Chemical Peels and Combination Therapies

CE
1.6
ANCC
Contact
Hours

Jennifer Linder, MD

The topical application of acids is one of the most dependable and widely recognized methods of improving the overall health and appearance of the skin. The goal of a chemical peel is to regulate and enhance the cellular turnover process—a complex system that ultimately leads to the shedding of cornified cells. In addition to maintaining healthy cell turnover rates, each of the most commonly used topical acids provides ancillary benefits. Numerous studies have shown that all chemical peel solutions stimulate collagen and glycosaminoglycan production, regardless of depth of penetration (Eskild, Hansson, & Blomhoff, 1994). Other modalities have also gained popularity and many of them may be successfully combined with chemical peels to create dramatic, visible results in the skin. By outlining a variety of chemoexfoliants, as well as some popular modalities, the clinician will gain a deeper understanding of the wide variety of combination therapies available for improving skin health.

Jennifer Linder, MD, is a dermatologist and Mohs micrographic skin surgeon, serving as CSO for PCA SKIN. She holds a clinical faculty position in the Department of Dermatology at University of California San Francisco, is a spokesperson for The Skin Cancer Foundation, and is a member of the AAD, the ASDS, and the ACMMSCO.

The author reports no conflicts of interest.

Address correspondence to Jennifer Linder, MD, 6710 E. Camelback Road, Suite 220, Scottsdale, AZ 85251 (e-mail: jlindermd@pcaskin.com).

DOI: 10.1097/PSN.0b013e318294cf71

COMMON PEELING AGENTS

Chemical peels are generally classified as superficial, medium or deep, depending on the depth of penetration after application (Brody, 1992). Certain peeling agents are capable of achieving a range of penetration depths, depending on the percentage employed and method of application. The agents listed later are the most commonly used acids used today for skin exfoliation, as well as the most appropriate for utilization in combination therapies.

Alpha hydroxy acids (AHA) include lactic, glycolic, citric, and malic acids, among others. For topical use, lactic and glycolic acids are the most deeply studied AHA. These acids offer many ancillary benefits, including humectant qualities, inhibition of *Propionibacterium acnes* bacteria proliferation, reduction of hyperkeratinization, and an inhibition of the melanogenesis process (Inan et al., 2006). Some studies suggest that AHA may have the ability to promote collagen synthesis in the skin while desquamating the corneocyte cohesions just above the granular layer (Clark, 1999).

Because of its degreasing properties, glycolic acid is best suited for oilier skin types and it has also shown efficacy in the treatment of hyperpigmentation. Glycolic acid's small molecular structure delivers hastened epidermolysis, making it more likely to induce inflammation and irritation in comparison to lactic acid—a larger molecule that penetrates more slowly. Lactic acid is indicated for patients with dry or dehydrated skin, dyschromias, sensitive skin conditions, and acne.

Alpha hydroxy acids are most typically performed as superficial peels, often used in blends with other peeling agents, making them excellent choices to incorporate into combined therapy protocols.

Salicylic acid (SA) is a lipophilic keratolytic that is considered a β-hydroxy acid. Salicylic acid has the ability to dissolve follicular impactions, reducing acne lesions. Also suitable for sensitive skin conditions, higher Fitzpatrick skin types and rosacea, SA provides notable anti-inflammatory exfoliation benefits (Grimes, 1999). This is a favorable option for Fitzpatrick skin types I–VI. Salicylic acid can be used in combined modality protocols, but because of its keratolytic action, it is best used in conjunction with modalities that are not used primarily for the removal of hyperkeratinization.

The *modified Jessner's solution* was the first documented blended acid peel solution. The original formula is a combination of 14% lactic acid, 14% SA, and 14% resorcinol—an effective chemoexfoliant and keratolytic. This solution offers marked improvements in acne, dyschromias, and the visible signs of extrinsic aging. The modified Jessner's solution is often administered because of its ease of use, extremely low risk of toxicity, and uniform peel depth (Rubin, 1995). This peel solution is recommended for Fitzpatrick skin types I–VI (Inan et al., 2006).

Trichloroacetic acid is a practical and versatile solution used in chemical peeling. Trichloroacetic acid stimulates collagen production and smoothes surface texture. It is ideal for the correction of rhytides, keratoses, dyschromias, and scarring (Harmon et al., 2006). Trichloroacetic acid also reduces hyperpigmented keratinocytes. Percentages range, on average, from 6% to 50%. Trichloroacetic acid, in general, is appropriate for all Fitzpatrick skin types; however, percentages higher than 10% should be avoided unless the patient is thoroughly prepared with dyschromia-controlling products. If higher percentages are used, one should not consider adding additional modalities to that particular protocol to avoid overtreatment.

