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Step by Step®

Chemical Peels

Niti Khunger

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3rd Edition

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CHAPTER

11

Salicylic Acid Peels

Niti Khunger

Summary

- Salicylic acid is a lipophilic beta hydroxy acid.
- Available as 20–50% solution, gel, hydrogel, and paste.
- Useful in acne, pigmentation, photoaging, and hyperkeratotic lesions.
- Contraindicated in pregnancy.
- Safe in all skin types.
- Can cause burning, redness, dryness and irritation.
- Salicylism if applied on large areas.

Pro Tips

- Good peel for active acne and postinflammatory hyperpigmentation (PIH) alone or as combination peel with mandelic acid.
- Use alcoholic solution for oily skin, gel base or with propylene glycol for dry skin, lipohydroxy acid (LHA) or supramolecular salicylic acid (SSA) for sensitive skin.
- Alcoholic solution can evaporate every time the bottle is opened leading to higher concentrations toward the end of the solution. Transfer the stock solution into smaller bottles.
- It has limited penetration and is effective for superficial epidermal conditions.
- For dermal lesions, it should be used sequentially with glycolic acid (GA) or trichloroacetic acid (TCA).

- Peel Formulations
- Equipment and Reagents
- Indications
- Contraindications
- Priming and Prepeel Preparation
- Clinical Outcomes
- Postpeel Care
- Complications
- Bottomline

INTRODUCTION

Salicylic acid is a beta hydroxy acid (ortho-hydroxybenzoic acid), with a pKa of 3, commonly used as a peeling agent, either alone or in combination

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with other peeling agents. Unna, a German dermatologist, first reported on the use of salicylic acid for chemical peels.[1] In the early 1990s, Swineheart reported satisfactory improvement of photoaging and pigmentary changes on the hands and forearms using 50% salicylic acid.[2] Salicylic acid is naturally present in certain plants and fruits and derived from sweet birch, willow bark, and wintergreen leaves.

It is lipophilic and acts as a keratolytic agent by dissolving the intercellular lipids, surrounding the keratinized epithelial cells. Due to its lipophilic nature, it preferentially acts on the sebaceous follicle, has excellent comedolytic activity and hence is very useful for acne. It also has anti-inflammatory and antimicrobial properties. It can also enhance penetration of other agents.[3] A derivative of salicylic acid, lipohydroxy acid (LHA) has also been used in acne and found to be as efficacious, but better tolerated.[4]

PEEL FORMULATIONS

It is available as salicylic acid powder, slightly soluble in water, but highly soluble in 95% ethanol, ether, or methanol (common spirit). On application, the alcohol evaporates and the salt crystallizes on the skin forming a white precipitate. This appears like a frost and is called "pseudofrost" because it is not true frosting as seen with trichloroacetic acid (TCA) due to coagulation of proteins.

- Hydroethanolic solution on a weight-to-volume basis; salicylic acid powder 20 g; add 100 cc spirit or 95% ethanol to get 20%.
- Salicylic acid in a gel base is also available. The advantage of the gel is that no burning occurs on application. The disadvantage is that no pseudofrost is seen, hence uniform application of the peel cannot be judged. It has to be kept on the skin for a longer time as the peel penetrates slowly.
- A derivative of salicylic acid, capryloyl salicylic acid or beta-LHA 5–10% has been used and found to be effective in lower concentrations. It showed slightly better results in a split-face study, when compared with glycolic acid (GA) for pigmentation and photoaging.[5]
- LHA is more lipophilic than salicylic acid, penetrates slowly, and causes gradual exfoliation as compared to salicylic acid, which penetrates quickly and causes rapid lysis of desmosomes, resulting in exfoliation as sheets.[4] Hence, LHA is better tolerated.
- Salicylic acid paste (salicylic acid powder USP 50% methyl salicylate 16 drops, aquaphor 112 g). These can be used as body peels.
- A new formulation of salicylic acid called as supramolecular salicylic acid (SSA) has been reported to be water soluble and cause fewer side effects.[6] It is also a sustained release formulation, penetrating slowly and reported to be safer in sensitive skin. It has been used in acne[6,7] and rosacea.[8]

Storage: Store in glass bottles, away from light.

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Stability

It is not light-sensitive, but the concentration of the formulation of alcoholic solutions may increase due to evaporation of alcohol, when the bottle is repeatedly opened. This can cause severe burning and irritation.

Tip: Store the pure alcoholic solution in small bottles from the original large packing to prevent evaporation of the alcohol, every time the bottle is opened.

