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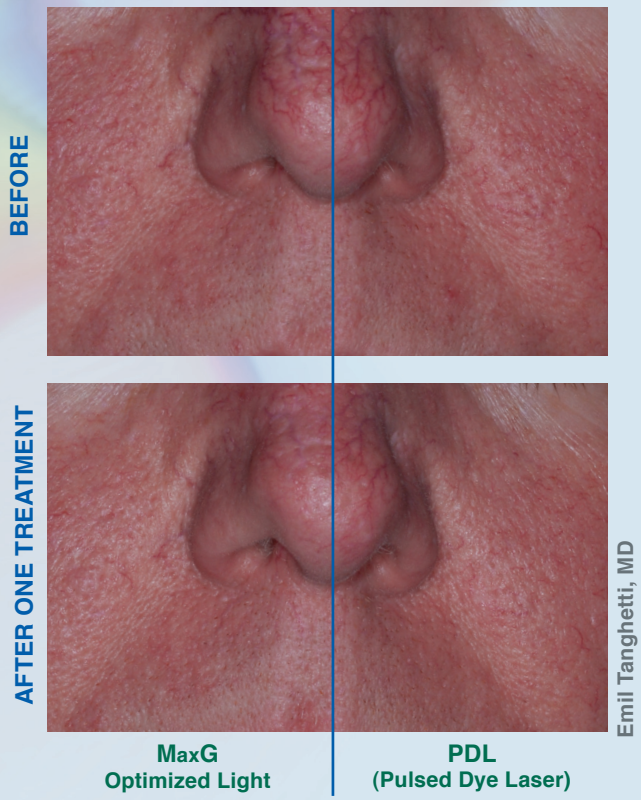

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JOURNAL OF DRUGS IN DERMATOLOGY

DECEMBER 2011 VOLUME 10 ISSUE 12 (SUPPLEMENT)

EDITORIAL

ORIGINAL ARTICLES

Introduction

Perry Robins MD

We present to you the first-ever DermPearls supplement to the *Journal of Drugs in Dermatology*: a distinctly new educational body of work that addresses a growing area of interest and concern in clinical dermatology.

Over the course of many years of teaching residents, fellows, dermatologists, and other specialists, I am frequently asked, "Isn't there an easier or better way to perform this procedure?" Very often, the answer is "yes!" It occurred to me that a collection of these practical tips and techniques would be useful to all.

In years' past I published two extremely popular books on clinical pearls in dermatology, and to this day people inquire as to when I will publish more. In response to this continued demand, I introduce to you DermPearls, a quarterly supplement to the *Journal of Drugs in Dermatology*.

DermPearls presents the very best clinical knowledge in dermatology, authored by my esteemed colleagues worldwide. I hope that you find our educational contributions through this exciting, new publication as beneficial as we do.

Perry Robins MD
Editor-in-Chief

Cosmetic Treatments on Skin of Color: A Unique Challenge

Eliot F. Battle Jr. MD

I am honored to serve as Editor of the first-ever DermPearls supplement to the *Journal of Drugs in Dermatology*. As practicing clinicians, as the population of the world shifts to include more patients of skin of color than ever before, learning how to appropriately treat this patient population has become increasingly more important. We need to be able to optimize results, manage patient expectations, and appropriately use our arsenal of devices and technologies to achieve the best possible outcomes.

As importantly, we need to adjust popular patient misconceptions to reflect new realities in the clinic: that today there are in fact numerous safe and effective aesthetic, laser and cosmetic dermatologic treatment options available for darker skin types that may have not existed as recently as a decade before.

The answer is not simple, but an important first step is the sharing of knowledge within the dermatologic and patient communities by experts in laser and aesthetic treatments on patients of color who know these unique techniques best. With pearls of wisdom from such experts as Dr. Andrew F. Alexis, Dr. Fran Cook-Bolden, Dr. Candrice Heath, and many others, this supplement seeks to broaden our knowledge base of how to best treat patients of darker skin types. From laser hair removal to injectables, from melasma to the appropriate management of acne to minimize the potential of post-inflammatory hyperpigmentation in patients of skin of color, one can find countless pearls of dermatologic wisdom within these pages.

I am proud to be among the dermatologists who have chosen to share their clinical wisdom within this collection of pearls, and hope that this supplement can serve as an educational addition to any dermatologist's intellectual armamentarium as the world becomes more and more familiar with the unique needs, challenges, and techniques brought forth by patients with skin of color.

Eliot F. Battle Jr. MD
CEO and Founder, Cultura Dermatology & Laser Center, Washington, DC

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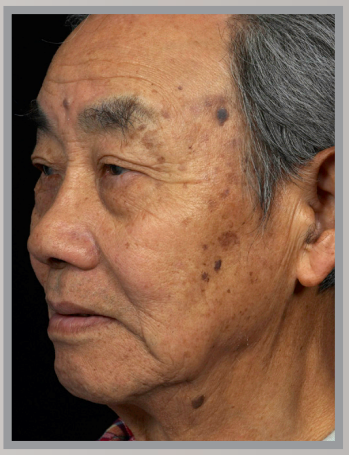

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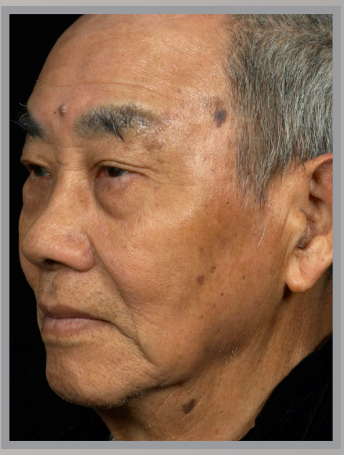

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Fractional Laser Resurfacing for Acne Scarring in Patients with Fitzpatrick Skin Types IV–VI

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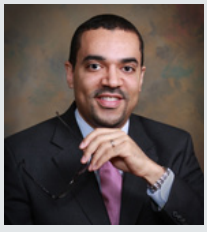
Assistant Clinical Professor, Columbia University College of Physicians & Surgeons, New York, NY



"Fractional non-ablative laser resurfacing is a safe and effective treatment option for patients with skin of color as long as conservative parameters (especially lower treatment densities) are used."

INTRODUCTION

Traditional methods for skin resurfacing (including medium to deep chemical peels, Er:YAG and CO^2 lasers, and dermabrasion) are associated with a substantial risk of dyspigmentation and, in some patients, keloidal scarring when performed on darker skin types (Fitzpatrick skin phototypes IV–VI). Fractional non-ablative lasers have emerged as a safer treatment option for resurfacing richly pigmented skin due to the considerably lower rate of the above complications when appropriate parameters are used.

