

# CAUTION!!! While using Chemical Peels for Hyperpigmentation on Indian Skin

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**Abstract:** *Hyperpigmentation is a common condition occurring in the dermis, epidermis or both is the darkening in both is the darkening of skin cause by an increased in the production of or distribution of melanin, it involves mainly the sun exposed areas, especially malar area (melasma). If after an injury it is turned into PIH (Post inflammatory Hyperpigmentation) where there is increase in the melanin production after injury. It's very common to use chemical peels as a first line treatment for this, but on Indian skin that Fitzpatrick skin type four and five the effects are very unpredictable. In this article I will discuss the parameters and reasons that are responsible for this and what precautions should be taken to get the maximum results from the treatment.*

**Keywords:** Melasma, Peels, Hyperpigmentation, PIH, Indian skin

## 1. Introduction

Chemical peeling is the process of applying chemicals to the skin to destroy the outer damage layers. It causes controlled destruction of a part or entire epidermis with or without the dermis, leading to exfoliation and removal of superficial lesions, followed by regeneration of new epidermal and dermal tissues. The epidermis regenerates from the epidermal appendages located in the remaining dermis. This process begins within 24 hours of wounding and is usually complete in 5-10 days. The new epidermis shows greater organization and vertical polarity, with the disappearance of actinic keratoses and lentigines. Dermal regeneration is a slower process but is usually complete within several months. The regenerated dermis demonstrates less elastosis and improved organization, with compact horizontally arranged bundles of collagen interspersed with elastic fibres. Ground substance is decreased and telangiectasias are absent. The overall result is soft supple skin that appears more youthful with fewer rhytids and dischromias.

Different agents and formulations are chosen based on their depth of penetration and risk profile. Destruction confined to the epidermis results in rapid healing without scarring, although some pigmentation change may be present if melanocytes are damaged. This superficial wounding has the disadvantage of producing less dramatic results but is very safe. Deeper wounding, extending into the papillary and, sometimes, reticular dermis, produces more dramatic results. However, deeper penetration eradicates a portion of the epidermal appendages, making healing slower and scarring more likely.

Penetration into the reticular dermis entails a very high risk of scarring.

### Types of treatments used.

1) Chemical peels act by causing controlled damage to various layers of the skin depending on the agent and methodology used. Caution must be taken when administering these agents, and a thorough history should be obtained before starting treatment. Side effects of chemical peels are variable, from mild transient effects, such as burning and skin irritation, to

more serious adverse effects such as scarring, infections and unwanted pigmentary shifts. When using chemical peels, studies have found that photoprotection and the use of HQ prior to administering the chemical peel can reduce the incidence of PIH.

### Glycolic Acid

Glycolic acid is a naturally occurring  $\alpha$ -hydroxyamide from sugarcane. Treatment concentrations range from 20% to 70% depending on the depths of peeling required, and neutralization can be achieved with water. This is generally considered the gold standard chemical peel for the treatment of melasma and can also improve fine wrinkles and sun-damaged skin. Numerous studies have examined the additive effects of glycolic acid in treating pigmentary disorders in skin of colour with therapies such as laser or Microneedling. Reported adverse events include transient irritation, burning and desquamation, with no reports of PIH.

### Salicylic Acid

Salicylic acid (SA) is a naturally occurring  $\beta$ -hydroxy acid from willow tree bark. Treatment concentrations range from 20% to 30%, depending on the study, and SA does not require neutralization. At these concentrations, numerous studies have shown SA to be well tolerated and effective in treating melasma in skin of colour. Only one study has reported its use in PIH. These studies have demonstrated that SA generally only causes mild side effects, such as dryness, itchiness and erythema.

### Jessner Solution

JS is a common combination peel consisting of resorcinol, SA, lactic acid and ethanol. This combination of different substances seems to work synergistically, ultimately allowing for reduced strengths of each individual component. Newer modified combinations of JS have also been popularized due to the possibility of potential allergic reactions to resorcinol. In a comparative study to 20% trichloroacetic acid, JS had similar efficacy post treatment with fewer reports of PIH in richly pigmented skin. In addition, when used in combination with a lower strength of 15% trichloroacetic acid, JS was also shown to be even more effective than monotherapy with fewer reports of PIH post treatment.

