

Clinical and histologic evaluation of six Erbium:YAG lasers for cutaneous resurfacing

Tina S. Alster, MD *

Washington Institute of Dermatologic Laser Surgery, Washington, DC 20037

*Correspondence to Tina S. Alster, 2311 M Street, N.W. Suite 200, Washington, DC 20037

Lasers in Surgery and Medicine
Volume 24, Issue 2 , Pages 87 – 92

Keywords

Er:YAG; cutaneous resurfacing; laser; histology

Abstract

Background

Several erbium:YAG lasers are currently available for cutaneous laser resurfacing. Although different laser systems are purported to produce equivalent laser energies to produce similar laser-tissue interactions, no comparative clinical or histologic studies have been performed to objectively demonstrate their relative efficacies.

Objective

The purpose of the present study was to examine the in vivo clinical and histopathologic effects of six different erbium:YAG resurfacing lasers.

Methods

A blinded, prospective study using six different erbium lasers (Candela, Continuum Biomedical, HGM, MDLT, SEO, Sharplan/ESC) was performed. The facial halves of 12 patients were randomly resurfaced with one of the six laser systems by using an identical laser technique at 5.0 J/cm². Intraoperative skin biopsies were obtained after each of three laser passes in two patients for blinded histologic determination of tissue ablation level and presence of residual thermal damage. Clinical assessments of reepithelialization rates, severity and duration of erythema, side effects, and degree of clinical improvement were made at 0.5, 1, 2, 4, 12, 26, and 52 weeks postoperatively.

Results

Irrespective of the erbium laser system used, complete reepithelialization typically occurred at 0.5 weeks and resolution of erythema was noted within 1-2 weeks postoperatively. A mean clinical improvement of 50% was observed, with photodamaged skin showing greater improvement than scarred skin. The most common postoperative side effect was hyperpigmentation, with all affected patients having either darker skin tones or preceding dermal inflammation. Three laser passes were needed to effect total epidermal ablation when using any one of the erbium:YAG systems.

Conclusions

Equivalent clinical and histologic results were seen after each of the six erbium:YAG lasers studied. Erbium:YAG laser resurfacing can be used to significantly improve mild cutaneous photodamage and atrophic scars. *Lasers Surg. Med.* 24:87-92, 1999. © 1999 Wiley-Liss, Inc.

Laser resurfacing with a long pulse erbium: YAG laser compared to the 950 ms pulsed CO₂ laser

Elizabeth F. Rostan, MD 1 *, Richard E. Fitzpatrick, MD 2, Mitchel P. Goldman, MD 2
1Dermatology Associates of San Diego County, Inc., Encinitas, California 92024
2Associate Clinical Professor, Division of Dermatology, Department of Medicine, University of California at San Diego, San Diego, California
email: Elizabeth F. Rostan (aandrews@dermassociates.com)

*Correspondence to Elizabeth F. Rostan, 477 N. El Camino Real, Suite B303, Encinitas, CA 92024.

Lasers in Surgery and Medicine
Volume 29, Issue 2 , Pages 136 - 141

Keywords

erbium; laser resurfacing

Abstract

Background and Objective:

Laser resurfacing with the 950 s pulsed CO₂ laser is an effective treatment for photodamage and acne scarring; however, the potential for prolonged erythema and delayed re-epithelialization dissuade many patients from the procedure. With the use of erbium lasers alone, there is a decrease in the incidence and severity of these adverse sequelae; however, it is difficult to achieve the same degree of improvement as with the CO₂ laser because of the more superficial depth of resurfacing. Thus, new erbium lasers have been developed with longer pulse durations to deliver increased thermal effects to tissue. It is hypothesized that with the use of these lasers, diminished erythema and faster wound healing will be observed as well as enhanced clinical outcomes.

Study Design/Materials and Methods:

Sixteen patients were randomized to receive laser resurfacing on one-half of the face with the 950 s pulsed CO₂ laser (UPCO₂) followed by short pulse erbium:YAG ablation, and to the other half with a variable pulsed erbium laser (VP Er:YAG) followed by traditional short pulse erbium laser. Patients were evaluated clinically before resurfacing and at 1, 2, 4, 8, and 12 weeks post-operatively. Histologic samples taken at various time periods before and after resurfacing were also evaluated.

Results:

Overall clinical improvement was equal for both UPCO₂ and VP Er:YAG treated sides with an average improvement in photoaging scores of 57%. Decreased erythema, less edema, and faster healing were observed on the VP Er:YAG treated side.

Conclusion:

The VP Er:YAG laser can achieve a similar degree of improvement as seen with short pulse CO₂ laser resurfacing with decreased thermal tissue effects and decreased risk for adverse sequelae. *Lasers Surg. Med.* 29:136-141, 2001. © 2001 Wiley-Liss, Inc.