BACKGROUND

Previous studies involving Asian subjects have shown that the risk of hyperpigmentation associated with nonablative fractional laser resurfacing in skin of color is increased with higher treatment densities,[1,2] which refers to the density of microthermal zones of thermal injury per square centimeter (MTZ/cm^2). For this reason, the author recommends conservative treatment densities for patients with Fitzpatrick skin types IV–VI. Safe treatment levels for the treatment of acne scarring in this population typically range from 4 (200 MTZ/cm^2 – 11%) to 8 (456 MTZ/cm^2 – 23%) at an energy of 40 mJ. A recent retrospective study of Chinese patients treated with the 1,550 nm erbium-doped fractional laser (Fraxel 1550, Solta Medical) found that using fewer passes per treatment, but increasing the total number of treatments was associated with a lower risk of postinflammatory hyperpigmentation without compromising efficacy.[3] Pre-treatment with hydroquinone may also help to reduce the incidence of hyperpigmentation post-fractional laser resurfacing.[4] The current author pre-treats with hydroquinone 4% cream to the full face beginning two weeks prior to fractional laser treatment. The hydroquinone is discontinued for seven days post laser (due to potential irritation) and resumed for four weeks thereafter. A broad spectrum sunscreen with an SPF of at least 30 is used and sun avoidance is advised.

Studies using ablative fractional CO_2 lasers for acne scarring in skin of color have reported considerably high rates of post-treatment hyperpigmentation,[5] and therefore, fractional non-ablative lasers are strongly preferred over fractional ablative lasers for Fitzpatrick skin types IV–VI in this author's opinion.[6]

SETTINGS AND METHODS

In a randomized, split-face, comparative, investigator-blinded study conducted by Alexis et al.,[7] subjects with Fitzpatrick skin phototypes IV–VI with acne scars had four monthly treatments with the non-ablative fractional laser (Fraxel 1550, 1,550 nm) using a low density setting (200 MTZ/cm^2 – 11%; treatment level 4) on one side of the face and a higher density setting (392 MTZ/cm^2 – 20%; treatment level 7) on the other, keeping the energy constant on both sides at 40mJ. Hydroquinone 4% cream was used two weeks prior to the first treatment and continued for one month after the last treatment. At six months (three months after the final treatment), greater improvement in acne scarring by blinded investigator Visual Analog Score was found on the side of the face treated with the higher density setting and no residual hyperpigmentation was observed in any subjects. There was no difference in the incidence of temporary hyperpigmentation when both settings were compared. The settings and treatment precautions used in one case of a 40-year-old Hispanic male patient with Fitzpatrick skin type IV and acne scarring who participated in the study and elected to get a "touch up" treatment were as follows:

- Pre-treatment with hydroquinone 4% cream to whole face starting two weeks prior to treatment
- Topical anesthesia – 23% lidocaine, 7% tetracaine ointment applied 45 minutes prior to treatment
- Energy: 40 mJ

- Treatment level 6 (17% coverage or 328 MTZ/cm^2)
- Eight passes (41 MTZ/pass)
- Continuous forced air cooling (integrated into the hand piece in this particular model of the Fraxel Re:Store)
- Post-treatment ice packs for approximately 10 minutes
- Post-treatment broad spectrum sunscreen SPF 30+ and sun avoidance

The energy on this device correlates with the depth of the microscopic columns of thermal injury induced by the laser. Therefore, the higher the energy, the greater the depth of thermal injury. For this patient, 40 mJ (which corresponds to MTZ's 1120µ in depth) was chosen based on the clinical severity (and depth) of the acne scars. A treatment density of 328 MTZ/cm^2 (treatment level 6 – 17%) was chosen to achieve greater efficacy than his previous treatments at a lower density (treatment level 4 or 200 MTZ/cm^2) while maintaining a low risk of postinflammatory hyperpigmentation and minimal downtime.

A useful treatment pearl to keep in mind is that when using higher densities, it is prudent to allow more time for cooling between passes of the laser. This is sometimes referred to as the "pawing" technique where two consecutive parallel passes are performed in the same direction, allowing for cooling between passes (as opposed to a backtracking method in which one pass is applied, followed by a second pass in the reverse direction along the same linear track). This approach helps to ensure a lesser risk for excessive bulk heating which may contribute a higher risk of hyperpigmentation post-treatment. When hyperpigmentation does occur, widening the interval between treatments is advisable, postponing the next treatment until the hyperpigmentation has completely resolved. In such cases, decreasing the treatment density on the subsequent treatments would be recommended. Alternatively, reducing the number of passes per session and performing more treatment sessions to achieve comparable efficacy could be considered (as described by Chan et al[3]).

CLINICAL BOTTOM LINE

In summary, fractional non-ablative laser resurfacing is a safe and effective treatment option for patients with skin of color as long as conservative parameters (especially lower treatment densities) are used. Pre-treatment and post-treatment precautions are also key to reducing the risk of pigmentary complications in this population.

DISCLOSURES

The author has no relevant financial conflicts of interest to disclose, but has received laser tips as a research grant from Solta Medical.

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The 810 nm Diode Laser: A Safe, Effective Modality to Meet a Growing Population Need

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"Today's lasers are innovative systems that depend on effective clinician-patient utilization to achieve the best possible outcome, and with a clearer understanding of the optimal settings for skin of color, the optimal results can now also be achieved in the skin of color population."

INTRODUCTION

For dermatologists who see patients of color in their clinics with increasing frequency as the years pass, the need for devices and techniques that are safe to use in this population may almost seem self-evident.[1] Skin of color (SOC) does in fact pose special challenges and considerations, as due to its increased melanin content it behaves inherently differently from skin of lower Fitzpatrick phototypes.[1]

Although the situation is improving, dermatologists frequently find themselves faced with a lack of clinical data and trials specifically concerning skin of color.[2] Not only has there previously been a lack of SOC patient representation in clinical trials, but darker-skinned patients themselves preclude their own treatment options by holding on to mistaken beliefs that laser treatments for procedures such as hair removal are not safe for them.[3] Luckily, this is a misconception that effective management of new techniques and patient misconceptions can correct.

The Food and Drug Administration (FDA) has approved two systems for photoepilation in darker skin types: the diode 810 nm and the long-pulsed Nd:YAG (1064 nm).[4] Both lasers utilize longer wavelengths, extended pulse durations and active epidermal cooling to provide the greatest efficacy and safety in treating skin phototypes IV–VI. To minimize epidermal thermal damage when treating darker skin types, pulse durations of 100 milliseconds or longer can be used with diode laser system.[5]

Epidermal thermal damage, post-treatment discomfort, erythema, edema, and irritation post laser treatment are a concern for patients of all skin types, but in patients with skin of color, side-effects can have especially pronounced manifestations in the form of dyspigmentation, scars, and blistering.[5-7]

The use of cooling devices,[8] now available on most laser systems, greatly improves not only patient outcome but patient comfort during laser procedures. The use of appropriate lower fluences—although it may prolong the duration of treatment(s) overall—will build patient confidence as results in cases such as hair removal will be slow and gradual, with a sufficient safety margin to reduce many treatment-related adverse events (AEs).

