IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 01, 2023

CHEMICAL PEELS

Aathira Madhu*, Prasanna Kumar P, Ankita Raj, Ankur Rathaur, Tuba Jamal, Achuth Mohan

Post Graduate, Department of Oral and Maxillofacial Surgery, Rama Dental College Hospital and Research Centre, Kanpur
Mailing Address: A-1/8, Rama Girls Hostel, Lakhanpur, Kanpur, Uttar Pradesh, 208024, India.
Corresponding Author: draathiramadhu@gmail.com

ABSTRACT

Chemical peels are useful cosmetic procedures for skin renewal. Their success can be attributed to their simplicity and versatility. Chemical peels are categorized as superficial, medium, or deep based on how far the peeling solution penetrates the skin. The procedure's outcomes are dependent upon the chemical and its concentration, application technique, duration of contact, skin type, readiness, etc. The degree of peeling affects the patient's discomfort both during and after the treatment, how quickly they heal, how frequently they may experience side effects, and the outcome. Chemical peel can reduce or improve fine lines and wrinkles, acne scars, uneven skin colouring and skin imperfections.

INTRODUCTION

Over the centuries numerous techniques have been employed to reverse the ravages of age and the effects of cutaneous disease. A chemical peel involves applying a caustic solution externally to the skin with the goal of improving the treated tissue's structure visibly. It can speed up the skin's natural exfoliation processes, but it can also essentially cause protein coagulation or lysis, which will kill the epidermis and a significant section of the dermis[1].

Chemical peels help to rejuvenate the skin by encouraging the growth of new, healthy epidermal cells and eliminating the keratin layer of dead skin cells that rests on the skin's epidermal surface. They are made to intentionally injure the skin to a predetermined depth. The texture and look of the skin will improve while the healing process takes place. This method promotes the formation of epidermal tissue while stimulating collagen in the dermis underneath, which results in a tighter appearance and more evenly distributed melanin[1].
Chemical peels are a class of therapies unto themselves and are one of the earliest methods of skin regeneration. They have a histological, chemical, toxicological, and clinical basis and are both adaptable and efficient.

CLASSIFICATION

Chemical peels are divided into 3 categories depending upon the depth of the wound created by the peel[3].

- **Superficial peels**, which exfoliate epidermal layers without going beyond the basal layer.
- **Medium-depth peels**, which reach the upper layers of the dermis down to the papillary dermis.

- **Deep peels**, which remove the papillary dermis and reach the reticular dermis

In general, the depth of the peel determines the patient's inconvenience during and after the procedure, the healing time, the rate of the potential side effects, and the results[2].

MECHANISMS OF ACTION OF PEELS

Superficial peels

Glycolic acid targets the corneosome by enhancing breakdown and decreasing cohesiveness, causing desquamation. Superficial peels with AHA also increase epidermal activity of enzymes, leading to epidermolysis and exfoliation[3].

Medium peels

Medium-depth peels, such as TCA, cause coagulation of membrane proteins and destroy living cells of the epidermis and, depending on the concentration, the dermis. New, healthy keratinocytes replace abnormal cells and stimulate the skin to produce new collagen[4]. The depth of skin necrosis correlates closely with the potency of the medium-depth peel.

Deep peels

Deep peels coagulate proteins, which produces the frosting seen clinically, and produce complete epidermolysis[5].

CHEMICAL SUBSTANCES USED FOR PEELINGS

Glycolic acid peel

GA peels have anti-inflammatory, keratolytic, and antioxidant effects. GA targets the corneosome by enhancing breakdown and decreasing cohesiveness, causing desquamation. The intensity of GA peel is determined by the concentration of the acid. GA peels need to be properly neutralized in order to stop acidification of the skin.

Salicylic acid

The efficacy of SA in the treatment of photoaging and acne has been described in patients with Fitzpatrick skin types I–III as well as in skin types V and VI.

Tretinoin peels

Tretinoin peels at varying concentrations may be used to treat acne, although supportive clinical trial data are sparse.

Lactic acid

When applied regularly, lactic and glycolic acids (at 3%, pH 3) lose a significant percentage of their capacity to destroy corneocytes and renew the epidermis around the 12th week.

At a concentration of 50%–70%, lactic acid produces the same amount of exfoliation as glycolic acid.

As early as 1974, it had been shown that lactic acid improved skin hydration and suppleness and that a pH of 3 was more effective than a pH of 5. Lactic acid is also a better hydrator than urea or glycerol. Some studies tend to show that 3 weeks of daily application of 12% lactic acid would allow as much collagen to be deposited in the papillary dermis as applying 25% trichloroacetic acid (TCA) or phenol[6].

