



**PIH AND COSMETIC PROCEDURES:
SAFE SKIN RESURFACING OPTIONS
FOR PATIENTS CONCERNED ABOUT PIH**



Skin texture is a top concern for aesthetics consumers. Tone and textural issues — like rosacea, bumps, acne scars and other scars, stretch marks, and uneven pigmentation — count among the most common signs of aging, unhealthy skin.¹ And according to a consumer survey by the American Society for Dermatologic Surgery, 71% of aesthetics consumers are concerned with their skin tone and texture.² These conditions are tough to treat, so patients are always on the lookout for safer and simpler solutions.

Skin resurfacing treatments are the best tools at our disposal for treating these common tone and texture issues. However, not all treatments are created equally. Results can vary widely from device to device or treatment to treatment, depending on the technologies used, the procedure protocol, or even patient-related factors. One of the top concerns for skin resurfacing patients is post-inflammatory hyperpigmentation — also known as PIH.

**WHAT IS PIH, ANYWAY? WHAT DOES IT MEAN FOR YOUR PRACTICE,
AND HOW CAN YOU PREVENT IT?**

This report will cover the risk levels associated with the development or worsening of PIH with various skin resurfacing methods, and outline advances in technology that have created safer options for patients concerned about PIH.

1 Fink B, Matts PJ. The effects of skin colour distribution and topography cues on the perception of female facial age and health. *J Eur Acad Dermatol Venereol*. 2008;22:493-498.

2 The American Society for Dermatologic Surgery. The 2017 ASDS Consumer Survey on Cosmetic Dermatologic Procedures [Internet]. 2017 [cited Feb 1, 2018] Available from: <https://www.asds.net/2017-consumer-survey/>.



WHAT IS PIH?

Post-inflammatory hyperpigmentation (PIH) occurs when the skin overproduces melanin, or disperses pigment irregularly, in response to inflammation or injury. Inflammation may result from acne, an infection, an irritant, a burn, or a cosmetic procedure. It results in flat, discolored spots on the skin that create an uneven skin tone.

Although PIH can occur in all skin types, it most commonly affects people with darker skin tones. According to the *Journal of Clinical and Aesthetic Dermatology*, PIH is a risk for individuals with skin types IV to VI on the Fitzpatrick scale — a significant portion of the aesthetic market, generally including most Latin Americans, Asians, Pacific Islanders, people of African descent, people of Middle Eastern descent, and the Indigenous peoples of North America.³

Yet, despite the fact that individuals with skin types IV to VI make up the majority of the world population, comparatively few skin resurfacing devices are safe for patients with these Fitzpatrick scale skin types. For clinics committed to offering these advanced aesthetic treatments, choosing the right device can make a world of difference in terms of serving greater numbers of customers.

PIH can be treated with both over-the-counter and prescription topical remedies (such as depigmenting agents), as well as with cosmetic procedures like chemical peels, laser, and other resurfacing techniques. However, some treatment types can cause irritation, or even end up worsening PIH. That's why finding the right treatment for each individual is so important.

³ Davis EC, Callender VD. Postinflammatory Hyperpigmentation: A Review of the Epidemiology, Clinical Features, and Treatment Options in Skin of Color. *J Clin Aesthet Dermatol*. 2010 Jul; 3(7): 20–31.

CAUSES OF PIH

PIH is the skin's natural reaction or defense to inflammation. The most common causes of facial skin inflammation are acne vulgaris (pimples) atopic dermatitis (a rash), and impetigo (a bacterial infection). A person may also develop PIH as a result of time in the sun (UV exposure), an insect bite, an allergic reaction, a chronic disease like psoriasis, or as a side effect from medication.

Since PIH causes an uneven skin tone, it's one of the many reasons people seek skin resurfacing treatments. However, some treatments cause additional inflammation and worsening of the condition, especially in darker skin tones. Let's take a look at the risks and which resurfacing treatments are the safest.



TECHNOLOGICAL ADVANCES IN SKIN RESURFACING TREATMENTS

Skin resurfacing treatments have adapted and evolved since they first entered the market in the 1990s, and with them, so have the risks and responses to PIH.

For many years, the CO₂ laser was the gold standard in skin resurfacing technology.⁴ However, the treatment has its pitfalls. Patients undergoing CO₂ laser treatment typically experience lengthy post-op recovery periods and potential side effects, including PIH. Patients with darker skin tones are especially prone.⁵ Thankfully, in recent years, technological advances have brought about less invasive techniques with a reduced risk of PIH. Here, we analyze the various technologies and their risks.

PIH occurs in nearly 40% of patients with darker skin tones when they are treated with a non-fractional CO₂ laser device.⁶ Ablative non-fractionated CO₂ laser resurfacing removes the epidermal layer, spurring collagen production. These lasers work by heating water molecules in the tissue until they are vaporized. Although the treatment often achieves great results, the aggressive technique can cause scarring, discoloration, or even infection. The recovery period after treatment typically lasts one to two weeks, though it can be longer.