EQUIPMENT AND REAGENTS

- Salicylic acid solutions 20%, 30%, 40%, 50%
- Alcohol to clean the skin
- Acetone to degrease the skin
- Cold water
- Petrolatum or Vaseline® to protect sensitive areas
- Syringes filled with normal saline for irrigation of eyes, in case of accidental spillage
- Glass cup or beaker in which the peeling agent is poured
- Cotton tipped applicators or swab sticks
- 2″ × 2″ cotton gauze pieces
- Gloves
- Head band or cap for the patient
- Fan for cooling

INDICATIONS[3-12]

Salicylic acid peels are safe and can be used for all skin types I to VI.

- *Acne*:
  - Comedonal acne
  - Inflammatory acne **(Figs. 1A to D)**
  - Pigmented acne scars
  - Superficial acne scars **(Figs. 2A to C)**
- *Hyperpigmentation*:
  - Epidermal melasma **(Figs. 3A to D)**
  - Postinflammatory hyperpigmentation (PIH)
  - Freckles
  - Lentigines
- *Photoaging*:
  - Fine wrinkles
  - Dyschromias
- *Textural changes*:
  - Oily skin
  - Rough uneven skin
  - Dilated pores

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FIGS. 1A TO D: Active acne treated with 20% salicylic acid after 6 sessions at 2 weekly intervals along with systemic antibiotics. (A and B) Before treatment; (C and D) after treatment.

- *Keratotic lesions*:
  - Keratosis pilaris
  - Warts
  - Seborrheic keratosis
  - Actinic keratosis
- Rosacea

CONTRAINDICATIONS

General contraindications include an allergy to salicylates or aspirin, pregnancy, lactation, unrealistic patient expectations, and dermatitis at the peeling site.

PRIMING AND PREPEEL PREPARATION

As with all chemical peels, patient selection and counseling are important prerequisites to successful peeling. Detailed history and examination are

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FIGS. 2A TO C: Superficial acne scars treated with 30% salicylic acid. (A) Before treatment; (B) pseudofrost after application of 30% salicylic acid; (C) after 6 sessions every 2 weeks.

essential. Detailed informed consent and photographic documentation are mandatory before peeling.

Priming and skin preparation vary according to the skin of the patient. In darker pigmented skins, priming should be done with skin-lightening agents that are intended to be used postpeeling, such as hydroquinone, kojic acid, azelaic acid, or arbutin. Patients should be repeatedly educated on the proper use of broad spectrum sunscreens and safe sun protection. Retinoids like tretinoin, adapalene, or tazarotene should be used at night at least 2 to 6 weeks prior to peeling. They thin the stratum corneum, enhance epidermal turnover, decrease epidermal melanin, increase penetration of the peeling agent, and expedite postpeel healing. Retinoid dermatitis, if any, must be controlled prior to peeling.

In patients with thin sensitive skins, retinoids should be stopped 1 week before the peel and resumed only after complete re-epithelialization.

Patients with photoaging benefit from 6 to 12% GA cream and retinoids as priming agents 2–4 weeks before peeling.

In patients with acne active infection should be controlled with systemic antibiotics before peeling. Azithromycin is preferable as both doxycycline and minocycline are photosensitizing.

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FIGS. 3A TO D: Acne with melasma treated with 20% salicylic acid, 6 sittings at monthly intervals. (A and B) Before treatment; (C and D) after treatment.

Procedure

- The patient is asked to wash the face with soap and water.
- The hair is pulled back with a hairband or cap.
- The patient lies down with head elevated to 45° with eyes closed.
- Using 2″ × 2″ gauze pieces, the skin is cleaned with alcohol and then degreased with acetone or a prepeel cleanser which accompanies the kit.
- Sensitive areas of the face such as the lips, inner canthus of the eye, and the nasolabial folds are protected with a thin layer of petrolatum.
- The initial peel should be done with 20% concentration to assess patient reactivity to the peel.

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- Salicylic acid 20% is poured in a glass cup and quickly applied using a cotton-tipped applicator or a brush or a gauze piece. Application is done in a predetermined manner to the facial cosmetic units, starting from the forehead and progressing to the cheeks, chin, perioral area, nose, and lower eyelids. The whole procedure should be completed within 30 seconds.
- Two to three coats are applied to get a uniform peel. Feathering strokes are applied at the edges, to blend with surrounding skin and prevent demarcation lines.
- The patient will experience a stinging and burning sensation which increases over the next 2 minutes, reaches a crescendo at 3 minutes and then rapidly decreases to baseline over the next minute. This is considered the endpoint of the peel. Some patients may experience mild anesthesia of the face due to the peel. Portable fans reduce the burning sensation.
- As the hydroethanolic vehicle evaporates, it leaves behind a white precipitate of salicylic acid on the surface of the face which is termed as salicylic acid frost or pseudofrost **(Fig. 2B)**. This appears at about 30 seconds to 1 minute after applying the peeling agent. If there is an uneven area of salicylic acid frost the peel is reapplied in that area. The penetration of the active agent stops once the vehicle has volatilized. At this point there is no burning or stinging as the agent causes a superficial anesthesia to light touch. In a gel-based peel no pseudofrosting is seen.
- The patient is instructed to wash the face with water and pat the face dry.
- A bland soapless cleanser may be used to remove traces of residual precipitate.
- Patients are then sent home with a moisturizing sunscreen and instructed to limit sun exposure and use sunscreens appropriately.
- In case of salicylic acid gel peels, the peel is left over on the skin for 6–8 hours as the peel penetrates slowly.