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**Trichloroacetic Acid**

Trichloroacetic acid (TCA) is an inorganic peel that can be used at varying concentrations as both a superficial and medium depth peel. Due to the risk of scarring or PIH is not used in Melasma.

**2. Approach and Methodology**

When we apply peel, it produces injury on superficial layer. There will be Inflammation → Proliferation → Regeneration. Melanocytes are Phagocytic cells that play the role in the inflammatory response. There is more melanin in the Indian skin, as melanin is responsible for UV protection and it protects against UV damage. Indian skin has more melanosomes, to protect the skin from UV radiation.

**2.1 Etiology of Facial Aging**

The etiology of facial aging is a broad subject. This article briefly discusses aging and contrasts it with sun and environmental damage.

When not compounded by extraneous factors, skin aging basically is the process of atrophy. Loss of subcutaneous tissue is the most obvious and recognisable sign of aging; however, skin, skin appendages, and cutaneous blood supply also atrophy with age. Both the epidermis and dermis thin, and cutaneous strength and elasticity are lost. Dermo epidermal adherence afforded by rete pegs is lost, and blistering or superficial epidermal loss commonly occurs with aged skin. Overall thinning and loss of integrity and wall strength of the cutaneous vasculature cause easy bruising.

Atrophy of the skin is a well-known process that occurs with aging. This process typically begins during the fourth decade of life. The outermost portion of the epidermis, the stratum corneum, becomes disorganized and less effective as a protective barrier to the external environment. A gradual decline in the number of melanocytes populating the basal layer of the epidermis also occurs. The dermo epidermal junction becomes flattened because of a decrease in the number of dermo epidermal papillae. More significant changes can be seen within the dermis, where an overall loss of organization occurs as this layer begins to thin with age. The amount of ground substance decreases, and elastic fibres degenerate, making the skin less resistant to deformational forces. Collagen is also lost, and the relative proportion of type I to type III collagen is reduced.

Environmental damage to skin often is explained incorrectly in the literature because of confusion between the short- and long-term changes that occur. Initially, as with most damage to the human body, the response is inflammatory. This tends to subside rather quickly in the skin, but continuous damage can result in prolonged inflammatory responses. Although post inflammatory hyperpigmentation is often considered a limited medical condition, most individuals express it to some extent, and prolonged exposure to damaging environmental factors results in tanning and prolonged hyperpigmentation. The increased volume of skin from inflammation tends to be transient and is caused by increased water volume from increased proteoglycans and glycosaminoglycans. The true long-term damage to skin from environmental stresses is a

decrease in the water volume and an increase in damaged cutaneous proteins. In particular, the elastic fibres tend to form tangled masses of nonelastic elastin remnants. This leads to increased volume of skin without functional elements. The solar elastosis or heliosis that is observed histologically is the end stage of this damage. In much the same manner that scarring or fibrosis is observed as the end stage of renal or hepatic disease, scarring and remnants of proteinaceous elements tend to be the end stage of cutaneous disease. Although contracture is present, the general trend in environmental damage of the skin is toward increased thickness, especially of the dermis. This thickening is with nonelastic and structurally weak skin. Sun damage, especially from ultraviolet (UV)-A wavelengths, causes ionization and oxidation of dermal elements and genetic information, resulting in premalignant and malignant skin lesions.

Many years of acne (both cystic and rosacea) increase the blood flow to skin and tend to hypertrophy the basic elements. Scar tissue also deposits and can contract, leading to uneven skin surfaces. True cysts and sinus tracts commonly result, and ice pick lesions usually are the visible manifestations of these processes. Actinic keratoses and lentigines are two examples of actinic damage, or photodamage.

**2.2 Understanding Brown Skin for Chemical Peels**

If you have a brown skin tone, you should know its unique properties and common challenges it faces before getting peeling treatment.

