
DERMATOLOGIC SURGERY

Side Effects and Complications of Fractional Laser Photothermolysis: Experience with 961 Treatments

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BACKGROUND A novel 1,550-nm erbium-doped laser (Fraxel, Reliant Technologies Inc.) has been shown to be effective in the treatment of photodamaged skin and scars with minimal postoperative recovery; however, studies evaluating its side effects and complication rates have been limited.

PURPOSE The purpose was to determine the frequency and range of side effects and complications associated with fractional photothermolysis treatment.

METHODS A retrospective evaluation of 961 successive 1,550-nm erbium-doped laser treatments in patients of various skin phototypes (I–V) was conducted in a single center. Side effects and complications of treatment, including time of onset and duration, were identified and tabulated. Patient demographics and laser parameters were also assessed.

RESULTS Seventy-three treatments (7.6%) resulted in development of complications. The most frequent complications were acneiform eruptions (1.87%) and herpes simplex virus outbreaks (1.77%). Side effects and complications were equally distributed across different ages, skin types, body locations, laser parameters, and underlying skin conditions, except for postinflammatory hyperpigmentation, which occurred with increased frequency in patients with darker skin phototypes.

CONCLUSIONS Fractional laser skin treatment is associated with a relatively low complication rate. Side effects and complications observed in this study were temporary and did not result in long-term or significantly severe sequelae (e.g., scarring).

Emmy M. Graber, MD, Elizabeth L. Tanzi, MD, and Tina S. Alster, MD, have indicated no significant interest with commercial supporters.

Ablative laser skin resurfacing with carbon dioxide (CO₂) or erbium:yttrium-aluminum-garnet (Er:YAG) lasers have been well accepted treatments for facial rejuvenation. The complete epidermal ablation resulting from treatment with these laser systems results in loss of barrier function and extended postoperative recoveries, provoking interest in less invasive skin rejuvenation methods. Nonablative laser systems that combine epidermal cooling with delivery of infrared wavelengths that create controlled thermal injury in the dermis with subsequent neocollagenesis provide a good alternative for patients who desire modest improvement of photodamaged skin without significant post-treatment sequelae. Owing to a need for more pronounced clinical improvement than these nonablative laser systems can provide, but with a

goal of limiting postoperative recovery, fractional photothermolysis was developed.

Fractional photothermolysis involves the use of a 1,550-nm erbium-doped fiber laser to create microscopic noncontiguous columns of thermal injury in the dermis (referred to as microthermal zones or MTZ) surrounded by areas of viable tissue. Multiple beams of infrared light are emitted at a density of 125 or 250 MTZ/cm². Each column produces localized epidermal necrosis and collagen denaturation. The stratum corneum remains intact during this process, thereby maintaining epidermal barrier function. Because each MTZ is surrounded by unaffected tissue, there is rapid healing from the viable epidermal and dermal cells. The depth of penetration of each MTZ is energy-dependent and can be

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