Tip: If applying over a large area, such as the back, chest, or forearms, do not use high concentration (should be <30%) and instruct the patient to drink ample water to prevent salicylism.

CLINICAL OUTCOMES

A study compared the clinical efficacy and safety of 25% TCA versus 30% salicylic acid peels in the treatment of mild and moderate acne vulgaris in 25 patients in each group.[13] The peels were done at 2-week intervals for a total of 12 weeks. Both peels were effective in treating acne, with the TCA peel better for noninflammatory lesions, and the salicylic acid peel better for inflammatory lesions, but the differences were not significant. More patients in the TCA peel group experienced burning and stinging sensations and the salicylic acid peel was better tolerated. Another study comparing 50% GA and 30% salicylic acid peel for post acne pigmentation reported

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better improvement with GA.[14] Another study reported significantly better results when salicylic acid peel 20% was combined with isotretinoin as compared to isotretinoin alone.[15] Lekakh et al. combined salicylic acid peel with pulsed dye laser in acne and found better improvement when used in combination as compared to salicylic acid peel alone.[16] Another study treated acne and enlarged pores with 30% SSA for four sessions at 2-week intervals followed by 1,565 nm nonablative fractional laser for three sessions at 4-week intervals.[17] Significant improvement in acne and enlarged pores was reported, with decrease in sebum secretion. SSA peel 30% also improved papulopustular rosacea in another study.[8]

POSTPEEL CARE

Patients feel tightness of the skin after a peel. Sunscreens and moisturizers are used postpeel till desquamation subsides. Mild soap or nonsoap cleanser may be used. If there is crusting, topical antibacterial ointment should be used to prevent bacterial infection. They should avoid peeling or scratching the skin.

The topical skin regimen of skin-lightening agents, acne medications, GA, and retinoids is then resumed as appropriate, till the next peel. Peels can be repeated every 2 weeks, till satisfactory improvement. This usually occurs after 4–6 peels. Maintenance peels once a month or as and when required can be done thereafter.

Salicylic acid paste is used to treat dyschromias due to photoaging. It is applied under occlusion for 48 hours on the exposed areas of the neck, back, and arms. Desquamation occurs that heals in 7–10 days.

COMPLICATIONS

The best way to avoid complications is to identify patients at risk and use lighter peels and good postpeel care. The patients at risk are those with a history of PIH, keloid formation, and heavy occupational exposure to sun such as field workers, uncooperative patients, and patients with a history of sensitive skin unable to tolerate sunscreens, retinoids and hydroquinone.

Complications are uncommon with salicylic acid peels and are usually mild and transient. Excessive crusting, desquamation, inflammation, and erythema can occur **(Fig. 4)**. These should be treated aggressively to prevent PIH, particularly in skins of color. Frequent applications of moisturizers and topical steroid cream like hydrocortisone 1% are used to reduce side effects. More potent steroids are used if there is severe irritation. The skin returns to normal in 2–5 days. Bari et al. studied 268 patients with type IV and type V skin treated with 30% salicylic acid peels, weekly for various facial dermatoses such as acne and melasma and found it to be safe, with a low incidence of side effects.[18]

Salicylism is not observed when applied on the face but has been reported when large amounts of 50% salicylic acid paste are applied to 50% of the body surface, under occlusion. It is characterized by tinnitus,

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FIG. 4: Dryness followed by postinflammatory hyperpigmentation following 20% salicylic acid peel used for photoaging in type V skin.

dizziness, abdominal cramps, and deafness. The patient should be asked to drink copious amounts of water to prevent salicylism.

BOTTOMLINE

Advantages

- Safe in all skin types I–VI
- Peeling action is self-limiting since it crystallizes within a short time on the skin surface.
- Excellent peeling agent for acne
- Easy to visualize since it causes a white pseudofrost
- Causes superficial anesthesia
- Predictable results
- Less downtime

Disadvantages

- Limited depth of peeling, hence only superficial lesions can be treated.
- Causes burning when applied

CONCLUSION

Salicylic acid peels are safe and well-tolerated in all skin types, including skin of color. They give predictable results with less downtime. Salicylic acid is an excellent peeling agent for acne due to its lipophilic nature. It is effective for superficial epidermal conditions like epidermal melasma, oily skin, rough skin, and mild photoaging. However, it is less effective in patients with significant photodamage due to limited penetration.

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