

# Laser and Face Peel Procedures in Non-Caucasians



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## KEYWORDS

• Ethnic skin • Non-ablative lasers • Superficial peels • Facial resurfacing

## KEY POINTS

- Non-Caucasian skin types represent a significant percentage of patients who seek facial resurfacing procedures.
- Inherent within non-Caucasian skin types is the increased risk for complications from lasers and chemical peels, including dyspigmentation and scarring.
- Traditional ablative lasers have largely been replaced by nonablative and fractional lasers.
- Chemical peels for non-Caucasian skin types are typically limited to superficial depths.
- Common reasons non-Caucasian patients seek resurfacing are dyschromias, including melasma and postinflammatory hyperpigmentation, acne scarring, facial rejuvenation, keloids and hypertrophic scars, cutaneous lesions, and hair-related conditions.

## INTRODUCTION

More than ever there is growing popularity in facial resurfacing and rejuvenation, as the goal to maintain one's youthful and attractive features becomes increasingly important. Historically, facial resurfacing procedures were described in the treatment of fair-skinned individuals of European descent, corresponding to Fitzpatrick skin types I to III (**Table 1**).<sup>1</sup> With the advent of new technologies and resurfacing techniques, there is increased potential to treat those of darker, non-Caucasian skin types. A 2013 national survey by the American Society of Aesthetic Plastic Surgery revealed that 22% of surgical and nonsurgical aesthetic procedures were performed on non-Caucasians (Hispanics, 8%; African Americans, 7%; Asians, 6%; other, 1%).<sup>2</sup> For the purposes of this discussion, non-Caucasian skin will be considered Fitzpatrick skin types IV to VI. This population poses unique circumstances and

challenges that must be recognized by the provider to achieve successful outcomes. Within this article we discuss various laser and light modalities, as well as chemical peels, used for facial resurfacing in non-Caucasian skin types.

Multiple definitions of beauty exist across cultures worldwide; however, several variables are universal: uniform distribution of skin pigment; smooth, tight skin; and an absence of rhytids are cornerstones of a youthful appearance and are the premises that facial resurfacing is based on.

Facial skin aging occurs via intrinsic and extrinsic pathways. Intrinsic changes are due to an individual's genetics, immune and general medical status, and include volume loss from lipooatrophy, gravitational sagging of skin, and resorption of the bony facial skeleton. Extrinsic changes include skin color aberrations, pigment redistribution in the form of lentigines, rhytids, actinic damage, elastic skin changes, and keratoses.<sup>3</sup> Smoking, exercise, and nutritional status

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**Table 1**  
**Fitzpatrick skin type classification**

Classification	Skin Color	Tanning Pattern	Burning Pattern
Type I	Very white	Never tans	Always burns
Type II	White	Tans minimally	Usually burns
Type III	White to olive	Tans moderately	Sometimes burns
Type IV	Light brown	Tans readily	Rarely burns
Type V	Dark brown	Tans profusely	Very rarely burns
Type VI	Black	Tans profusely	Never burns

contribute to extrinsic changes; however, the most important factor in extrinsic skin aging is ultraviolet (UV) photodamage.<sup>4</sup>

In setting the goals of treatment, one must take into consideration the unique histologic differences between Caucasian and non-Caucasian skin types. Although the absolute number of melanocytes is similar across races, darker skin pigment is the result of increased amounts of melanin within the skin. Within lighter skin types, the melanin is located in melanosomes within melanocytes confined principally to the stratum basale layer of the epidermis. In non-Caucasian skin, there are increased numbers of melanosomes with increased levels of melanin. The melanosomes also are more widely distributed throughout the epidermis.<sup>5</sup> Cadaveric studies of black-colored skin biopsies have demonstrated an average sun protective factor of 13.4.<sup>6</sup> Other findings in darker skin types include relatively thicker skin and increased fibroblast activity.<sup>7</sup> Findings such as these support the clinical observations that photoaging, particularly rhytids, in darker skin types tends to lag 1 to 2 decades behind that of the fair skin counterparts.

## LASER AND LIGHT MODALITIES

The historic standard resurfacing laser therapies relied on ablative CO<sub>2</sub> and erbium-doped yttrium aluminum garnet (Er:YAG) lasers. These modalities are usually reserved for fair-skinned individuals (Fitzpatrick skin types I–III). As mentioned previously, there are a number of histologic findings unique to non-Caucasian skin. These findings also are responsible, in part, for causing increased

risk of complications, namely dyspigmentation and scarring. Melanin is a chromophore with a wide light absorption spectrum (250–1200 nm). Absorption tends to be greater at shorter wavelengths and less at longer wavelengths. Because there is a greater amount of melanin distributed throughout the epidermis, increased laser energy absorption results in greater heat production and subsequent thermal tissue injury.<sup>7</sup>

For these reasons, darker-skinned individuals are treated primarily with newer laser and light technologies, including nonablative, fractional, and wide-spectrum light modalities. Nonablative lasers selectively target the dermis while the epidermis is spared, aided by direct skin cooling. Additionally, lower fluences and longer pulse durations help to minimize thermal injury and subsequent complications.<sup>8</sup> Commonly used nonablative lasers include neodymium (Nd):YAG (1064 nm), 1450-nm diode, and pulsed dye laser (PDL) (585–595 nm). Nonablative erbium-doped fractional laser (1550 nm) and ablative fractional CO<sub>2</sub> (10,600 nm) lasers rely on creating microthermal zones (MTZ) surrounded by untreated tissue, thereby reducing overall tissue injury and allowing rapid recovery time. When fractional therapies are used, fractional treatment densities can be lowered to minimize risk. Intense pulsed light (IPL) (515–1200 nm) uses a broad range of wavelengths and can treat a variety of conditions in non-Caucasian skin. The trade-off when using the more conservative modalities to minimize complications is that less overall tissue destruction occurs and resultant tissue regeneration and remodeling are less significant than that attained in more aggressive treatments of fair-skinned individuals. As a result, more treatment sessions are often required.

## CHEMICAL PEELS

As with laser and light therapies, to perform chemical peels on non-Caucasian individuals, one must recognize the trade-off between achieving the desired clinical improvements and minimizing the risk of postinflammatory hyperpigmentation (PIH), hypopigmentation, and scarring. For this reason, the general practice is limited to superficial chemical peels for patients with Fitzpatrick skin types IV to VI. Superficial peels are defined as those that induce tissue destruction limited to the epidermis with inflammation reaching as deep as the superficial papillary dermis. Healing is expected within 3 to 5 days, and the usual side-effect profile is limited to mild peeling, erythema, and mild burning pain. Medium and deep peels carry too great a risk of postoperative complications; therefore, they are

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