Retinoids encompass all forms of vitamin A. The forms used most often for professional treatments are retinoic acid, retinaldehyde, and retinol. These agents encourage cellular turnover and regulation of abnormal desquamation, while reducing the incidence of corneocyte cohesion (Harmon et al., 2006). Science suggests that retinoids have the capacity to reduce the activation of matrix metalloproteinase enzymes, such as collagenase (Clark, 1999). Retinoids not only are melanogenesis inhibitors but also stimulate the production of collagen and discourage hyperkeratinization within the follicle (Draelos, 2005). Retinoids are safe for all Fitzpatrick skin types I–VI, although retinoic acid may induce significant amounts of topical irritation. If surface irritation is a concern, retinol is an effective alternative (Draelos, 2005). Retinoids typically cause little irritation upon application in a professional setting, so they are excellent options for combined modality treatments.

Blended acid chemical peels create favorable changes within the skin without inducing large amounts of inflammation or complications. A multitude of ingredients can be combined to treat many skin conditions and all Fitzpatrick skin types, making these particular peels an all-inclusive treatment option. Blended peels typically offer a combination of acids, in addition to melanogenesis inhibitors, hydrating agents, and anti-inflammatory and antioxidant ingredients.

Blended peels have been administered for well more than 20 years; over the last decade, however, there has been a noticeable spike of interest in the industry. Blended peel treatments are more controlled in their penetration than straight acid chemical peels; therefore, they do not need to be administered by the physician but can instead be applied by other staff members—physician's assistant, medical assistant, RN, or aesthetician.

Blended peels simultaneously induce exfoliation while also infusing the skin with added beneficial ingredients. These added ingredients often make it unnecessary to neutralize the acid, which can also be advantageous. Straight AHA peels, for example, require neutralization (Draelos & Lowe, 2002) (Dewandre & Rubin, 2006). If not neutralized, AHA can potentially collect in the upper portions of the skin, causing surface irritation and even burns. Neutralization, while necessary in this instance, can release more free carboxylic groups and reduce the pH of the skin even further, increasing stimulation and inflammation. By using several acids blended together, each can be used at a lower percentage, thereby maximizing outcomes, and minimizing side effects, including the risk of pooling in the epidermis (Dewandre & Rubin, 2006). Blended solutions are exceptionally good choices when creating combined therapies. Because of their combinations of multiple, lower percentage peeling agents, they are well-suited to these types of treatments.

MODALITIES APPROPRIATE FOR COMBINED THERAPIES

Microdermabrasion

This clinical device may be performed as a stand-alone treatment or in combination with other procedures. Microdermabrasion treatments are beneficial for a wide variety of patients and are used to decrease excessive stratum corneum (SC; Fulton & Porumb, 2004). This removal of SC leads to an increase in topical product penetration (Dudelzak, Hussain, Phelps, Gottlieb, & Goldberg, 2008). Microdermabrasion is contraindicated for those suffering with active pustular acne, impaired barrier function, and rosacea.

There are endless options when it comes to combined therapies that include microdermabrasion. This modality tends to produce dryness in the skin because of its removal of the SC. Because it disrupts the delicate moisture balance of the skin, even the lightest microdermabrasion treatment can lead to rapid moisture loss that lasts for a short period of time. It is recommended to avoid stacking microdermabrasion with other professional treatments known to be drying, such as modified and enhanced

Jessner's solutions, high percentage SA treatments, or chemical peels with high alcohol content. Instead, choose professional chemical peels that incorporate hydrating ingredients such as lactic acid to counteract the loss in moisture. Microdermabrasion also works quite well in conjunction with hydrating therapeutic masks.

The versatility of microdermabrasion also allows the clinician to combine it with other advanced modalities such as light-emitting diode (LED), ultrasound, intense pulsed light, and nonablative lasers. A general rule is to make only one pass when combining microdermabrasion with other procedures to avoid unnecessary complications.

Light-Emitting Diode

Light-emitting diode, commonly referred to as LED, is a double-sided electrical component that allows for energy to be released from only one end. Light-emitting diode is used as a light source for numerous items, including car dashboards, alarm clocks, and holiday lights. In skin care, LED lights are used to create a photobiochemical reaction within the skin. Because this modality does not exfoliate or cause inflammation and thermal injury to the skin, it can be combined with virtually any procedure (Trelles, Mordon, & Calderhead, 2007). The application of the lights should take place on clean, dry skin before any other professional or corrective treatments are applied. Once the LED treatment has concluded, any additional treatments may be conducted safely.

