

The Resurgence of Chemical Peels

a report by

Helen M Torok, MD

Medical Director, Trillium Creek Dermatology and Surgery Center



Helen M Torok, MD, is owner and Medical Director of Trillium Creek Dermatology and Surgery Center in Medina, Ohio. Prior to founding Trillium Creek, Dr. Torok opened HMT Dermatology Associates Inc., Medina, in 1978. She obtained her Fellowship in Dermatology from Case Western Reserve University in Cleveland, Ohio in 1978. Her affiliations include founder of the Ohio Society for Dermatological Surgery, founder of the American Society of Cosmetic Dermatology and Surgery (ASCDAS), Past-President of Medina County Medical Society, and member of the Ohio Society for Surgery, the American Academy of Dermatology (AAD), the Women's Dermatological Society (WDS), and the Akron Dermatology Society.

Chemical peels have been reported in medical literature since 1941, when Eller and Wolff described their use in the treatment of acne and scars of the face. The peels are a type of controlled wounding, with resultant collagen remodeling and resurfacing of the skin. With the increased interest in non-surgical skin rejuvenation, chemical peeling has had a resurgence because of its ease, safety, and availability. Skin disorders that benefit from treatment with peels include:

- acne;
- scarring;
- photodamage;
- actinic keratoses (AKs);
- rhytides; and
- pigmentary disorders.

Chemical peels are divided into three categories depending on the depth of the wounding (see *Tables 1* and *2*) Superficial peels penetrate the epidermis only, while medium-depth peels damage the entire epidermis and the papillary and upper reticular dermis. Deep peels penetrate to the mid-reticular dermis. The length of time for healing and the associated complications depend on the category of peel utilized and patient selection. Patient selection, skin priming, and peel selection are tantamount for optimum results with minimum side effects.

Patient Evaluation

The complete medical history of a patient should be reviewed and a physical examination should be performed. The history should include: eczema, sensitive skin syndrome, herpes simplex virus (HSV) infection, keloid formation, nicotine use, oral isotretinoin use, previous facial surgery, HIV, seborrhea, and the use of topical formulations including retinoids, adapalene, or glycolic acids, and previous X-ray treatments.

Patients with a history of recurrent herpes infections should receive one gram of Valtrex® (valacyclovir) three days prior to the peel—this should be continued

for three days post-peel. No peel should be initiated if the patient has an active herpes infection.

A history of oral isotretinoin use will cause a delay in wound healing resulting in an increased incidence of keloid formation. It is recommended that a peel should be performed six to 12 months after cessation of the oral retinoids. Topical retinoids cause disruption of the stratum corneum, enhance the penetration of the peel agent, and can help to induce more rapid healing.

Patients with a history of eczema or sensitive skin will react more to the peeling agent and require lower strengths or neutralized acids. Psoriasis patients may develop a Koebner phenomenon, while patients with sebaceous skin require more aggressive pre-peel degreasing.

Previous facelift or browlift surgical patients should wait six to 12 months for medium to deep peels, as the skin's blood supply may be compromised. Superficial X-ray therapy destroys the pilosebaceous unit, which will delay re-epithelialization and healing. Nicotine use decreases the blood supply and, in turn, can delay healing.

Skin type and the degree of photodamage must be documented by digital imaging. Skin type can be classified using the Fitzpatrick skin type scale (see *Table 3*). This scale is important when deciding the appropriate peeling agent. The Fitzpatrick skin type scale is used to predict a patient's pigmentary response to each chemical peeling agent. Fitzpatrick I and II can usually be treated safely with all chemical agents while types III–V have a much higher risk of developing post-inflammatory hyperpigmentation (PIH). PIH can be prevented by pre-treating with hydroquinone alone, or a combination bleaching agent as TriLuma®.

Included in the examination are the signed consent forms, clarification of the pre-peel and post-peel instructions, supplies to have on hand at home, emergency 24-hour phone numbers, and a candid discussion of expected results.

Priming the Skin for Peels

Pre-treatment preparation two to four weeks before the peel ensures an even take of the peeling agent by thinning the epidermal barrier, accelerating wound healing, and reducing post-inflammatory hyperpigmentation. Agents used include lactic acid, salicylic acid, Kojic acid, hydroquinone, tretinoin, retinol, glycolic acid, and azelaic acid. A broad-spectrum ultra violet (UV)A/UVB sunblock with a minimum of sun protection factor (SPF) 30 should be utilized in all peels. Those containing the stabilizer mexoryl are recommended.

Superficial Chemical Peel

Superficial chemical peels use the following:

- 10–35% trichloroacetic acid (TCA) peel;
- alpha-hydroxyacid (AHA) up to 70%;
- beta-hydroxyacid (BHA)—salicylic acid;
- tretinoin; and
- Jessner's—14% resorcinol, 14% salicylic acid, 14% lactic acid and ethanol.

Superficial peels penetrate the epidermis. The lower the percentage of the AHA or TCA the lighter the peel, penetrating the upper layer of the stratum spinosum. Increasing the strength of the peeling agent causes effective penetration of the entire epidermis.