SETTINGS AND METHODS

The 810 nm diode laser has seen marked evolution in ease and safety in treating skin types IV and V with features utilizing aggressive cooling, long pulse durations, rapid movement and pre-set treatment parameters.

A young Hispanic woman (Figure 1) with Fitzpatrick skin type IV was treated using an 810 nm diode laser (Soprano XLi®, Alma Lasers), which has pre-set parameters of how to treat various skin types. This device has evolved to determine essential laser parameters: fluence, total kilojoules, and the appropriate treatment time based on the patient's skin type.

The area of treatment (underarms) was selected, along with the treatment size (150 cm). The device automatically selects the fluence per pulse (8 J/cm^2), total kilojoules (8–10 kJ), and treatment time (80 seconds) (Figure 2).

When treating the underarm, the speed and technique are important. The diode lasers have evolved from the stamping

FIGURE 1. A young Hispanic woman with Fitzpatrick skin type IV was treated using an 810 nm diode laser.

FIGURE 2. The 810 nm diode laser automatically selects the fluence per pulse, total kilojoules, and treatment time.

the skin to either suction or waving pattern. Using a sweeping mode, up and down, at 10Hz per second, the physician gradually heats the epidermis to treat the dermal target without damaging the epidermis. Another important advantage to treating darker skin types is the ability to use a primary and secondary cooling device.

All lasers have evolved into rapid treatment machines, giving dermatologists the capability of spot treatment. The 810 nm diode laser has five degrees of contact-cooling and an apparatus that enables the physician to attach a Zimmer cooler as a secondary cooler. Not only does the cooling system improve safety in darker skin types, it also improves patient comfort.

CLINICAL BOTTOM LINE

When it comes to darker-skinned patients, it is important not to let mistaken patient pre-conceptions[3] or restrictive cultural opinions and outdated practices[9] govern what could be a very rewarding dermatological treatment result. Today's lasers are innovative systems that depend on effective clinician-patient utilization to achieve the best possible outcome, and with a clearer understanding of the optimal settings for skin of color, the optimal results can now also be achieved in the skin of color population.

DISCLOSURES

The author has no relevant conflicts of interest to disclose.

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A Novel 0.65 Millisecond Pulsed 1064 nm Laser to Treat Skin of Color Without Skin Cooling or Anesthetics

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"This uniquely gentle, sanitary, and effective laser treatment experience for patients of color can increase the likelihood that they will return for follow-up treatment sessions and also recommend the treatment to others."

INTRODUCTION

The Nd:YAG 1064 nm has become the gold standard laser modality for safely treating all skin types and specifically skin of color. The 1064 nm laser technologies with ultra long pulse durations generally require anesthetics as well as skin cooling in order for patients to tolerate the treatment. The use of anesthetics and gels can involve considerable time, cost and mess. The development of a new 1064 nm laser technology with a unique 0.65 msec pulse duration now enables virtually pain-free treatment of skin of color, with no need for skin cooling or anesthetics and no skin contact during treatment by the handpiece. This uniquely gentle, sanitary, and effective laser treatment experience for patients of color can increase the likelihood that they will return for follow-up treatment sessions and also recommend the treatment to others.

SETTINGS AND METHODS

Patients were treated for unwanted facial and axillary hair, as well as clearance of Pseudofolliculitis Barbae (PFB) (Figure 1). After confirmation that the patients were not taking photosensitizing medications and were not pregnant, they were advised to shave the treatment sites approximately 2–3 days prior. On the day of the laser session, the treatment sites were thoroughly cleaned and allowed to dry before treatment.

Settings

Energy fluence applied was in the range of 14 to 21 joules/cm^2, with a 0.65 millisecond pulse duration and the use of a 6 mm spot size. The energy profile of the laser is a collimated beam, which means that overlapping is not necessary and is also not harmful on any skin type at these relatively low fluences. This 1064 nm laser with the unique 0.65 msec pulse duration is also capable of reaching 318 joules/cm^2.

Technique

The novel 0.65 msec pulsed 1064 nm laser does not contact the skin. It employs a collimated beam so that the distance from handpiece to skin tissue does not affect fluence or spot size. When treating larger areas, a white eyeliner pencil is used to grid out the area. The laser pulses are then applied across the target area in a painting technique, with the handpiece held perpendicular to the treatment site and no need to overlap pulses. A visible charring of hairs is observed and most hairs are vaporized upon impact by the laser beam.

Treatment was performed in the complete absence of any cooling sprays, gels or topical anesthetics. Post-treatment cooling was applied on occasion with an ice pack to gradually reduce the temperature of the treatment site for enhanced comfort, but in most cases it is not used at all, as the treatment is extremely tolerable even in sensitive anatomical areas.

This procedure and this specific laser are appropriate for all Fitzpatrick skin types without limitation, as the risk of treatment discomfort, pigmentary changes, or scarring is absolutely minimized. This laser modality is applicable to a diverse array of skin conditions, including PFB, permanent hair reduction, acne vulgaris, and acne scars. It can also be used to treat PIH (hyperpigmentation), either by destroying the underlying cause such as acne or PFB lesions, or by treating PIH that remains from pre-existing lesions that have since disappeared.

Device

Traditional 1064 nm lasers often utilize pulse durations of 5 to 30 milliseconds, which are well in excess of the TRT (thermal relaxation time) of skin tissue, which is approximately 0.8 milliseconds. With these ultra long pulse durations, the skin must

be cooled continuously during treatment with gels, sprays and/or contact cooling plates. Additionally, in spite of the cooling, treatment with these traditional lasers can still be very painful. The LightPod Neo (Aerolase, Tarrytown, New York) represents a newer generation of Nd:YAG laser, whereby the laser emitter is mounted directly in the handpiece, and cooled during operation with a stream of air. This explains the compact size of the device (the traditional internal water circulating system and optical fiber lightguide system that is typical of the large, stationary water-cooled laser devices has been eliminated with this technology). This laser also has a key clinical benefit. With the emitter in the handpiece, the design avoids optical power losses associated with optical cables, which means it is able to generate sufficient fluence for aesthetic treatments within a shorter 0.65 millisecond pulse duration, below the skin's TRT.

This feature explains why the power profile is gentler on skin of color without sacrificing efficacy.

