

# Contemporary Laser and Light-Based Rejuvenation Techniques



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## KEYWORDS

- Laser resurfacing • Fractional laser resurfacing • Erbium:YAG laser • CO<sub>2</sub> laser • Hybrid fractional
- Photoaging • Rhytids • Ablative

## KEY POINTS

- The main wavelengths used for skin rejuvenation continue to be the CO<sub>2</sub> and the erbium:YAG. Improvements in devices include fractional technology, combination with other wavelengths, and deeper penetrating spot sizes.
- Whether CO<sub>2</sub> or erbium, full-field resurfacing remains the technique of choice for those Fitzpatrick types 1 and 2 patients with deep rhytids and extensive photodamage.
- For younger patients with an active lifestyle, fractional and hybrid devices offer new opportunities for skin rejuvenation with minimal downtime and minimal risks.
- Laser skin rejuvenation in darker skin types remains a challenge, although newer devices offer the possibility of safe treatment.
- The overall laser skin rejuvenation field has grown tremendously with fractional and hybrid devices, creating most of this expansion.

**Question 1: What is your choice of device for extreme sun damage and aged skin (Glogau 4) in Fitzpatrick types 1, 2 and why? Give typical settings?**

## HAMILTON

For those patients with extensive photodamage and deep wrinkles who are done with the sun and desire maximal improvement, full-field CO<sub>2</sub> laser resurfacing is the best option. This technique has a proven track record of consistent, effective results. The simplicity and speed of these treatments are far superior to erbium techniques. It has been listed as the gold standard for maximal

facial rejuvenation, and I believe that has not changed.<sup>1</sup>

Although CO<sub>2</sub> laser does produce more heat deposition, this provides an advantage, especially in more severe cases. Depositing heat causes collagen and thus tissue contraction. This provides further skin tightening as well as wrinkle reduction. In cases needing consistent maximal wrinkle reduction, only CO<sub>2</sub> laser is able to provide this.

Although deep penetrating fractional lasers offer an interesting alternative for deep rhytids, the results for the most part have been disappointing. Despite the ability to offer much deeper depths of penetration, the decrease in skin surface area

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**Panel Discussion**

1. What is your choice of device for extreme sun damage and aged skin (Glogau 4) in Fitzpatrick types 1, 2 and why? Give typical settings.
2. How do you approach patients who need surgical lifting as well as skin resurfacing?
3. What is your choice for rejuvenation of skin in higher Fitzpatrick skin types (3–6)? Typical settings?
4. How do you approach the young patient with early aging (Glogau 1, 2)?
5. What techniques do you use to speed along post-laser healing?
6. How have your techniques with laser and light-based facial rejuvenation changed in the last 5 years?

covered has precluded comparable wrinkle improvement to full-field resurfacing in a single session. Even with multiple treatments, maximal improvement in difficult cases with fractional devices just cannot match full-field resurfacing.

For laser resurfacing, I use the Lumenis Encore. This device is reliable and effective. Procedures are quick and bloodless. Typical settings vary depending on the patient as well as the device. That said, for extensive photodamage, settings of 100 to 125 mJ and a density of 5 are typically used. On average, 2 passes are made and possibly a third or fourth in more challenging cases. Passes after the second are typically done at a lower setting and only to select deep rhytids (**Fig. 1**).

**CAMPBELL**

I prefer the erbium:YAG laser by Sciton. The erbium laser is the most efficient way to ablate the skin because of its absorption spectrum. At 2940 nm, the laser only penetrates the skin about 4  $\mu\text{m}$ , thus causing virtually all of the energy to be converted instantly to heat, vaporizing the skin. Because of this efficient absorption, there is very little heat transfer, limiting necrosis and heat shock of deeper tissue. This has been proven to greatly reduce the risk of hypopigmentation, hyperpigmentation, and prolonged healing. The duration and intensity of erythema are also greatly reduced, yet the wrinkle reduction has been shown to be equivalent to a CO<sub>2</sub> laser.<sup>2</sup> Basically, it gives me all of the benefits of the best wrinkle reduction while minimizing the side effects of hypopigmentation, hyperpigmentation, and erythema of the CO<sub>2</sub> laser.

For deep rhytids, the settings I use are typically 200  $\mu\text{m}$  per pass at 50% overlap. One to 3 passes are made across most areas of the face, but the perioral region can be treated with up to 8 passes (my personal maximum; most patients are treated with 3–4 passes) as needed. The periorbital area is treated with 80  $\mu\text{m}$  with 25  $\mu\text{m}$  of coagulation. This treatment of the periorbital area seems to help tighten the thinner periorbital skin safely when making 2 to 3 passes. The passes are tapered across the jawline. The neck can safely be treated with 25 to 80  $\mu\text{m}$ .

**HOLCOMB**

Dual-mode erbium-YAG laser and fractional CO<sub>2</sub> laser are used in combination. This approach conserves the benefits of full-field deep laser skin resurfacing while also incorporating the benefits of ablative fractional resurfacing. Patients that have significant to extreme skin photoaging typically have significant dyschromia and deep rhytids and may have actinic changes. Full-field ablative laser skin resurfacing with the erbium-YAG laser will substantially resolve surface concerns with a single pass of adequate depth (dual-mode erbium-YAG; eg, 100–200 ablate, 0 coagulate, 50% overlap, 4-mm spot). Treatment with the fractional CO<sub>2</sub> laser immediately follows to further the goals of rhytid reduction and skin tightening (eg, 120- $\mu\text{m}$  spot, 55 mJ, 15% surface area coverage). For the most severe rhytids, additional passes with the erbium-YAG laser and/or use of a larger spot size and higher energy and coverage with the fractional CO<sub>2</sub> laser (eg, 1000  $\mu\text{m}$ , 200 mJ, 100% surface area coverage) may occasionally be warranted (**Fig. 2**).

**Question 2: How do you approach patients who need surgical lifting as well as skin resurfacing?**

**HAMILTON**

Multiple studies have shown that CO<sub>2</sub> laser resurfacing can be safely combined with a facelift.<sup>3</sup> Important factors in making this combination safe include facelift technique and laser settings. The deep plane facelift offers a greater degree of safety for combined procedures. I use an extended SMAS biplanar facelift with a fair amount of skin undermining in some cases. It is important to lower the setting over areas of elevated skin. Fortunately, these are typically areas of less sun damage and wrinkling. For most cases, just one pass at a setting of 60 mJ or less and a density of 5 is made over the elevated tissues.

Fractional resurfacing provides an even greater margin of safety. Many patients undergoing

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