Ablative fractionated CO₂ lasers came about in 2007. Instead of treating the entire projected surface area, fractionated lasers treat an equally distributed portion. Physicians and patients noticed a reduction in recovery time with fractionated lasers, but ultimately, these lasers still retain the risk of damage.⁷

Non-ablative fractional laser therapies are safer alternatives to ablative methods, but they still present the risk of post-op discoloration. In a recent study, 15 female patients, some with darker skin tones, underwent 4 sessions (at 3-week intervals) of Erbium glass fractional laser treatment. PIH was reported in more than 13% of the participants.⁸

Light therapy is an alternative to laser treatments. Intense Pulsed Light (IPL) treatments use a broad-spectrum pulse of light, often filtered, to penetrate various levels of skin. The pulsed effect reduces the chance of PIH, compared to laser options. However, recent studies show the condition is still a potential side effect along with recovery periods that can last up to two weeks.⁹

4 Gold MH. Update of Fractional Laser Technology. *J Clin Aesthet Dermatol*. 2010 Jan; 3(1): 42–50.

5 Hsiao PF, Lin YC, Huang CC, Wu CC. Efficacy and safety of a single treatment using a 10,600-nm carbon dioxide fractional laser for mild-to-moderate atrophic acne scars in Asian skin. *Dermatologica Sinica* 31 (2013) 59-63.

6 Tan KL, Kurniawati C, Gold MH. Low risk of postinflammatory hyperpigmentation in skin types 4 and 5 after treatment with fractional CO₂ laser device. *J Drugs Dermatol*. 2008 Aug; 7(8):774-7.

7 Preissig J, Hamilton K, Markus R. Current Laser Resurfacing Technologies: A Review that Delves Beneath the Surface. *Semin Plast Surg*. 2012 Aug; 26(3): 109–116.

8 Puri N. A study on Fractional Erbium Glass Laser Therapy Versus Chemical Peeling for the Treatment of Melasma in Female Patients. *J Cutan Aesthet Surg*. 2013 Jul-Sep; 6(3): 148–151.

9 Trivedi MK, Yang FC, Cho BK. A review of laser and light therapy in melasma. *Int. J Women's Dermatol*. 2017 March; (3)1: 11-20.

INNOVATIONS IN FRACTIONAL RADIOFREQUENCY

The latest in skin resurfacing technology involves fractional radiofrequency (RF). RF devices use radio frequency to create skin damage and stimulate growth and repair.¹⁰ The RF method has quickly risen in popularity because it offers a safer solution for patients with darker skin tones. The use of an electric current, rather than a laser light (as with other methods), prevents diffraction or absorption. Study results comparing RF treatment with laser treatment on Asian patients found minimal occurrence of PIH with the RF method.¹¹

Innovations in radiofrequency technology are proving safer for patients in a wide range of skin types. Differentiated from fractional RF devices, nano-fractional radiofrequency — or, NanoFractional RF™ — technology utilizes needle-shaped pin tips as the electrode to deliver the RF energy.

Reseachers in Thailand conducted a study on the effects of NanoFractional RF™ on 33 patients of skin types III-IV with striae albae (stretch marks) in 2016. Both physicians and patients observed an improvement in the appearance of stretch marks, with minimal PIH (treatable with a topical agent). Due to the smaller size of the impact area at the pin tips, along with notable technology features designed to maintain homogeneous energy delivery, researchers found that NanoFractional RF™ systems could ensure consistently high-intensity energy to be effective in skin resurfacing while reducing risk of PIH.¹²



10 Bloom BS, Emer J, Goldberg DJ. Assessment of safety and efficacy of a bipolar fractionated radiofrequency device in the treatment of photodamaged skin. *J Cosm Laser Ther.* 2012;14(5):208-211.

11 Yeung CK, Chan NPY, Shek SYN, Chan HHL. Evaluation of combined fractional laser treatment for acne scars in Asians. *Lasers Surg Med.* 2012;44(8):622-630.

12 Ponggsrhadulchai N, Chalermchai T, Ophaswongse S, Pongsawat S, Udompataikul M. An efficacy and safety of nanofractional radiofrequency for the treatment of striae alba. *J Cosmet Dermatol.* 2016; 1-7.

CONCLUSION

Despite the many skin resurfacing options available, research shows that only one technology offers a markedly lower risk for PIH, especially in individuals who have darker skin.

Innovations on fractional RF systems, like the NanoFractional RF™ technology used by Venus Viva™, prove to be the safest choice for aesthetic professionals looking to offer patients non-invasive solutions for their tone and texture problems with minimal adverse effects.

Venus Concept is a leading global innovator of versatile medical aesthetic devices that offer high efficacy, strong ROI, and award-winning support; we take pride in keeping our practitioner partners at the forefront of aesthetic expertise.



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