

Chemical Peels

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The use of chemical peels to treat the aging face is well established and poses minimal risk when performed by educated practitioners. In addition to improving the texture of the skin and reducing hyperpigmentation and mild wrinkling, peels are also useful in the treatment of acne, rosacea, and melasma. In 1999, chemical peels were so popular that they were found to be the most common cosmetic procedure performed in the United States.¹ In 2006, chemical peels were second only to Botox among the top five minimally invasive cosmetic procedures performed by board-certified members of the American Society of Plastic Surgeons, with 1.1 million procedures performed.² The introduction of lasers in skin rejuvenation may have some impact on the frequency of chemical peel treatments. Although the claims of what chemical peels can do have been

frequently overstated, there is actually an abundance of research on the utility of these products, which are used in physicians' offices and salons worldwide.

Chemical peels are categorized based on the depth of the procedure: superficial, medium or deep. Superficial peels induce necrosis of all or parts of the epidermis, from the stratum granulosum to the basal cell layer (Figs. 20-1 and 20-2). Medium-depth peels create necrosis of the epidermis and part or all of the papillary dermis in the treatment area. The necrosis extends into the reticular dermis following deep peels.³ Currently, superficial peels are the most frequently performed peels, as intense pulsed light, laser resurfacing and dermabrasion have essentially supplanted medium and deeper-depth peels. Superficial- and medium-depth peels do not significantly ameliorate deep wrinkles or sagging skin, but can improve the color and texture of the skin thereby yielding a more youthful appearance. This chapter will focus on and differentiate between the most frequently used in-office types of superficial and medium-depth peels, including mechanisms of action, side effects and results obtained with the various acids

used in peels. Many of the ingredients in these peels are also found in home products; therefore, some skin care products will be mentioned in this chapter as well.

