

Laser Resurfacing for Treatment of Acne Scarring in Fitzpatrick Skin Types V to VI: Practical Approaches to Maximizing Safety

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Acne scarring is a potentially disfiguring and psychosocially distressing condition that can affect patients of all races, ethnicities, and skin phototypes. Traditional approaches to treating acne scars (eg, dermabrasion, medium to deep chemical peels, CO₂ laser resurfacing) are associated with a high risk for pigmentary and scarring complications in patients with skin of color, especially those with Fitzpatrick skin types V to VI, and therefore are not generally recommended in this patient population. However, the advent of nonablative laser technologies, most notably fractional lasers, has broadened the range of treatment options for darker-skinned patients with acne scars.

Based on safety considerations, nonablative devices are strongly preferred for laser resurfacing in patients with skin of color.¹ Laser resurfacing modalities that have been studied in patients with Fitzpatrick skin types V to VI include fractional nonablative lasers,² the microsecond-pulsed 1064-nm Nd:YAG laser,³ and the 1450-nm diode laser.⁴ In patients with skin of color, postinflammatory hyperpigmentation (PIH) is a considerable risk with lasers but is lowest with the microsecond-pulsed 1064-nm Nd:YAG laser, which typically requires more treatment sessions to achieve satisfactory improvement in acne scarring. Fractional nonablative laser resurfacing offers a favorable safety and efficacy profile and is my preferred approach to laser treatment of acne scarring in darker-skinned patients with Fitzpatrick skin types V to VI. Postinflammatory hyperpigmentation following treatment with fractional nonablative lasers has been reported in up to 40% of cases involving darker skin types,⁵ and therefore conservative

treatment parameters, careful techniques, and perioperative precautions are paramount to minimizing the risk for this potentially disfiguring complication.¹

As with all dermatologic procedures, the first step to ensuring favorable outcomes when using lasers for treatment of acne scarring is patient selection and realistic expectations. All patients with Fitzpatrick skin types V to VI should be warned of the high post-treatment risk for PIH but also should be reassured that it typically resolves within 8 weeks or less when topical bleaching agents are used. Patients who are not comfortable with this potential outcome or are unwilling to take necessary precautions to reduce their risk for PIH (eg, use of bleaching agents and sun protection) should be excluded. Patients with concomitant melasma may experience a worsening of their condition after undergoing a laser resurfacing procedure and should be counseled accordingly. If they are not excluded from consideration, melasma patients also should be treated with more conservative treatment settings, which in turn would require more sessions to achieve the desired level of improvement in acne scarring. When using nonablative modalities, multiple treatment sessions—3 to 4 sessions for fractional nonablative lasers and 6 to 8 sessions for the microsecond-pulsed 1064-nm Nd:YAG—are necessary to achieve satisfactory results. Prospective patients must be informed of the need for multiple treatments to achieve at least 50% improvement in the depth and overall severity of acne scars.

When fractional nonablative lasers are used for treatment of acne scarring in darker skin types, treatment parameters should be adjusted to minimize the risk for PIH. Higher treatment density (microthermal zones [MTZs] of injury per square centimeter) appears to be more closely associated with the risk for PIH than higher energy, though both parameters are important.^{6,7} When using the 1550-nm erbium-doped fractional nonablative laser, treatment densities in the range of 200 MTZ per square centimeter (ie, 11% coverage or treatment level 4 on this device) to 392 MTZ per square centimeter (ie, 20% coverage or treatment level 7) generally are safe.¹

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A recommended energy range for treatment of acne scarring in darker skin types is 40 to 70 mJ depending on the depth of the scars, but the risk for PIH is likely higher in the upper limits of this range (ie, 60–70 mJ). In a recent retrospective review of 115 treatment sessions in patients with Fitzpatrick skin types IV to VI, the mean energy level among cases associated with posttreatment PIH was 60.8 mJ compared to 44.7 mJ in those with no occurrence of PIH.⁸

Another approach to reducing the risk for PIH associated with fractional nonablative laser resurfacing while also maintaining treatment efficacy is to use fewer passes per treatment session and to increase the total number of treatments.⁹

When higher energies and/or treatment densities are utilized with the fractional laser, pausing between passes to allow for additional cooling is a useful technique to reduce bulk heating and to avoid potentially excessive thermal injury that could lead to PIH.¹⁰ It is recommended that adequate cooling (eg, with a forced-air skin-cooling system) be maintained throughout the procedure as well as the use of post-treatment ice packs.

To reduce the risk for PIH as well as its severity and duration, application of topical bleaching agents before and after fractional laser resurfacing is strongly recommended.^{1,10} Ongoing sun-protective behavior and use of a broad-spectrum sunscreen during the course of treatment also are important preventative steps. In my anecdotal experience, initiating hydroquinone cream 4% twice daily for at least 2 weeks prior to the first treatment session as well as continued use 4 weeks after each session is effective in lowering the risk and/or severity of posttreatment PIH. By contrast, treatment sessions with the microsecond-pulsed 1064-nm Nd:YAG laser (eg, 300 microseconds; 14 J/cm²; 5–7 Hz) are associated with a lower risk for PIH, and therefore perioperative application of hydroquinone generally is not required.

When PIH occurs between laser treatment sessions, it is advisable to postpone subsequent treatments until complete resolution occurs. Prescription hydroquinone formulations are preferred in the treatment of laser-induced PIH and usually result in improvement in less than 2 months (when using the laser devices and parameters previously discussed).

Although patients with Fitzpatrick skin types V to VI are at the highest risk for pigmentary abnormalities associated with laser resurfacing procedures, safe laser treatment of acne scarring is possible in this population when therapeutic nuances are taken into

account. Key strategies to maximizing laser treatment outcomes in patients with darker skin types include selecting the appropriate nonablative device, using conservative treatment settings, employing careful techniques, and initiating prophylaxis with hydroquinone both before and after treatment. Keeping these approaches in mind, safe and effective laser treatment of acne scars can be achieved in patients with Fitzpatrick skin types V to VI, a population with limited treatment options due to safety concerns regarding traditional resurfacing techniques.

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