Jessner solution

Jessner solution consists of salicylic acid (14 g), resorcinol (14 g), lactic acid 85% (14 g) and ethanol (100 mL q.s.). It is a clear, amber-coloured solution that needs to be kept in a brown bottle to prevent photo-oxidation.Jessner solution is generally applied in two to three coats before mild erythema and delicate, patchy frosting develops. It does not require neutralisation. Patients may experience a burning sensation with this peeling agent. It can be used as a preparatory peel to enhance the penetration of another peeling agent such as TCA[7].

Pyruvic acid

Also known as acetyl formic acid, pyruvic acid is an a-keto acid that differs from AHA by having a carbonyl group in the position of a carboxyl group. It is a potent peeling agent with a pKa of 2 and is soluble in water and ethanol. Pyruvic acid is physiologically converted to lactic acid and is used in concentrations of 40–70%. It causes ablation of the stratum corneum and dermo-epidermal separation resulting in decreased epidermal thickness. Over a long term it induces increased collagen, elastic fibre and glycoprotein deposition in the papillary dermis[8]. Pyruvic acid causes intense pain on application and its vapour is pungent and irritating.

Resorcinol

Resorcinol is a phenol derivative. It has a pKa of 9 and is soluble in water, ether and alcohol. It is used in the treatment of acne, acne scars, hidradenitis suppurativa nodules and melasma. Adverse effects associated with resorcinol include allergic and irritant contact dermatitis, myxoedema and ochronosis from prolonged use, and methaemoglobinaemia[5].

Trichloroacetic acid

Trichloroacetic acid also known as trichloroethanoic acid and trichloromethane carboxylic acid, comes in the form of colorless or white crystals and has a distinctive sharp, pungent odor.

Trichloroacetic acid solution is compounded in a weight to-volume preparation. To prepare a 35% solution, we dissolve 35 g of TCA crystals in a small amount of water and add water to a total volume of 100 mL. Trichloroacetic acid is stable at room temperature and not light-sensitive.

GENERAL PRINCIPLES OF PEELING PROCEDURES

The process and the technique of a peeling procedure are largely determined by the chemical's nature and the concentration of the applied peeling substance. However, most peeling procedures follow a typical sequence of steps.

Chemical peel consultation

History

The pre-procedure consultation should begin with an assessment of the patient's motivation for chemical peeling as well as their expectations of treatment.

Examination

The physical examination should begin with assessment of skin colour using the Fitzpatrick skin phototype scale. Skin colour is used to predict the pigmentary response to chemical peeling and to guide the selection of patients for test-spot testing.

Patient selection

The ideal candidate for medium-depth and deep chemical peeling has a composite of blue eyes, fair complexion and female sex. Dry skin, superficial fine rhytides and minimal gross redundancy are other desirable characteristics.

Test-spot testing

Test spot testing involves the application of the medium-depth or deep-peeling agent to a small area of skin in an inconspicuous area or at the edge of the treatment field.

Pre-peel care

Priming is a term that encompasses all pretreatment and preparation activities that are performed on the skin prior to chemical peeling[7].

Pre-peeling preparation (priming)

Pretreatment of the skin should begin at least 2–4 weeks before the chemical peel and ceased 3–5 days prior. Patients should be instructed to limit their UV exposure and apply a broad-spectrum sunscreen with a sun protection factor of 50+ that blocks both UVA and UVB each morning. Photoprotective activities are important as they prevent sunburn, diminish tanning and reduce melanocyte activity. Sunscreen should ideally be instituted 3 months prior to the procedure and continued indefinitely thereafter[9].

Pre-treatment

A pre-treatment cleansing step directly prior to the actual application of the chemical peel substance is a consistent part of every peeling protocol. It is crucial to obtain a homogeneous penetration of the peel and thus a uniform result. The application technique is very simple. The skin is first systematically and thoroughly cleansed to remove fats and oils and to eliminate debris from the stratum corneum – some authors use acetone for this. The skin is then rinsed and dried[10].

Treatment

The peeling agent is then applied using, for example, compresses, cotton, an applicator or a brush. Contact time depends on the caustic agent used and the desired depth. The peel is neutralized with sodium bicarbonate or water, as necessary.

Each session is terminated with the application of a hydrating and healing cream. Some authors place bandages after treatment with medium-depth and deep peels. Treatment can involve the entire face or only a part. In the latter case, facial anatomy is divided into four aesthetic units (upper lip, both cheeks and forehead). Each unit is treated in its entirety to avoid an excessively visible demarcation line between treated and untreated zones.

Patients should be advised that the treatment may be painful:

- Usually, just a simple sensation of heat is experienced with superficial peels.
- With medium-depth peels, more intense pain may require local anaesthesia with an anaesthetic cream.
- Deep peels result in very intense pain that normally necessitates general anaesthesia.