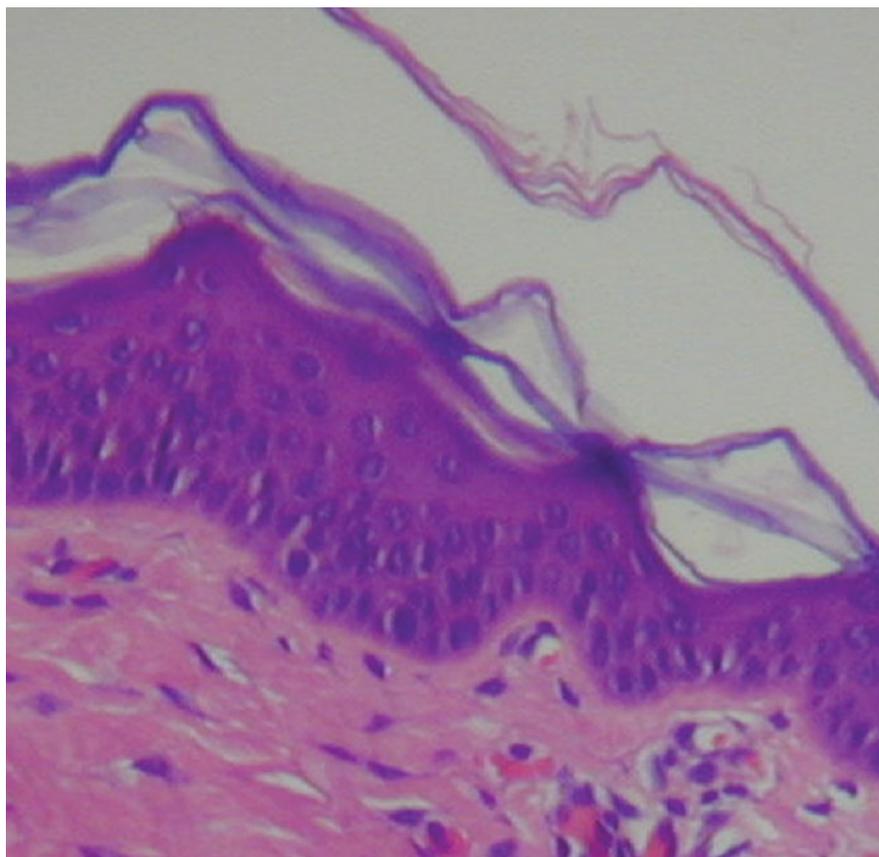
SUPERFICIAL PEELS

Although a wide variety of agents have been shown to be effective for superficial peeling, alpha hydroxy acids (AHAs), beta hydroxy acid (BHA), Jessner's solution, modified Jessner's solution, resorcinol, and trichloroacetic acid (TCA) are the most commonly used in-office peel compounds. All of these compounds produce effects on the skin by inducing desquamation with resultant hastening of the cell cycle. These solutions remove the superficial layer of the stratum corneum (SC), yielding skin that is smoother in texture and more evenly pigmented. The individual ingredients of these peels will be discussed but, notably, these ingredients are often used in combination. Many of these ingredients are found in home products as well.

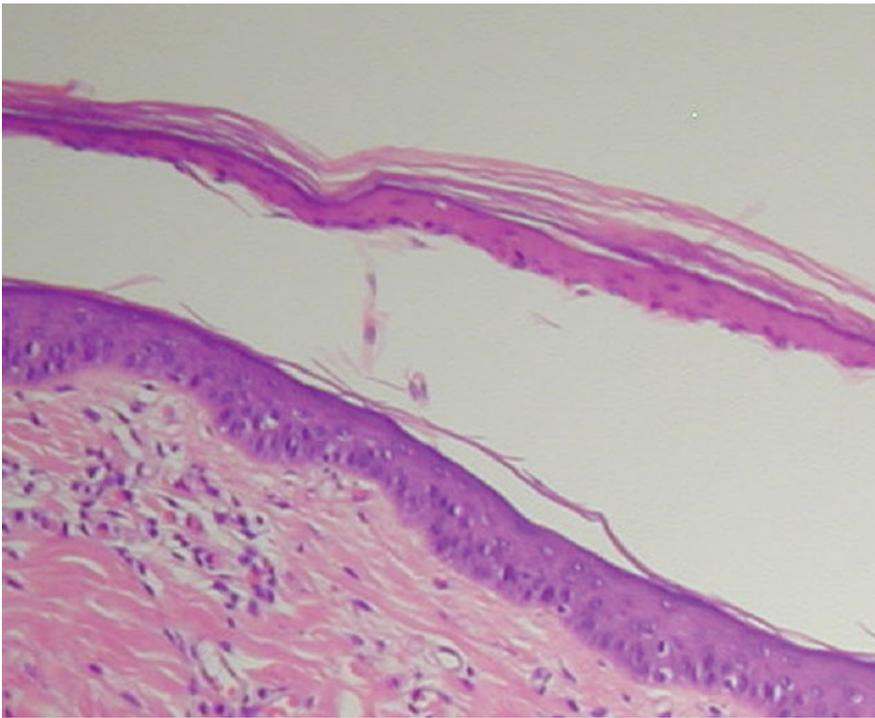
AHAs AND BHA

AHAs and BHA are naturally-occurring organic acids that contribute to inducing exfoliation and accelerating the cell cycle. Clearly there are myriad uses for AHAs and BHA in the practice of cosmetic dermatology. Authors have reported success using such products in the treatment of photoaging by improving mottled pigmentation, fine lines, surface roughness, freckles, and lentiginos. AHAs and BHA have also been used with success to treat actinic and seborrheic keratoses.⁴

Research in the 1970s demonstrated that topical preparations that contain AHAs exert profound influence on epidermal keratinization.⁵ AHAs and BHA affect corneocyte cohesiveness at the lower levels of the SC,⁶ where they alter its pH, thereby acting on the skin.⁷ When AHAs and BHA are applied to the skin in high concentrations, the result is detachment of keratinocytes and epidermolysis; application at lower concentrations reduces intercorneocyte cohesion directly above the granular layer, advancing desquamation and thinning of the SC.⁷ This has two major effects: quickening of the cell cycle (which is slowed in aged skin) and increased desquamation, which results in improvement of hyperpigmentation and a smoother skin surface.