AHA and BHA peels are effective for acne as they are keratolytic. The lower strength TCA can be used prior to or after 5-fluorouracil (5-FU) therapy for AK. A series of 20–25% TCA peels are effective for melasma (moderate photodamage). There is less edema and exfoliation with this regimen, allowing patients to resume normal activity in four to five days.

These peels are safe in all skin types but can result in some erythema and exfoliation, leading to some post-inflammatory hyperpigmentation in Fitzpatrick skin types IV–V. Healing time can be shortened and PIH can be prevented by pre-treating with tretinoin for four to six weeks prior to the peel.

Medium-depth Peels

Medium-depth peels use the following:

- solid CO₂ and 35% TCA;
- Glycolic acid (70%) and 35% TCA;
- Jessner's solution and 35% TCA;
- 88% phenol; and
- 50% TCA peel.

PEEL AWAY THE YEARS

THE SYSTEMATIC APPROACH TO OPTIMAL SKIN HEALTH

visible results
begin in-office



NEW! REJUVENATING UNI-DOSE PEEL PADS

30% to 70% non-neutralized "free" glycolic acid.

Guaranteed saturation level for consistent results.

Exclusive peel center houses Glytone's Professional System for effective and convenient in-office use.

NEW! VITACEUTICAL FACIAL SERUM

Daily anti-oxidant protection formulated with Delta-Tocopheryl Glucoside, a breakthrough in prevention.

Glytone offers a systematic approach to optimal skin health with a full range of indication based skincare to complement in-office procedures.

Call today
for more
information at
800.459.8663



GLYTONE

EXCLUSIVE TO PHYSICIANS

Because the best treatments
are available only through
physicians

Table 1: Chemical Peels Depth of Penetration

Very light	Wounds to the level of the stratum spiosum
Light, superficial	Wounds through the epidermis
Medium	Wounds to the upper reticular dermis
Deep	Wounds to the mid-reticular dermis

Table 2: Chemical Peeling Agents Classifications

Superficial	10–35% TCA Peel; Alpha-hydroxyacid (AHA) up to 70%; Beta-hydroxyacid—salicylic acid; Tretinoin; Jessner's solution
Medium depth	Solid CO ₂ and 35% TCA; Glycolic acid (70%) and 35% TCA; Jessner's solution and 35% TCA; 88% phenol; 50% TCA peel
Deep	Baker-Gordon peel; Venner-Kellson phenol peel

Table 3: Fitzpatrick's Classification of Sun-reactive Skin

Skin type	Color	Reaction to First Summer Exposure
I	White	Always burns, never tans
II	White	Typically burns, tans with difficulty
III	White	Sometimes mild burns, tans average
IV	Medium brown	Rarely burns, tans with ease
V	Dark brown	Very rarely burns, tans easily
VI	Black	Never burns, tans very easily

Fifty-five percent TCA has been the gold standard for medium-depth peels but, due to many complications of scarring and PIH, is used primarily for xanthelasma.

Combination peels of glycolic acid, solid CO₂, and Jessner's solution, followed by 35% TCA have replaced the 50% TCA peel. Combination peels are very effective for AKs, melasma, seborrheic keratoses (SKs), solar lentigenes, rhytides, and textural changes. Hyperkeratotic lesions need to be curetted or abraded prior to the peel solution application for maximum benefit.

Fitzpatrick IV–V skin type has an increased incidence of PIH with a medium-depth peel. However, this resolves over time and can be easily treated with hydroquinone 4% or a combination formulation, such as TriLuma®.

Post-peel patients experience erythema, edema, and exfoliation that resolves in eight to 10 days. Edema must be emphasized, as patients will have significant edema of the lips and eyes. Eighty-eight percent phenol is rarely used due to the significant risk of renal and cardiac toxicity. It can be performed slowly over one hour and by using a saline intravenous (IV) drip to flush the kidneys. Cardiac status must be monitored throughout the length of the procedure.

Patients with photodamage, dyschromias, and AKs who have a Fitzpatrick rating of I–III are the ideal

candidates for a medium-depth peel. There is resolution of the actinic damage in eight to 10 days and improvement in the quality of the skin, rhytides, and pores. This combination can also be used to blend the skin after laser resurfacing; for melasma, it can clear the pigment completely and effectively. Hydroquinone must be used as a pre- and post-treatment regimen. This is not a peel that is recommended for rosacea patients or acne patients as it may induce a 'flare-up'.

Deep Chemical Peel

Deep chemical peels, compared with CO₂ laser resurfacing, are recommended for Fitzpatrick skin types I and II. The results are dramatic for deep rhytides, scarring, laxity, dyschromias, and photodamage.

Permanent post-inflammatory hypopigmentation develops in a significant percentage of patients due to the direct melanotoxic effect of phenol. This is labeled the 'alabaster look'. The Baker-Gordon peel, published in 1962, is composed of croton oil (three drops), phenol (3ml), H₂O (2ml), and Septisol liquid soap (eight drops). This yields a 48.5% phenol solution and 2.2% croton. Morbidity is much more dramatic than with the medium peel, as edema, erythema, and exfoliation continues for 14 days or longer.