FIGURE 1. The novel 0.65 msec pulsed 1064 nm laser does not contact the skin. It employs a collimated beam so that the distance from handpiece to skin tissue does not affect fluence or spot size.

CLINICAL BOTTOM LINE

This new 1064 nm laser technology with a 0.65 msec pulse duration treats the skin beneath its TRT, negating the need for numbing and skin cooling and enabling uniquely gentle, sanitary, and effective laser treatment experiences for patients of color.

DISCLOSURES

The author has no relevant conflicts of interest to disclose.

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Laser Hair Removal Pearls in Skin of Color

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"The long pulsed 1064 nm Nd:YAG laser allows enough energy to safely pass through the heavily melaninated epidermis, while still being absorbed by the follicular melanin in sufficient quantities to reduce hair growth."

INTRODUCTION

Laser hair removal (LHR) has been used in clinics since 1995; however, it was approximately 50 years ago that laser energy was first noted to "char" hair in the laboratory.[1,2] The use of laser energy for hair removal has substantially advanced in both technology and knowledge. Today, LHR has become one of the most requested procedures in cosmetic dermatology.[3]

The theory behind which the laser beam is known to affect or cause a decrease in hair growth is largely based upon Anderson and Parrish's theory of selective photothermolysis, and later, extended photothermolysis.[4,5] Basically, a pulse of laser energy emitted at a particular wavelength is absorbed by a targeted chromophore and does not cause damage to nearby structures as long as the pulse duration does not extend beyond the chromophore's thermal relaxation time.[4] In the case of LHR, extending the pulse duration beyond the thermal relaxation time is beneficial; this allows the thermal energy absorbed by the hair follicle to diffuse to the stem cells in the follicular bulge region, thereby causing permanent hair reduction instead of temporary hair removal.[3] The targeted chromophore in LHR is melanin within the hair follicle located approximately 2–5 mm in the dermis.[6] This poses a problem in skin of color (SOC) or the darker Fitzpatrick skin types (IV–VI). A significant amount of melanin in the epidermis in SOC competes for the absorption of laser energy with the melanin in the hair follicle. When too much laser energy is absorbed by the melanin in the epidermis, as opposed to the hair follicle, complications such as permanent pigment alteration (hypopigmentation) or burns can arise.

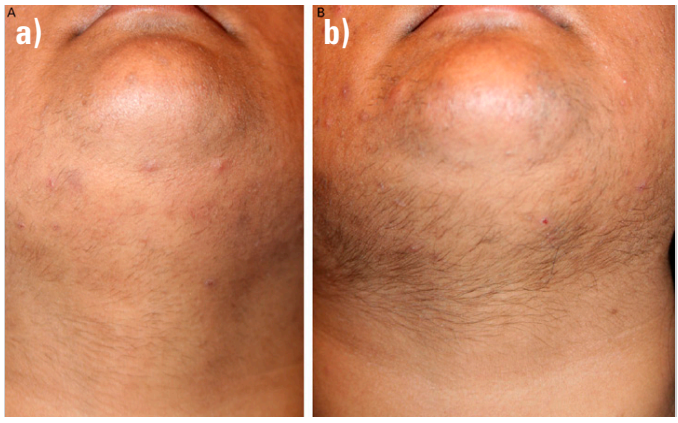
SETTINGS AND METHODS

The ideal patient for laser hair removal has a low Fitzpatrick skin type and dark hair, thereby minimizing the competition between the melanin of the epidermis and the melanin of the hair. In order to minimize unwanted laser energy absorption by epidermal melanin in SOC (Fitzpatrick Skin Types V–VI), a wavelength should be chosen that minimizes the epidermal melanin's absorption. The epidermal melanin absorbs less light as one progresses towards longer wavelengths in the electromagnetic spectrum. Thus, the long pulsed 1064 nm Nd:YAG is able to safely pass through the epidermal melanin while still allowing sufficient absorption of the follicular melanin to be an effective tool for LHR. Unfortunately, the 1064 nm Nd:YAG laser is not quite as effective as the 755 nm alexandrite laser, which can be safely used in lighter skin types, because just as there is less epidermal melanin absorption, there is also less follicular melanin absorption.[7] It is better to carry out more treatment sessions with the Nd:YAG laser than risk permanently altering the patient's cutaneous pigment. The clinical endpoint when performing laser hair reduction in SOC patients with the Nd:YAG laser is perifollicular erythema and edema.[3] The fluence should be adjusted to achieve this endpoint. It is best to start at lower fluences and work one's way upwards to achieve that endpoint, especially when treating new SOC patients. Higher fluences yield more permanent hair reduction, but must be carefully used because they can result in more side effects.[8,9] A lower setting on the dynamic cooling device should be used, as too high of a setting in SOC can lead to cryogen burns with post-inflammatory pigmentation (Figure 1). Longer pulse durations lead to more effective hair reduction, adhering to the hypothesis of extended photothermolysis.

Certain anatomical locations respond better to LHR and similarly, other locations are associated with more side effects. Notably, areas that traditionally exhibit thinner skin, such as the axilla, have been reported to result in better hair reduction than thicker-skinned areas such as the leg or chin.[6] The sun-exposed locations have been reported to exhibit more side effects such as vesiculation and temporary pigment changes.[6] It should also be noted that the incidence of paradoxical hypertrichosis is also higher in darker skin types, with most reports occurring in females (Fitzpatrick skin types III–IV) with polycistic ovarian syndrome along the side of the face after treatment with IPL or the 755 nm long pulse alexandrite laser (Figure 2).[10,11] The etiology behind this phenomenon remains undiscovered[12]; however, many investigators have suggested that laser energy delivered at too low of a fluence may actually stimulate nearby hair follicles to begin a robust phase of anagen.[13,14]

FIGURE 1. Photograph of an individual treated with an excessively high dynamic cooling device setting. Note the hyperpigmented macules distributed over the medial side of the lower leg.

FIGURE 2. Photographs of a 22-year-old woman (skin type IV) **a)** before and **b)** after two treatments with a long-pulse 755 nm alexandrite laser of the chin and beard area: 18-mm spot size, energy level of 20 J/cm^2, and 3 ms pulse.[12] Reproduced with permission from Blackwell Publishing.



CLINICAL BOTTOM LINE

In conclusion, the competition between epidermal and follicular melanin in SOC dictates which laser wavelength should be used for achieving the optimal balance of safety and efficacy. The long pulsed 1064 nm Nd:YAG laser allows enough energy to safely pass through the heavily melaninated epidermis, while still being absorbed by the follicular melanin in sufficient quantities to reduce hair growth. The longer pulse duration allows for diffusion of the absorbed follicular energy to affect the follicular stem cells in the bulge region, thus thought to cause permanent hair reduction. Lower fluences should be used at first in new SOC patients and then gradually increased to safely achieve perifollicular erythema and edema.