▲ **FIGURE 20-1** A hematoxylin and eosin (H&E) stain of untreated normal bovine skin.



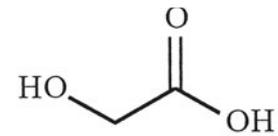
▲ **FIGURE 20-2** A hematoxylin and eosin (H&E) stain of bovine skin treated with a superficial chemical peel (two coats of the Pigment Peel Plus). This biopsy demonstrates a split in the spinous layer of the epidermis.

AHAs

AHAs are a group of naturally-occurring compounds that contain the hydroxy group in the alpha position. This versatile group of acids includes glycolic acid, which is derived from sugar cane, lactic acid, from sour milk, citric acid, from citrus fruits, and phytic acid, which is derived from rice. The use of hydroxy acids in skin care products dates back to ancient Egypt and Cleopatra, who was said to have applied sour milk to her face to enhance its youthfulness.

GLYCOLIC ACID Glycolic acid (Fig. 20-3) is the AHA most commonly used in chemical peels in the offices of dermatologists and aestheticians. It is popularly known as “the lunchtime peel” because it can be completed during the patient’s lunch hour and the patient can return to work without any telltale signs. The glycolic peel was one of the first superficial chemical peels to become popular because of its effectiveness and ease of use.

Well-designed studies have demonstrated the efficacy of AHA peels as a treatment for photoaging. In 1996, Ditre showed that application of AHAs resulted



Glycolic Acid (2-Hydroxyethanoic acid)

▲ **FIGURE 20-3** Chemical structure of glycolic acid. The OH group is in the alpha position; therefore, this is in the alpha hydroxy acid family.

histologically in a 25% increase in skin thickness, increased acid mucopolysaccharides in the dermis, improved quality of the elastic fibers, and increased collagen density.⁸ These findings are desirable because they imply that AHAs reverse some of the histologic signs of aging. This was again illustrated in a mouse model by Moon et al., who reported that mice treated with glycolic acid showed a significant decrease in wrinkle score and an increase in the amount of collagen synthesized.⁹ It has been well established that collagen synthesis decreases with aging (see Chapter 6); therefore, increased synthesis of collagen may help retard the aging process. This increase of collagen production after treatment with AHAs has been demonstrated both in vivo and in vitro by using fibroblast cultures. In fact, in a study by Kim et al., glycolic acid treatments increased fibroblast proliferation in vitro as well as collagen production.¹⁰ Glycolic acid peels are sometimes used in patients with acne; however, in a study by Lee et al., application of two glycolic acid peels (30%) or Jessner’s solution with a 2-week interval failed to display any effect on sebum production.¹¹ **Table 20-1**

TABLE 20-1
Commonly Used Glycolic Acid Peel Brands^a

PRODUCT NAME	COMPANY	PERCENT GLYCOLIC ACID	PERCENT FREE ACID	pH	NEUTRALIZED	BUFFERED	ADDITIVES
Refinity Skin Solution	Cosmederm Technologies	70%	70%	>1	No	No	Strontium Nitrate
M.D. Forté Glycolic Chemical Peel Kit I	Allergan	70% peel	48% glycolic and ammonium glycolate	2.75	Partially	Yes	
M.D. Forté Glycolic Chemical Peel Kit II	Allergan	99% peel	68% glycolic and ammonium glycolate	2.25	Partially	Yes	
Glyderm—50% GA swab	ICN	50%	Free acid is esterified; as such it probably is not active				Citric alcohol <5%
MicroPeel 20	BioMedic	20	20	1.3	No	No	Glycerin
MicroPeel 30	BioMedic	30	30	1.3	No	No	Glycerin
MicroPeel 50	BioMedic	50	50	0.8	No	No	Glycerin

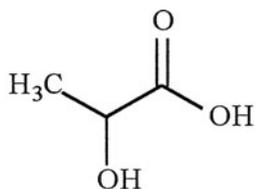
^aThe amount of free acid determines the strength of the peel. Esterified free fatty acid must be hydrolyzed to the free acid by the skin’s natural esterases to be active.

provides a list of the most commonly used glycolic acid peel brands.

