper microcolumns. Clinical observations and in vivo histology demonstrate rapid re-epithelization and limited adverse side effects. Facial treatments were performed in the periorbital and perioral areas using 1-8 passes of single and stacked pulses. Treatments were well-tolerated and subjects could resume their normal routine in 4 days. A statistically significant reduction in wrinkle scores at 3 months was observed for both periorbital and perioral wrinkles using blinded grading. For periorbital treatments of four passes or more, over 90% had ≥ 1 score wrinkle reduction (0-9 scale) and 42% had ≥ 2 . For perioral wrinkles, over 50% had substantial improvements (≥ 2).

Conclusion

The clinical observations and histology findings demonstrate that micro-fractional ablative treatment with 2,790 and 2,940 nm erbium lasers resulted in safe and effective wrinkle reduction with minimal patient downtime. The depth and width of the ablated microcolumns and varying extent of surrounding coagulation can be controlled and used to design new treatment procedures targeted for specific indications and areas such as moderate to severe rhytides and photodamaged skin. *Lasers Surg. Med.* 40:113-123, 2008. © 2008 Wiley-Liss, Inc.