DISCLOSURES

The authors have no relevant conflicts of interest to disclose.

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Treating Lentigines in Asian Patients With the Q-switched Alexandrite Laser

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"Treatment using the Q-switched Alexandrite would be appropriate for Asian patients with Fitzpatrick skin types III and IV."

INTRODUCTION

Lentigines are a common problem for Asian patients, as photodamage tends to present as dyspigmentation rather than wrinkling in this population.[1] Irregularities in skin tone and color often represent a great cosmetic concern.[2] Laser treatment of pigmented lesions in patients with Fitzpatrick skin types III and IV are challenging given the risk of both hypopigmentation and hyperpigmentation and limited response in a significant proportion of cases.[3] Asian skin, in particular, has high epidermal melanin content making it more likely to develop adverse pigmentary reactions after laser surgery.[1]

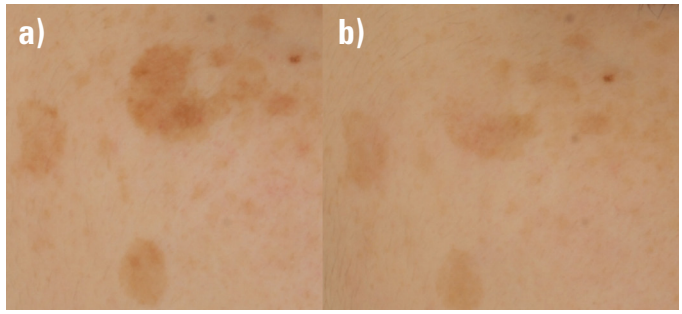
SETTINGS AND METHODS

The authors' approach is to start treatment with topical agents aimed at pigmentation. The topical agents used are tretinoin cream, hydroquinone, or a combination of tretinoin, hydroquinone, and a topical steroid. In addition to the topical retinoids and hydroquinone, the authors emphasize the importance of sun protection. These topical agents are rarely sufficiently effective, and the authors usually additionally treat lentigines with laser devices, mostly commonly the Q-switched (QS) Alexandrite laser.

The 755 nm Q-switched Alexandrite laser is selectively absorbed by melanin, and, unlike other wavelengths used to target lentigines—such as 532 nm—has limited absorption in hemoglobin. Treatment using the Q-switched Alexandrite would be appropriate for Asian patients with Fitzpatrick skin types III and IV. The authors use either a 3 mm or 4 mm spot size with a low fluence. With the authors' approach, it is essential to direct the spot to the pigmented area and to avoid unaffected skin. The technique involves making a single pass over the target area with minimal overlap. The clinical endpoint for this treatment is immediate, barely-visible whitening. Treatment is usually performed a total of three times every four weeks (Figure 1). The biggest concern is post-inflammatory hyperpigmentation (PIH).[4]

Other options for treating lentigines in Asians include Intense Pulsed Light,[5] Q-switched and long pulsed Nd:YAG 532 nm,[6] Q-switched Ruby,[2] long pulsed Alexandrite,[3,7] and non-ablative fractionated 1927 nm laser. After any of these treatments, strict sun protection is advised to minimize the risk of PIH.

FIGURE 1. a) Baseline. **b)** Three months post Q-switched Alexandrite treatment. Treatment parameters: 5/Jm^2, 4Hz, 3 mm.



Photos are courtesy of Henry Chan MD PhD

CLINICAL BOTTOM LINE

Lentigines are a common condition in Asian patients, and dermatologists needs to be aware that gentle treatment yields good results and a lower risk of side effects.

DISCLOSURES

The authors have no relevant conflicts of interest to disclose.

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Before **After 3rd Tx**

(Photos courtesy of Dr. Juliette Hepburn)

"I have used a variety of aesthetic laser devices and modalities, but the Neo has been the best in terms of efficacy and safety on skin of color," said **Fran Cook-Bolden, MD**, *Director of Skin Specialty Dermatology in New York, NY.* "The laser utilizes a unique pulse duration which is shorter than the relaxation time of the skin tissue, so the treatment is safer and gentler – even without the use of skin cooling or anesthetics. It works great on hair removal and PFB, but I've also used it for non-ablative skin rejuvenation and clearance of acne and PIH. I also use the Neo with great success on skin types I-III for vascular lesions and other conditions."

"I owned an IPL system but was looking for something with a broader range of treatments as well as a wider safety margin for skin of color," said **Dr. Juliette Hepburn,** *President of The Skin Centre in Nassau, Bahamas.* "I had heard of Aerolase from a renowned laser dermatologist and eventually brought the LightPod Neo into my practice. I use it for a wide range of treatments from hair removal, PFB, acne and spider veins to nail fungus and wound healing. It is unusually versatile and safe on any skin type, and I don't have the hassle of multiple treatment heads and costly service or consumables with this system."

(Photo courtesy of Dr. Neil Persadsingh)

"The ability to deliver very high power enables the LightPod Neo to supply sufficient fluence for hair removal in a relatively short pulse duration of 0.65msec," said **Michael Gold, MD,** *Director of the Gold Skin Care Center in Nashville, TN* "Use of a pulse duration shorter than the thermal relaxation time of the skin tissue allows efficient, long-lasting and virtually pain-free hair removal. This can be crucial to patient acceptance of the procedure."

"I can truly say that the LightPod Neo is the best laser on the market for hair removal, acne, skin tightening and toning," said **Ajitpal Tiwana, MD**, *of Bakersfield, CA.* "I have had great success with the Neo in my clinics in Bakersfield and in Punjab, India. In many cases, most of the hair is already gone after just one treatment."

"I spent several years researching the aesthetic laser market before making a purchase," said **Dr. Neil Persadsingh, FAAD,** *a dermatologist who practices in Kingston, Jamaica* and treats almost exclusively skin types V and VI. "I wanted to proceed carefully to ensure that I could offer laser treatments with the maximum safety margin. I am very pleased to say that the Neo has exceeded my expectations, in terms of both efficacy and safety for my patients, while being much more affordable than other aesthetic laser systems on the market."

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Laser Hair Removal in Ethnic Skin: Principles and Practical Aspects

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"In clinical practice, there are number of dark-skinned patients who still have negative attitudes and lack of knowledge about LHR despite safe treatment existing for more than 10 years."

INTRODUCTION

Laser hair removal (LHR) has become an increasingly popular procedure during the past decade. In white skin, LHR is known and works with a fairly low number of treatments and relatively few side effects. In dark-skinned individuals, especially African-Americans, where the hair tends to be coarse and curly, dermatologic conditions such as pseudofolliculitis barbae and significant post-inflammatory hyperpigmenation often do not respond to conventional methods of hair removal. Thus, LHR can become a medical necessity for the treatment of unwanted hair in dark-skinned patients, for whom there may be few therapeutic alternatives.