Glycolic acid peels are inexpensive and easy to use. However, unlike many other peels, glycolic acid must be neutralized after use so as to prevent burning. For this reason, it is difficult to use on large areas of the body. It is best used in a small area on which application can be quickly applied and quickly neutralized.

LACTIC ACID Lactic acid (Fig. 20-4) is a popular AHA that is found in many at-home products and prescription moisturizers. It is usually not used as an in-office peel. Lactic acid is hypothesized to be part of the skin's natural moisturizing factor which plays a role in hydration¹² (see Chapter 11). Several studies on the activity of buffered 12% ammonium lactate lotion (LacHydrin™) have documented its moisturizing ability.¹³ Lactic acid also has been shown to impart antiaging benefits similar to those seen with glycolic acid. One study demonstrated an increase in skin firmness and thickness and improvement in skin texture and moisturization using 5% and 12% lactic acid. These effects were limited to the epidermis as no effect on dermal firmness or thickness was seen.¹⁴

OTHER EFFECTS OF AHAs Aged skin, in addition to manifesting wrinkles and pigmentation abnormalities, is generally dryer than younger skin. Most cosmetic dermatologists forget that AHAs are also effective moisturizing agents because they have humectant properties (see Chapter 32). Interestingly, lactic acid is one of the few ingredients in the United States that is available in the same strength over the counter (OTC) and in prescription form. LacHydrin™ is actually an FDA-approved drug for use in dry skin, but not for photoaged skin. AHAs are beneficial in dry skin because they function as humectants, causing the skin to hold onto water. They also



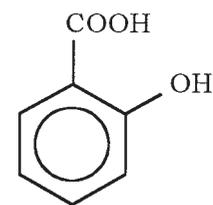
Lactic Acid (2-Hydroxypropanoic acid)

▲ **FIGURE 20-4** Chemical structure of lactic acid.

enhance desquamation thereby normalizing the SC by getting rid of the clinging keratinocytes that make the skin look rough and scaled. Once the desquamation is enhanced, the skin is more flexible and better able to reflect light. Although many patients with sensitive skin are afraid to try AHAs, the irritation induced by some of these acids has been shown to be related to the formulation rather than the AHA itself.¹⁵ In fact, AHAs have actually been demonstrated to reduce the irritation experienced when known irritants are placed on the skin. It is thought, but not proven, that AHAs can actually increase skin barrier function. In one study, glycolic acid, lactic acid, tartaric acid, and gluconolactone were compared in a double-blind, vehicle- and negative-controlled randomized trial. It was found that all of these AHAs protected the skin from irritation caused by a 5% sodium lauryl sulfate challenge patch test as measured by resulting erythema and changes in transepidermal water loss (TEWL). In fact, this study showed that TEWL is not altered by application of AHAs. It is interesting that AHAs are able to cause a sheet-like separation of the SC that is not associated with compromise of the barrier function.⁷ The exact mechanism of action of how AHAs impart this protection is currently unknown; however, these agents may prove useful in the management of skin diseases associated with diminished barrier function and a susceptibility to irritant contact dermatitis.

BHA

Also known as salicylic acid (SA), BHA is another commonly used type of in-office chemical peel used by aestheticians and cosmetic dermatologists. These formulations are also available in OTC home products that have lower concentrations of acids (usually 0.5%–2%) than those used in the office (usually 20%–30%). Derived from willow bark, wintergreen leaves, and sweet birch, SA is the only member of the BHA family, so named because the aromatic carboxylic acid has a hydroxy group in the beta position (Fig. 20-5). This is actually a misnomer because the carbons of aromatic compounds are traditionally given Arabic numerals (1, 2, etc.) rather than the Greek letter designations typical for the nonaromatic structures. It is likely that SA was labeled as a BHA at the time BHA peels were introduced in order to market the products and benefit from the popularity of AHAs. Although BHA is a newer category of chemical peels, SA is hardly a



Salicylic Acid

▲ **FIGURE 20-5** Chemical structure of salicylic acid.

new agent—it had a long history of effectiveness before it was labeled as a BHA.