Here are the key properties of brown skin:

High Melanin Concentration in Brown skin has a higher level of melanin concentration than fair skin and thus, has a higher risk of hyperpigmentation as the pigment cells react quickly. As brown skin contains more melanin, it gets more protection against harmful sun rays. Dark skin has the same number of melanocytes as light skin. However, such cells produce larger melanosomes.

Brown skin contains more cellular layers, which makes it more compact and less prone to wrinkles and aging. Dark skin has more tiny blood vessels and sweat glands and is thus, a little oilier than fair skin. It also tends to get drier as its transdermal moisture losses more than light skin.

Asian skin has a high level of ceramide that helps in maintaining a strong skin barrier, holding moisture, protecting against irritants, and controlling moisture loss. A high ceramide content in Indian brown skin helps in strengthening the barrier and keeps it hydrated.

**2.3 Sensitivity to Pigmentation Changes**

Even after having a high ceramide content, brown skin is quite sensitive to pigmentation changes. Ceramides and sensitivity in your skin have a complicated relationship, which varies depending on multiple factors, such as environmental elements, genetic predisposition, allergies, irritation from skin care product ingredients, and other skin disorders. As brown skin is extremely sensitive to pigmentation changes, it demands special attention.

**Immediate Reactions to Deep Phenol & TCA Peels**

Here are the immediate reactions your skin may have after getting deep phenol peel:

**Irritation**

Your skin may irritate a little after doing the deep phenol peel. You can apply petroleum jelly or protective ointment to soothe your skin.

**Redness after chemical peel**

Some redness appears on your skin after the peel treatment. Redness can also get severe and can fade in a few weeks or months. Color Changes are there after chemical peel. The treated area may get lighter or darker than the surrounding skin.

**Burns and Scars after chemical peel**

A deep phenol peel may cause burns and scars, mostly on your face's lower portion. You can take steroid medications or antibiotics to reduce the appearance of scars.

**Crusting and Scabs after chemical peel**

After the deep phenol peel, you can see crusting and scabs appearing on your skin that may stay for 7 to 10 days.

**Swelling after chemical peel**

Once you get the treatment, you can see swelling on your face, mainly near your eyes. You can subside the swelling by applying an ointment.

**Allergies after chemical peel**

The peel with a high concentration may irritate your skin. Your skin may experience itching and stinging when it gets allergic after the peeling treatment.

**Infection after chemical peel**

A deep phenol peel may cause viral, fungal, or bacterial infection. People with herpes tend to get outbreaks after the peeling treatment.

**Increased Sensitivity to Sunlight**

The peel treatment increases your skin's sensitivity to sunlight by boosting the formation of sunburn cells and cyclobutene pyrimidine dimers. Avoid sun exposure after 1 week of peeling treatment to protect your treated skin from harmful UV rays.

**Long-Term Complications of Deep Peels on Brown Skin**

Besides mild side effects, brown skin may face long-term, severe, and life-threatening complications below after getting a deep phenol peel:

**Persistent Erythema**

Persistent erythema is your skin staying erythematosus more than that's normal for a chemical peel. Erythema tends to fade away in 2 to 3 months after getting the deep phenol peel. If erythema stays on your skin for more than 3 months, you should beware as it indicates potential scarring.

**Edema**

Edema tends to occur in 24 to 72 hours after getting the deep phenol peel. You should be careful during peeling if you have dry, thin, and atrophic skin, mainly in the periorbital region as

edema may occur in this area due to deeper penetration. Tachypnea, hoarseness, and stridor may develop a day after phenol peeling because of larynx hypersensitivity reaction irritated by cigarette smoking.

**Blistering**

Young people with sagging periorbital skin may experience blistering after the peeling treatment. A deep phenol peel may cause blistering, vesiculation, and epidermolysis, mostly in sensitive areas, such as the perioral region and nasolabial fold.