BACKGROUND

Clinical Issues

When darker-skinned women present with unwanted facial hair, there is often significant post-inflammatory hyperpigmentation in the affected area. Conventional hair removal methods such as waxing, shaving, depilatories, and plucking often remove the hair, but can increase the development of perfollicular hyperpigmentation. In the clinical setting, dark-skinned women with complaints of hirsutism, accompanying hyperpigmentation, and pseudofolliculitis formation should first be evaluated for hormonal abnormality (Figure 1). Once this is ruled out, laser hair removal is the only hair removal technique that will allow treatment of large areas with safety and an ensuing decrease in population and pigmentation.

When a darker-skinned man presents with the primary complaint of significant papules, pustules and irritation in the beard area with shaving, the options are few for definitive treatment of these lesions. Laser hair removal in a limited number of treatments can offer significant improvement in all clinical complaints in the beard areas without extensive change in hair density, allowing men to retain the male look of facial hair.

Here we describe the key points when dealing with LHR in darker-skinned patients. With these strategies, dermatologists and medical practitioners will be more confident when treating unwanted hair with laser.

SETTINGS AND METHODS

Before Treatment

Patients should be informed and understand the risks and benefits of treatment, long-term results, treatment alternatives, cost, and the possibility of treatment failure or potential recurrence of hair growth. In patients who are at high risk or particularly concerned about potential side effects, a laser test spot, preferably in or next to the planned treatment area, should be carried out. The test spot should be assessed for adverse reactions immediately after the treatment and 1–2 weeks later. In addition, patients with unrealistic expectations are not ideal treatment candidates.

In clinical practice, there are number of dark-skinned patients who still have negative attitudes and lack of knowledge about LHR despite safe treatment existing for more than 10 years. Data from a recent survey found that 15 of 221 (6.8%) African-American subjects surveyed had been told not to have LHR because of skin color and 44.8 percent of these subjects disagreed or were not sure whether dark-skinned people could be treated with LHR.[1] Thus, it is important for dermatologists to give appropriate information during the initial consultation and emphasize the safety of LHR in dark-skinned patients.

During Treatment

The absorption coefficient of melanin is inversely correlated with the wavelength of the laser, i.e., epidermal melanin absorbs approximately four times as much energy when irradiated by a 694 nm ruby laser compared to the 1064 Nd:YAG laser.[2] There-

FIGURE 1. Hirsutism, pseudofolliculitis, and significant post-inflammatory hyperpigmentation in a 45-year-old African-American woman.

FIGURE 2. A built-in copper cooling device integrated into the tip of the laser handpiece.

FIGURE 3. External air cooling device.

fore, dark-skinned patients should be treated with devices with a long wavelength (1064 Nd:YAG) rather than a wavelength that has a higher coefficent of absorption with epidermal melanin (e.g., Alexandrite).[3]

When determining treatment parameters, fluence is as important as the laser wavelength chosen when treating dark-skinned patients. Skin phototype VI may absorb as much as 40 percent more energy when irradiated by visible light laser than does skin phototype I or II when fluence levels and exposure duration are constant.[4] Thus, the minimum fluence that produces the desired tissue effect in a given individual should be employed to minimize unnecessary damage of collateral tissue. In addition, the fluence should be lowered on highly dense hair-bearing areas (e.g., chest, back) to avoid non-selective damage through excessive heat diffusion.

The use of longer pulse duration (e.g., more than 30 ms) is recommended when treating dark-skinned patients.[5] With longer pulse duration, the energy is transferred to the skin more slowly, and the epidermis absorbs the light slower and heats up slower, reducing epidermal injury. Effective cooling devices are essential when treating dark-skinned patients. Without epidermal cooling, the heat creates unwanted thermal injuries including blistering, scarring, and dyspigmentation. Most lasers are equipped with cooling devices (e.g., copper cooled tip, sapphire cooled tip, cryogen spray cooling) (Figure 2). In addition, external air cooling and cooling aqueous gel may be used adjunctively to minimize epidermal injury (Figure 3).

After Treatment

Strict sun avoidance and daily use of broad-spectrum sunscreen is recommended to avoid further tanning of the treated sites. Patients should be made aware of what to expect postoperatively (e.g., transient erythema) and instructed to notify the office as soon as possible if an adverse reaction occurs.

Cautions

While conservative fluence settings should be employed in dark-skinned patients, it is still important to consider the endpoint, i.e., perifollicular edema and erythema. Too-low fluence settings can result in no therapeutic improvement. Excessive cooling should also be avoided as it can result in cold injuries (e.g., blistering, dyspigmentation).[6,7]

CLINICAL BOTTOM LINE

In conclusion, in this pearl we addressed important aspects of dealing with LHR in dark-skinned patients. The key points are to offer patients of color the option to have laser hair removal treatment if it is indicated (while recognizing that they may be under incorrect assumptions regarding safety) by using long wavelength, long pulse duration, conservative fluences, and effective epidermal cooling.

The population of the United States is dramatically shifting in the 21st century. The majority of US populations will no longer have fair skin, but instead darker skin, also referred to as "skin of color." This change will significantly impact the practice of dermatology. With this laser pearl, we hope that dark-skinned patients who are treated with laser hair removal will achieve a high satisfaction without complications after the procedure.

DISCLOSURES

The authors have no relevant conflicts of interest to disclose.

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Best Practices and Evidenced-Based Use of the 800 nm Diode Laser for the Treatment of Pseudofolliculitis Barbae in Skin of Color

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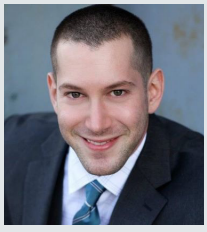

"Despite recent advances, post-inflammatory dyspigmentation, burns and scarring are of real concern in patients with skin of color (Fitzpatrick IV–VI), although the Nd:Yag and the diode lasers have been shown to be safe.[5-7]"

INTRODUCTION

Pseudofolliculitis barbae (PFB) is a common, irritating skin condition that manifests as inflammation around hair follicles after shaving and often with associated keloidal papules/nodules resulting from ingrown follicles. Patients of all skin types many present to the dermatologist with a complaint of ingrown facial hairs and/or irritation after shaving, but the problem is more commonly seen in males with darker skin types with thick, curly hair. While many treatment options exist, such as 1) allowing the beard to grow out completely; 2) shaving technique changes (direction of shave, warm compresses/steam heat to soften hair prior to shaving, single versus multiple blade razors, shaving oils); 3) treatment with topical keratolytics, antibacterials, or retinoids; 4) chemical peels; or 5) the use of oral antibiotics with anti-inflammatory affects; the most effective, permanent measure in stubborn cases is laser hair removal[1] (Figure 1a-c).