Most physicians use preparations of 20% or 30% SA for in-office peels. Such peels have been shown to fade pigment spots, decrease surface roughness, and reduce fine lines,¹⁶ with similar results to those seen with AHAs. In the early 1990s, Swinehart reported satisfactory results using 50% SA on the hands and forearms of patients exhibiting actinically induced pigmentary changes in those areas.⁴ These effects are likely caused by increased exfoliation and an accelerated cell cycle, as seen with AHAs. However, unlike AHAs, BHA affects the arachidonic acid cascade and, therefore, exhibits anti-inflammatory capabilities. These properties may allow SA peels to be effective while inducing less irritation than AHA peels. A 1997 double-blind consumer-perception study of neurosensory discomforts after 3 weeks of use confirmed that SA is perceived by patients as being milder than glycolic acid. Of subjects treated with glycolic acid, 20% reported subjective adverse reactions, while 4% to 7% of the SA group reported such reactions.¹⁷ The lower incidence of perceived irritation caused by SA has contributed to the great popularity of in-office peels and home products that contain BHA. The anti-inflammatory effects of BHA make it a very useful peel in patients with acne and rosacea (Fig. 20-6). It can be combined with traditional acne therapy to speed the resolution of comedones and red inflamed papules (see Chapter 15). SA peels may have a whitening effect in patients with darker skin types. In a study of 24 Asian women who were treated with bi-weekly facial peeling with 30% SA in absolute ethanol for 3 months, some lightening of skin color was seen.¹⁸ These peels can also lead to postinflammatory hyperpigmentation. The risks of skin lightening or darkening should be explained to patients with darker skin types prior to their use. The trick is to use a strong enough peel to be



▲ **FIGURE 20-6** Beta hydroxy acid peels can be used to treat acne and photoaging on any part of the body. This patient was treated with BHA for acne and postinflammatory hyperpigmentation on the back.

effective but not strong enough to induce inflammation. If in doubt use a lower strength peel and titrate to stronger peels in future sequential treatments.

Another difference between AHAs and BHA is that BHA is lipophilic, which enables it to penetrate the sebaceous material in the hair follicle and exfoliate the pores.¹⁸ AHAs, which are water-soluble, do not exhibit this comedolytic characteristic¹⁹ (Table 20-2). Kligman

evaluated this phenomenon in a study that compared the number of microcomedones seen in biopsies of women treated with 2% SA to those from women treated with 8% glycolic acid. The glycolic formulation did not decrease the density of microcomedones, whereas a statistically significant ($p < 0.05$) decrease was seen after BHA application.¹⁷ Therefore, because of its lipophilic nature, BHA confers a stronger comedolytic effect than do AHAs.

BOX 20-1

It is important to note that the frost seen in a BHA peel represents precipitated SA, while the frost in a TCA peel represents precipitated skin proteins. These “skipped” areas seen in a TCA peel should not be touched up as they can be with a BHA peel, because the TCA peel frosting time depends on the concentration used. Lower concentrations take longer to frost. BHA peels frost in 2 minutes. Retouching the unfrosted areas of a TCA peel could result in burning the patient and should be strongly discouraged.

Although there is a wealth of evidence that suggests that AHAs stimulate collagen production, there are no published data examining the effects of BHA on collagen synthesis. Many authors postulate, however, that the increased collagen synthesis seen with AHAs and retinoids may be due in part to the resulting inflammation, which may stimulate collagen synthesis. If this is true, one would expect that SA would also increase collagen synthesis.

BHA also differs from the AHAs insofar as it does not need to be neutralized and the frost is visible once the peel is complete (Box 20-1). The practitioner can readily observe the uniformity of application of a BHA peel because of the white precipitate of SA that forms (Fig. 20-7).