The Venner-Kellson phenol peel formula has a 62.5% phenol concentration, and a croton of 0.16%, which results in less pain and shortened healing time.

Combining Levels of Peel

Combining several different peels on the same patient will enhance the effects. One can combine the CO₂ resurfacing, i.e. performed periorally, periorbitally for deep rhytides—Jessner's 35% TCA to the remainder of the face and Jessner's peel to the neck, shoulders, and chest.

Chemical peels can be combined with dermabrasion for deeper penetration, especially if there are hyperkeratotic lesions as SKs and AKs.

Complications

The primary cause of complications is inadequate training in chemical peeling. Proper storage, preparation, and handling of caustic peeling agents is vital. Formulations of TCA, phenol, and AHA are available from manufacturers. These are standardized formulas stored in appropriate containers that have appropriate material data safety sheets (MSDS) available.

Each peeling agent carries its own inherent risk of side effects and complications. The more aggressive and deeper the peeling agent, the greater the inherent risk of potential error and side effects that include the following.

- Edema—every agent can cause some edema. This is usually seen within 24–72 hours and is an expected sequelae of any peel. Periorbital and perioral edema may be significant and may require ice, drinking through a straw, and, at times, systemic corticosteroids. The oral steroids may delay wound healing and should not be used routinely.
- Pain—a very common and expected side effect of any agent. Superficial peels have little pain and medium-depth is very short lived, whereas deep peels may produce pain that lasts eight to 12 hours. Topical anesthetic agents, such as eutectic mixture of local anesthetics/liposomal 4% lidocaine cream (EMLA/LMX₄) can be used to reduce pain without affecting the depth of the peel.
- Persistent erythema—this is a natural response to the wounding of the peel agent. TCA peel erythema lasts two to three weeks and phenol peel erythema lasts six to eight weeks. Prolonged erythema must be carefully assessed as it can lead to scarring.
- Ocular injuries—rapid copious lavage with saline will dilute the acid and prevent corneal damage. Phenolic compounds require mineral oil lavages, as the saline will increase the potency of the acid.
- Acne—acneiform eruptions occur due to the occlusive nature of the emollient creams that are utilized during healing; this is self-limiting and they resolve on their own. Major eruptions may require oral antibiotics, such as minocycline.
- Infection—the acidic peeling agents are germicidal; however, the occlusive ointments with petrolatum promotes the growth of *Streptococcus pyogenes*, *Staphylococcus epidermidis* and *Pseudomonas aeruginosa*. *Pseudomonas* infections are the most common and

have a distinct sweet smell and lakes of pus. Dilute 0.5% acetic acid compresses are used for *Pseudomonas*. The risk of scarring is increased when infections occur.

- HSV—herpetic infection presents as a painful erosion, not a vesicle, due to the lack of an intact epidermis. Pre-treatment with Valtrex will diminish the possibility of a ‘flare-up’.
- Hypopigmentation/hyperpigmentation—infection and scarring can lead to hypopigmentation. Hyperpigmentation is more common in Fitzpatrick skin types III–VI and is seen after the inflammation subsides. Treatment with 4% hydroquinone and retinoids or steroids is helpful. Sun protection must be stressed.
- Milia—these occur two to three weeks after re-epithelialization and are due to the occlusive ointments that are used. Extraction may be necessary.
- Demarcation lines—an obvious line of pigmentary change may be seen when deeper peels are used. Feathering with a lower concentration of acid into the surrounding skin should be employed.
- Scarring—patients with a history of poor wound healing, keloid formation, isotretinoin use or X-ray treatments have an increased incidence of scarring. Non-facial skin, the neck, chest, and hands, scar readily from deeper peels. The hallmark for early detection of scarring is persistent erythema and pruritus. These should be aggressively treated with topical steroids and pressure dressings.

Summary

The cosmetic physician has many tools for facial rejuvenation. Chemical peeling continues to be an effective, safe, and economically desirable procedure. Once the peeling agents, indications, appropriate patients, and complications are mastered, the procedure will lead to superior results and satisfied patients. ■

Further Reading

1. Brody H J, “Chemical Peeling”, St Louis, Mosby Yearbook (1992).
2. Glogau R G, “Chemical Peeling and Aging Skin”, Journal of Geriatric Dermatology (1994); 2(1): pp. 30–35.
3. Coleman W P, Futrell J M, “The glycolic acid trichloroacetic acid peel”, Journal of Dermatologic Surgery and Oncology (1994); 20: pp. 76–80.
4. Monheit G D, “The Jessner’s-TCA peel”, Facial Plastic Surgery Clinics of North America (1994); 2: pp. 21–27.
5. Rubin M, Dover J S, Alam M, “Chemical Peels”, Procedures in Cosmetic Dermatology Elsevier Sauder (2006).
6. Rubin M, Manual of Chemical Peels, Philadelphia: Lippincott (1995).