Ultrasound

Phonophoresis, a technique in which ultrasound waves are used to force topical products into the tissue, is a highly effective way to enhance the penetration of corrective products (Dudelzak et al., 2008). There is some level of heat involved with all types of ultrasound; therefore, the wound healing response activates collagen production. Combining procedures with ultrasound offers a variety of treatment options. Keratolytic treatments, such as SA, pumpkin, or papaya enzyme masks, can be performed before ultrasound to increase the penetration of topical corrective products. Remove any excess mask product thoroughly before proceeding to the ultrasound treatment so as not to push the active ingredients further into the skin. To combine with a chemical peel, be sure that all coupling gel or aloe vera gel is removed and the skin has dried completely. It is suitable to apply one layer of a superficial chemical peel to the entire treatment area to enhance results postultrasound. If combining ultrasound with a superficial chemical peel, always be mindful of the corrective just pushed into the skin. Although the integrity of the product is not compromised, the deeper penetration of the active ingredients may cause the skin to be more sensitive than normal.

Because intense pulsed light, radio frequency, and laser treatments are all thermal in nature, combining these modalities with peels in the same protocol is unadvisable.

When to Perform Combination Therapies?

Treatments involving multiple procedures are an effective way to touch on various skin concerns during one appointment and produce dramatic results. Combination therapy is, no doubt, a more aggressive approach to treating patients and should be done with care. It is critical to consider the mechanism of action of each modality before combining them into one treatment. This practice reduces the risk of thermal skin injuries and supports positive treatment outcomes.

Before performing multiple modalities during one appointment, be sure that you have successfully treated the patient with each selected treatment on its own before combining them into one procedure. Be certain that the patient understands the importance of a comprehensive skin care regimen and the use of postprocedure care before starting a progressive treatment program. Diligent use of a broad spectrum sunscreen product is by far the best insurance for their skin care investment and the most effective way to protect the skin from ultra violet damage. In addition, a detailed patient history taken prior to any treatment is integral to positive patient outcomes.

Achieving healthy, beautiful skin for your patients is the ultimate goal of all in-office and daily care treatments. Having a working knowledge of how each chemical peeling agent and treatment modality works alone and in combination with others will help reduce possible complications. Take the time to understand your patients' skin and educate them on the integral nature of compliance with your directions pre- and postprocedure. The safe and effective use of multiple modalities will help you and your patients achieve healthy, beautiful skin—effectively and safely.

REFERENCES

Brody, H. J. (1992). *Chemical peeling* (pp. 33–50). New York: Mosby Year Book, lnc.

Clark, C. P. (1999). Office-based skin care and superficial peels: The scientific rationale. *Plastic & Reconstructive Surgery*, *104*(3), 854–864.

Dewandre, L., & Rubin, M. G. (Eds.). (2006). The chemistry of peels and a hypothesis of action mechanisms. In *Chemical peels* (pp. 1–12). Philadelphia, PA: Elsevier Inc.

Draelos, Z. D. (2005). Retinoids in cosmetics. *Cosmetic Dermatology*, *18*, 3–5.

Draelos, Z. D., & Lowe, N. J. (Eds.). (2002). Glycolic acid and other

superficial peels. In *Textbook of facial rejuvenation: The Art of minimally invasive combination therapy* (pp. 49–59). Boca Raton, FL: CRC Press.

Dudelzak, J., Hussain, M., Phelps, R. G., Gottlieb, G. J., & Goldberg, D. J. (2008). Evaluation of histologic and electron microscopic changes after novel treatment using combined microdermabrasion and ultrasound-induced phonophoresis of human skin. *Journal of Cosmetic and Laser Therapy*, *10*(4), 187–192.

Eskild, L. W., Hansson, V., & Blomhoff, R. (Eds.). (1994). Vitamin A functions in the reproductive organs. In *Vitamin A in health and disease* (pp. 531–559). Boca Raton, FL: CRC Press.

Fulton, J. E., Jr., & Porumb, S. (2004). Chemical peels: Their place within the range of resurfacing techniques. *American Journal of Clinical Dermatology*, *5*(3), 179–187.

Grimes, P. E. (1999). The safety and efficacy of salicylic acid chemical peels in darker racial-ethnic groups. *Dermatologic Surgery*, *25*(1), 18–22.

Harmon, C. B., Hadley, M., Tristani, P., Tosti, A., Grimes, P. E., & De Padova, M. P. (Eds.). (2006). Trichloroacetic acid. In *Color atlas of chemical peels* (pp. 59–68). New York, NY: Springer.

Inan, S., Oztukcan, S., Vatansever, S., Ermertcan, A. T., Zeybek, D., & Oksal, A., et al. (2006). Histopathological and ultrastructural effects of glycolic acid on rat skin. *Acta Histochemica*, *108*, 37–47.

Rubin, M. G. (1995). *Manual of chemical peels: Superficial and medium depth*. Philadelphia, PA: Lippincott Williams & Wilkins.

Trelles, M. A., Mordon, S., & Calderhead, R. G. (2007). Facial rejuvenation and light: our personal experience. *Lasers in Medical Science*, *22*(2), 93–99.