TABLE 20-2
Comparison of AHAs and BHA

	AHAS	BHA
Useful in photoaging	Yes	Yes
Useful in acne	Yes	Yes
Useful in melasma	Yes	Yes
Useful for dry skin	Yes	Yes
Speeds cell cycle	Yes	Yes
Enhances exfoliation	Yes	Yes
Lipophilic	No	Yes
Inhibits arachidonic acid	No	Yes
Anesthetic properties	No	Yes
Anti-inflammatory properties	Maybe	Yes
Must be neutralized	Yes	No
Visible frost	No	Yes
Risk of salicylism	No	Yes (low)
Variety of available concentrations	Yes	A few
FDA-approved for prescription use	Yes (dry skin)	No
Shown to increase collagen synthesis	Yes	No
Useful in pregnancy/breast feeding	Yes	No



▲ **FIGURE 20-7** The white frost appears 2 minutes after application of the salicylic acid peel and signals that the peel is complete.



▲ **FIGURE 20-8** Prior to a superficial modified Jessner's peel. Note the solar lentigos.

Any areas that have been inadequately peeled can be easily identified and then treated by reapplying the BHA solution. Also, timing of the peel is unnecessary, and the risk of overpeeling is remote because once the vehicle becomes volatile, which occurs in approximately 2 minutes, there is very little penetration of the active agent. It is important to immediately use the chemical peel liquid once the cap has been taken off the bottle, otherwise it will evaporate and change the efficacy. In addition, do not use a fan when you use this peel because it will increase the rate at which the vehicle becomes volatile and will lessen the effect of the peel. Because neutralization of the BHA peel is unnecessary, it is easier to apply to larger areas of the body such as the back and chest that are difficult to adequately neutralize. However, it is unwise to peel large surface areas of the body with SA in one office visit. Although toxic levels of salicylates have not been reported in association with the concentrations currently used for SA

peels,³ there have been case reports of children with multiple excoriations and elderly patients with ichthyosis treated with topicals containing SA that developed salicylism.²⁰ Therefore, large body surfaces should be treated with care and the physician should watch for the signs of salicylism, which include nausea, disorientation, and tinnitus. Of course, BHA, whether in concentrations developed for in-office peels or in at-home products, is contraindicated in patients who are pregnant, breast-feeding, or allergic to aspirin.

Many home care product formulations contain SA. Typically, they are labeled as "acne washes" and contain 0.5% to 2% SA. These products are an excellent addition to a home care regimen for acne, rosacea, photoaging, and pigmentation disorders. Notably, irritation and skin dryness can result from such products, especially since patients tend to use higher and higher concentrations of home products to maintain exfoliation. Patients should use an

effective moisturizer in combination with BHA products to prevent this problem.

SA is currently a popular component of many in-office peels using a combination of ingredients. Examples include the Jessner's Peel, the PCA Peel™ by Physician's Choice, and the Pigment Plus Peel™ by Biomedic.

DISADVANTAGES OF HYDROXY ACIDS AHAs are a significant set of options in an anti-aging armamentarium; however, it is important for patients to have realistic expectations. Superficial chemical peels are only able to produce subtle changes in the skin with each peel. It is the cumulative benefits of the peels that yield the most noticeable changes in the skin. At least four superficial peels are usually necessary before patients can begin to see amelioration of photodamage, solar lentigos, and melasma. Those with more severe damage may require eight or more. If this is not explained to patients, they will become discouraged after one or two chemical peels and will not be compliant with the prescribed regimen. Patients must also be told that superficial peels are unable to correct moderate to severe wrinkles and scars even though many OTC cosmetic products promise these unrealistic changes. If patients' expectations are realistic, they will be pleased with the results that superficial peels can provide (Figs. 20-8 and 20-9).