Several lasers have been shown to be effective in hair reduction, such as the ruby (694 nm), alexandrite (755 nm), diode (800 nm), and long-pulsed Nd:Yag (1,064 nm).[2,3] The hair removal lasers work by selective photothermolysis of follicular melanin (chromophore) located near stem cells in the bulge of the hair follicle.[4] In order to be most effective, the laser energy must be absorbed primarily by the follicle, with limited influence on the surrounding tissues. Despite recent advances, post-inflammatory dyspigmentation, burns and scarring are of real concern in patients with skin of color (Fitzpatrick IV–VI), although the Nd:Yag and the diode lasers have been shown to be safe.[5-7] Efficacy is higher with the diode as compared to the Nd:Yag given that the melanin in the hair follicle absorbs 3–4 times more energy at the 800 nm wavelength than at the 1,064 nm.[8]

The author's experience with the diode laser with hand piece (cooled convex sapphire lens) for hair removal has shown excellent results, especially with use in patients of color. The newer hair removal lasers have pulse durations that are much longer (100–400 ms) than traditional systems (20–40 ms), allowing darker skin types to be treated with little risk of complications given the appropriate settings. Longer pulse durations transmit laser energy at slower rates, allowing a maximum temperature rise of the hair follicle with minimum energy dispersion to the surrounding tissues. Under the right parameters, a planned treatment course, sun avoidance and protection, and pretreatment with a topical skin care regimen, results are extremely satisfying to patients. Traditional settings employ high-powered, low pulse durations (25-35 J/cm^2, 2 Hz, 10–30 ms) in a single-pass, although new studies have documented success with few side effects from low-powered, high pulse duration (5-15 J/cm^2, 2 Hz, 100–400 ms) in single or multiple-pass pulses.[9,10] Multiple-pass or "stacking" of the laser energy into the hair blub is thought to cause more destruction with less energy dispersed to surrounding tissue (given delivery is equal to or less than the thermal relaxation time of the skin or the threshold of burn). Since sensation/pain is directly related to fluence, pain may also be decreased by this new paradigm, although topical numbing creams 30–60 minutes prior to treatment and/or icepacks can limit pain during treatment.

SETTINGS AND METHODS

For best results in patients of color, follow this protocol for the safest and most effective treatment:

- Treat the folliculitis. Have the patient employ new shaving techniques or allow the beard to grow for 30–45 days prior to first hair removal treatment. Add topical antibacterial treatment with a benzoyl peroxide-antibiotic combination daily as well as a glycolic or salicylic acid face wash at least three times weekly.

FIGURE 1. a-c) A patient with Fitzpatrick skin type V **a)** before, **b)** after two months, and **c)** after four months of four treatments using high fluence (20-25 J/cm^2, 2 Hz) and long pulse duration (100 ms) in a single pass using the LightSheer diode laser for the treatment of pseudofolliculitis barbae.

FIGURE 2. Crusts and hypopigmentation after treatment with diode laser. High fluence and failure to adequately pre-treat the keloidal papules/nodules influenced this adverse effect, which resolved with conservative management of emollients and sun protection.

- Avoid the sun. Sun avoidance and/or daily protection (SPF >30) will aid in preventing any melanogenesis that may interfere with selective photothermolysis of the laser energy.

- Prevent hyperpigmentation. Most notably in darker skin types, add 4% hydroquinone cream at bedtime for at least 4–6 weeks prior to treatment to help prevent post-inflammatory hyperpigmentation and/or treat the existing post-inflammatory hyperpigmentation that often exists in areas of resolved folliculitis.

- Thin the thick, curly hair. Apply a thin film of eflornithine 13.9% cream twice daily to the affected area of the beard 4–6 weeks prior to laser treatment, as hair removal results are more rapid and complete when used in combination with laser.[11] It is important to warn patients of cutaneous irritation that may develop. In some patients, facial scrubs or medical devices such as the Clarisonic® Brush (Pacific Bioscience Laboratories Inc., Bellevue, WA) may also help loosen hairs and exfoliate.

- Do not forget the keloids. If possible, prior to laser treatment, keloidal papules/nodules should be lanced with a #11 blade and have the entrapped hair extracted. Larger lesions can be injected with diluted triamcinolone (2.5–5 mg/cc, <0.1 cc injected per site). Treatment of these lesions prevents "arching" of the laser beam (laser tip needs to be directed perpendicular onto a flat skin surface) and prevent vesiculation or burns that may lead to crusts with resultant scars (Figure 2). If an adverse event were to occur, treat as a superficial burn with topical antimicrobials, emollients, and/or emulsion creams.

- Plan the treatment(s) course. The motto "start low and go slow" is best followed with patients of color, given the high risk for cutaneous side effects despite adequate hair removal. Lower fluences (10–15 J/cm^2) at longer pulse widths (100–400 ms) in single or multiple-pass pulses will take longer for substantial and sustained reduction in hair density, but will avoid complications. Although it is often taught that perifollicular inflammation and minimal cutaneous erythema is not the ultimate endpoint, good results can still be obtained with conservative settings with minimal irritation.

- Post-treatment skin care. Stress the importance of skin care post treatment with gentle cleansers and the use of low-potency steroid lotions/creams if cutaneous erythema or pain is substantial. Hypopigmentation that may develop is typically transitory and due to a reduced melanogenesis in "stunned" melanocytes, and not due to actual damage to the cells.

DISCLOSURES

The author has no relevant conflicts of interest to disclose.

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Clinical Pearls for Dermal Filler Enhancement in Patients With Skin of Color

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"In general, as individuals with skin of color age, they do not develop fine or deep rhytids, but rather they experience diminution of the underlying facial bony structure, collagen, and ground substance which leads to descent of the malar fat pad.[4]"

INTRODUCTION

Patients of all racial and ethnic groups are interested in maintaining a vital and youthful appearance. As the US population of skin of color patients grows, so too does the number of skin of color patients seeking cosmetic treatments.[1-3] Therefore, the goal is to maximize aesthetic results in this population while minimizing potential adverse events.

In general, as individuals with skin of color age, they do not develop fine or deep rhytids, but rather they experience diminution of the underlying facial bony structure, collagen, and ground substance which leads to descent of the malar fat pad.[4] Intradermal fillers are appropriate for correction of these defects. However, when considering the use of dermal fillers for cosmetic enhancement in patients with skin of color, adverse events such as the development of hyperpigmentation, keloidal or hypertrophic scarring must be considered.