Post-peeling care

After a superficial peeling, simple hydration is all that is required. For medium peel, downtime is necessary for about one week. Post-operative treatment to accelerate healing is required and is based on moisturizers. For deep peels, post-operative care is required for 10 days and unsightliness imposes social isolation during this time; healing care, based on moisturizers or bandages, and daily attentive surveillance are undertaken. Photoprotection with sunscreens is recommended for several weeks, especially for medium and deep peels. Prophylactic herpes treatment is often administered to patients suffering from frequent infections, especially for medium and deep peels.

Frequency of application

Superficial peels, especially with AHA and beta-hydroxy acids (BHA), require 4–6 applications, generally 2–4 weeks apart. Deeper peeling products are applied only once.

PEELING TECHNIQUE

Location, personnel and equipment

Chemical peeling should be undertaken in a dedicated procedural room with appropriate lighting, adequate ventilation and access to resuscitation equipment. An assistant should be present to position the patient, manage equipment and to blot tears from the medial canthal regions to prevent the backtracking of the peel agent into the eye. Under no circumstances should the patient be left alone during the procedure.

Patient

The patient undergoing facial chemical peeling should be positioned supine with their head elevated on a pillow at 45° and a towel placed around their neck. Their eyes should remain closed for the procedure and appropriate eye shielding provided where appropriate. A surgical cap or hair band is used to keep the hair off the treatment site[6]. Petrolatum or zinc oxide paste may be applied to the lateral canthi, nasal alar grooves, nasolabial folds, lips and oral commissures to prevent pooling of the peeling agent in these areas.

Pain control and anxiety management is an important aspect of patient care. This may be achieved by physical agents (e.g., cool packs and fans), oral agents (e.g., paracetamol, non-

steroidal anti-inflammatory agents and anxiolytics), regional nerve blocks and general anaesthesia.43 Superficial peels generally do not require anaesthesia, whereas phenol peeling often requires sedation, regional or general anaesthesia[4].

CONCLUSION

Chemical peels remain a rapid, safe and cost-effective technique for cutaneous rejuvenation, particularly in our ageing, photodamaged population. They are also a useful treatment option for certain dermatological conditions such as acne vulgaris, melasma, actinic keratoses and scarring.31 Successful chemical peeling is reliant on the proper selection of patients and peels. This comprehensive review provides clinicians with the theoretical and practical knowledge essential for the expert application of chemical peels.

Chemical peels are ideal for patients looking to improve skin texture and tone. They are simple office procedures, with little downtime. Newer peels, newer ways to peel and combinations with other procedures keep chemical peels among the top five minimally invasive aesthetic procedures performed globally.

Reference

1. Kin SW et al. Glycolic Acid versus Jessner's Solution: Which Is Better for Facial Acne Patients? A Randomized Prospective Clinical Trial of Split-Face Model Therapy, Dermatol Surg 1999;25:270–73
2. Grimes PE, The Safety and Efficacy of Salicylic Acid Chemical Peels in Darker Racial-ethnic Groups, Dermatol Surg 1999;25:18-22
3. Mandelsohn JE, Update on Chemical Peels, Otolaryngologic Clinics Of North America 2002;35:55-72
4. Kitzmiller JW et al. Comparison of a Series of Superficial Chemical Peels With a Single Midlevel Chemical Peel for the Correction of Facial Actinic Damage, Aesthetic Surgery Journal 2003;23:339-344.
5. Ahn HH, Kim IH, Whitening Effect of Salicylic Acid Peels in Asian Patients, Dermatol Surg 2006;32:372–5.
6. Sachdeva S. Comparative efficacy of 10-20% trichloroacetic acid and 35-70% glycolic acid peel in 60 cases of melasma, freckles, lentigines and postinflammatory hyperpigmentation, Journal of Pakistan Association of Dermatologists 2006;16:76-80
7. Kessler E, Comparison of a- and b-Hydroxy Acid Chemical Peels in the Treatment of Mild to Moderately Severe Facial Acne Vulgaris, Dermatol Surg 2008;34:45–51.
8. Khunger N. Standard guidelines of care for chemical peels, Indian J Dermatol Venereol Leprol 2008;74:S5-S12.
9. Garg VJ, Sinha S, Sarkar R, Glycolic Acid Peels Versus Salicylic–Mandelic Acid Peels in Active Acne Vulgaris and Post-Acne Scarring and Hyperpigmentation: A Comparative Study, Dermatol Surg 2009;35:59–65.
10. Landau M, Chemical peels, Clinics in Dermatology 2008;26:200-8.