Although AHAs are very popular as ingredients in daily cleansers and moisturizers, some experts have suggested that continued use of hydroxy acids may lead to a decrease in efficacy with continued use because of accommodation of the skin. It is postulated that this occurs because the skin becomes a better acid buffer and is able to more efficiently neutralize the effects of the acids.¹⁴ At this time there is no published evidence to support this claim, but this possibility should be kept in mind. It may be beneficial to have patients stop their hydroxy acid preparations periodically to enhance the efficacy of these products when used long term.

Although AHAs are well known to make the SC appear more compact, this effect has not been associated with the use of SA in the literature. However, it is likely that BHA has the same effect. AHAs, but surprisingly not BHA, were under scrutiny in the past because of the fear that AHAs "thinned" the skin. This has not been proven. There is concern that the thinner SC will provide less of a barrier to harmful environmental factors



▲ **FIGURE 20-9** After one modified Jessner's peel. The solar lentigos are mildly improved, but it will take at least three more peels for the patient to note a significant difference in these pigmented lesions.

such as ultraviolet (UV) light and toxins in the environment. Although studies have shown that TEWL is not affected by the use of AHAs, there was still concern that the barrier would be disturbed in skin treated with AHAs. In 1999, a study evaluated the barrier integrity of hairless guinea pigs after treatment with 5% and 10% glycolic acid at pH 3.0. Investigators found no increase in skin penetration of exogenously applied hydroquinone, musk xylol, and 3H water when compared to controls. However, they did find that the guinea pigs treated with the glycolic preparations had approximately a two-fold increase in epidermal thickness and almost double the number of nucleated cell layers as compared with the control group.²¹ This suggests that although the SC is thinned by AHAs, the overall epidermis is thicker. Another concern with AHAs is that they may increase photosensitivity. A study by Tsai et al. demonstrated that pretreatment of human skin

with 10% glycolic acid caused an increase in UVB-induced skin tanning in Caucasian and Asian subjects and an increase in UVA tanning in Asian subjects (but not Caucasians).²² Many cosmetic companies have also noted that increased numbers of sunburn cells have been seen in patients treated with AHA preparations. The FDA is now requiring that all AHA preparations be labeled to inform patients about photosensitivity and to advise using sunscreens.

EVALUATING AND COMPARING HYDROXY ACID PREPARATIONS The most important aspect of chemical peel strength is the amount of available free acid. The amount of free acid itself is affected by the following: concentration of the peel (% hydroxy acid), the pK_a of the acid preparation, the pH of the solution (which is also affected by the type of vehicle used), and whether or not the peel is buffered. Because of this complex interplay of factors, it is difficult to com-

pare one brand of chemical peel to another. For example, a 30% glycolic acid peel from one company is not necessarily the same strength as a 30% glycolic peel from another company. The acid percentage is only a small part of the story. It is necessary to consider the pH, the amount of free acid, the additive ingredients, and whether or not the peel is buffered before comparing different peeling brands.

The Significance of the pK_a In order to use AHAs and BHA properly, one must understand the pK_a and how the pH of a peel affects its efficacy. The pK_a of a substance measures its capacity to donate protons. The pK_a is the pH at which the level of free acid is the same as the level of the salt form of the acid. When the pH is less than the pK_a , the free acid form, the one responsible for exfoliation of the skin, predominates; when the pH is greater than the pK_a , the salt form predominates. The acid form is the “active form” in the peel because it causes exfoliation. It is necessary to have the proper balance of the salt and acid forms to have an efficacious peel with minimal irritation. The pK_a for salicylic acid is 2.97 while 3.83 is the pK_a for the AHAs.^{23,24} Because the pK_a of BHA differs from that of the AHA family, it is difficult to formulate a combination product containing both that reaches an optimal pH. For example, in a combination AHA–BHA product with a pH of 3.5, the AHA acid form would predominate but the BHA salt form would predominate. The effects of BHA would be rendered suboptimal then.

Significance of the pH The higher the pH, the more basic the solution is; the lower the pH, the more acidic the solution is. The irritation induced by a product is often directly related to how low the pH is. Lower pH equates to increased irritation, as well as efficacy.