These unique adverse events prompted the Food and Drug Administration (FDA) to require adequate numbers of skin of color patients in pivotal filler trials or post-marketing phase IV studies to document the rate of these adverse effects in skin of color patients with Fitzpatrick skin types IV–VI. Study results have demonstrated no keloidal scarring, but hyperpigmentation of the nasolabial folds and hypertrophic scars in a small number of patients.[5-9] However, these studies excluded patients with a history of hyperpigmentation in the nasolabial fold area, a history of keloidal scarring and/or a family history of keloids.[5-9] Post-approval, many skin of color patients who present for cosmetic consultation and procedures have a history of pre-existing hyperpigmentation or a personal or family history of keloids.

Although all patients with skin of color, or Fitzpatrick skin types IV–VI, are candidates for fillers, it is important to treat patients with skin of color conservatively (Figure 1). Additionally, informed consent with a review of the potential adverse events of hyperpigmentation, hypertrophic or keloidal scarring is essential.

CLINICAL BOTTOM LINE

To minimize skin of color specific adverse event during and after injecting filler substances, utilize the following pearls:

- When injecting filler substance, use techniques that minimize the total number of injections, such as linear threading.
- If erythema occurs following a procedure, minimize the potential risk of post-inflammatory hyperpigmentation by utilizing a mid-potency topical corticosteroid twice daily for several days to diminish inflammation.
- Remind patients of the value of sunscreen application to minimize the onset of hyperpigmented macules or UV darkening of macules once present.
- Hydroquinone may be used following filler procedures to either minimize the risk of hyperpigmentation in susceptible individuals or treatment of early onset hyperpigmentation.

DISCLOSURES

Susan C. Taylor has served as investigator, advisory board member, and speaker for Medicis, Allergan, Johnson and Johnson, Merz, and Bioform. Candrice R. Heath has no relevant conflicts of interest to disclose.

FIGURE 1. Patient with Fitzpatrick skin type V receiving dermal filler. Erythema of the left nasolabial fold is visible immediately following dermal filler enhancement.

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Strategies to Minimize Irritation and Potential Iatrogenic Post-Inflammatory Pigmentation When Treating Acne Patients With Skin of Color

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"Minimizing iatrogenic irritation and post-inflammatory pigmentation can be achieved by 1) the use of lowest concentration and least irritating products possible; 2) the use of combination therapy with products with moisturizing vehicles; and 3) the use of moisturizers in combination with topical medications."

INTRODUCTION

Post-inflammatory pigmentation (PIH) is a frequent complication of skin inflammation in patients with skin of color, so it is important to reduce the risk of potential irritation of topical medications when treating acne patients.

When acne lesions resolve in patients with skin of color, they frequently leave behind hyperpigmented macules that can persist for months to years. In fact, PIH may develop after any type of inflammation in the skin.[1] While topical acne medications are extremely efficacious, their most common side effects are local cutaneous adverse events, including erythema, peeling, and burning. Medication-induced irritant contact dermatitis can also lead to PIH. This type of pigmentation can have a significant psychosocial impact on affected individuals,[2] so it is important to treat acne effectively while minimizing the risk of iatrogenic PIH.

SETTINGS AND METHODS

There are several methods by which irritation from topical acne medications can be minimized. Some pearls for selecting an appropriate treatment regimen for a patient with skin of color are discussed below.

When considering a topical retinoid or a benzoyl peroxide containing product, select ones with lower concentrations of the active ingredient. Clinical trials comparing potential irritancy of tretinoin microsphere 0.04% and 0.1% gels have demonstrated less irritation in the groups using the lower concentration product.[3] Similarly, tazarotene 0.05% cream has demonstrated less cutaneous irritation than tazarotene 0.1% cream.[4] Moreover, evaluations of benzoyl peroxide at multiple concentrations have demonstrated similar efficacy among 2.5%, 5%, and 10% creams. However, cutaneous adverse events from the 2.5% containing cream were statistically significantly lower than the 10% cream.[5]

Consensus guidelines for the treatment of acne recommend the use of combination therapy. Multiple medications with different mechanisms of action can effectively address the multiple pathophysiological factors that lead to acne.[6] An added benefit of combination therapy is the reduction of potential irritation of topical retinoids from the other products. In a clinical trial comparing the use of adapalene 0.1% gel alone to fixed-dose combination clindamycin 1%/benzoyl peroxide 5% (C 1%/BPO 5%) gel (tube) in the morning and adapalene 0.1% gel in the evening, there was less cutaneous irritation in the combination therapy group. This was attributed to mitigating effects from excipients in the C/BPO product.[7] A second study comparing tazarotene 0.1% cream along with CP 1%/BPO 5% gel (tube) in combination with tazarotene 0.1% cream showed similar results. While the difference was not statistically significant, a trend of less peeling was observed in the combination group and was attributed to moisturizing ingredients in the C/BPO product.[8] Finally, fixed-dose combination adapalene 0.1%/benzoyl peroxide 2.5% gel in a vehicle with two humectants has been shown to be a safe treatment in patients with skin of color. In a meta-analysis of three randomized, double-blind studies of over 900 participants, patients with Fitzpatrick skin types IV–VI were no more susceptible to cutaneous irritation than those with Fitzpatrick skin types I–III.[9]

Topical retinoid therapy monotherapy can be an appropriate treatment for some acne patients, especially those with primarily comedonal disease.[6] Moreover, in patients with skin of color, topical retinoids may help improve post-inflammatory pigmentation.[10-12] While effective, topical retinoids commonly cause skin erythema, peeling, and dryness, especially during the initial two week retinization period. One way to help minimize these cutaneous side effects is the use of a moisturizer prior to application of the retinoid. A study evaluating the use of tazarotene 0.1% cream alone compared to moisturizing twice daily along with tazarotene 0.1% cream showed statistically significant reduced dryness in the moisturizing group ($P<0.01$) and a trend towards less erythema and

peeling. The evening moisturizer was applied 20 minutes prior to application of tazarotene. Efficacy was equivalent between groups and unaffected by moisturizing prior to application of tazarotene.[13]

CLINICAL BOTTOM LINE

Minimizing iatrogenic irritation and post-inflammatory pigmentation can be achieved by 1) the use of lowest concentration and least irritating products possible; 2) the use of combination therapy with products with moisturizing vehicles; and 3) the use of moisturizers in combination with topical medications

DISCLOSURES

Dr. Zeichner has served as an advisory board member, consultant, or investigator for Coria, Galderma, Medicis, Onset Dermatologics, and Ortho Dermatologics.

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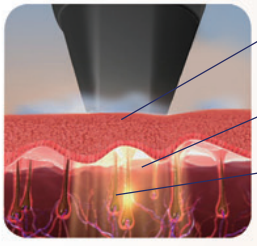

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