**Milia**

Milia are cysts that occur as an inclusion of the deep phenol peel healing process. You get milia in the initial few weeks of the healing period. The post-peel maintenance of the deep peel causes milia by blocking the pilosebaceous units by applying ointments. Patients with thicker skin are more exposed to the risks of getting milia.

**Hyperpigmentation**

Hyperpigmentation may develop on your skin any time after a peel. When not treated effectively, hyperpigmentation may be persistent. The complications from the peel can be dyschromia or transient hyperpigmentation, mainly in brown-skinned patients. Nevi and lentigines may occur temporarily when the current sun damages get cleared. Solar lentigines may return post a peel as the melanocytes responsible for pigmentation stay under the level of peel.

**Depigmentation**

You can see a bleaching effect after the deep peel mostly in the jaw neck area where the untreated neck skin touches the periorbital skin or rejuvenated cheek. The bleaching gets less noticeable and complicated in patients getting regional peeling since the melanocytes lose their abilities of melanin production.

Herpes simplex infection occurs on your face and perioral region suddenly as grouped erosion, which aches. You can easily treat active herpetic infections with antiviral agents. When herpes simplex infection is detected and treated early, it doesn't scar.

**Microneedling as a Best Option for Brown Skin**

Microneedling is a beauty treatment suited for skin tones varying from black to dark olive. This treatment has no risks as it involves no heat. Thus, people with darker and Indian skin tones don't experience PIH. This treatment hydrates facial skin and reduces the appearance of acne scars, wrinkles, and fine lines. It gets inside your facial skin, promotes your body's healing process, and boosts collagen production. This treatment takes almost 20 minutes with a minimum healing time. Your skin may heal in a day and you can resume your normal activities immediately after the treatment. You get radiant, glowing, and healthy skin.

**3. Results and Discussion****3.1 Points to Ponder**

So, we know that Phenols and TCA peels are not at all suitable for Indian skin. But the common AHA & BHA peels are good for the Indian skin. This peeling treatment exfoliates the top

layer of the skin and boosts the turnover of collagen and elastin which leads to firmer and lighter skin.

But even these peels when done frequently cause hyperpigmentation as there is recurrent injury which leads to increase in melanin production, and there is PIH or hyperpigmentation. And if we keep these peels for longer contact time, there is more injury caused.

Nowadays patients themselves are not ready for peels, because of chances of acne, dry skin, hyperpigmentation and milia.

Nowadays beauty products have AHA and BHA agents in it which make skin more sensitive and darker.

#### 4. Conclusion

After learning all this, understanding the mechanism and pathogenesis of chemical peel, I conclude that -

PIH and melasma are common relapsing disorders that are notoriously difficult to manage. Over the past decade, the management of these conditions has been altered due to newer agents gaining popularity as well as technological advancements. Currently, the single most important treatment option that should be included in the management of these disorders is robust photoprotection, which is both UV and VL blocking. HQ and HQ-containing combinations, such as TCT, remain the most well-studied options for topical management; however, cysteamine and topical TXA are reasonable alternatives. Oral TXA is a potential systemic treatment for patients' refractory to topical therapies. Chemical peels, such as GA and JS, could be useful for certain patients as an adjunctive therapy. Finally, LFQSL could be useful for patients with treatment-resistant lesions; however, extreme caution should be taken when considering procedural options in darker skin tones due to a high rate of recurrence and risk of post-treatment pigmentary anomalies. Treatment of melasma and post-inflammatory hyperpigmentation is an evolving area of research and therapies are expected to continue to develop.

- 1) Chemical peels AHA and BHA should be used with great caution.
- 2) Keep the peeling agent for lesser contact time which means we need to neutralize fast, try not to keep it for more than 2 minutes and we should start the contact time from 30 sec and gradually increase.
- 3) Big No for phenols and TCA.
- 4) Give a good moisturizer and sunscreen.
- 5) If you see erythema after neutralising peel, give low potency topical steroid for local application for at least 3 days.
- 6) In between peeling sessions, include some hydrating treatments.
- 7) If melasma is more combined, peeling treatment with microneedling.
- 8) Oral medications, oral tranexamic acid should be used.

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