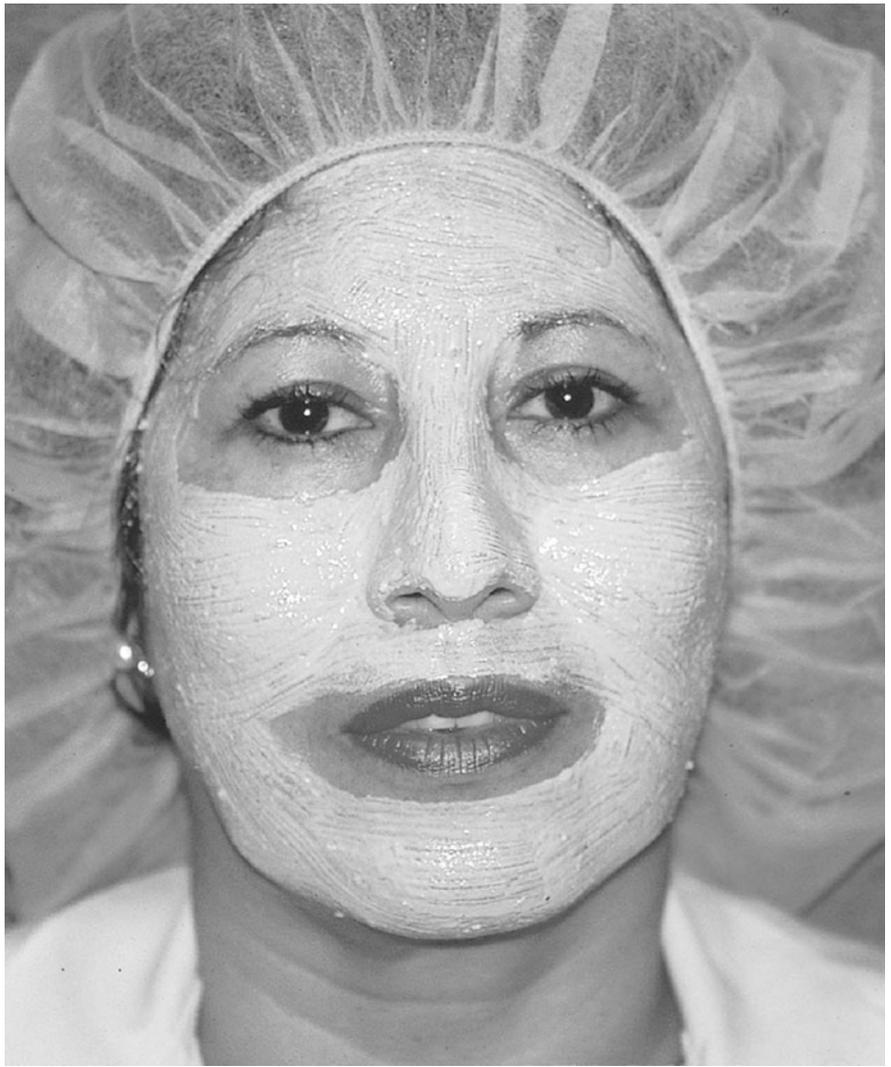
Buffered solutions Some chemical peel formulations are “buffered.” Many companies claim that this increases the tolerability of these agents. A product is buffered when a base such as sodium bicarbonate or sodium hydroxide is added to the solution. This produces an increased amount of the salt form, which results in less free acid and a higher pH. Buffered solutions are resistant to pH changes when a salt or an acid is added to the preparation. Because these solutions have a lower pH and less free acid, there is a decrease in side effects; however, there may also be a decrease in efficacy. These formulations are safer for

use by beginners and nonphysicians, which may account for their popularity.

Vehicle It is important to remember that the vehicle can also cause irritation to the patient. In fact, studies indicate that irritation associated with AHA products is usually related to the formulation of the product and not to the AHA itself.⁷ Also, the difference in vehicles can contribute to variations in the clinical response. Some companies add strontium nitrate (e.g., Cosmederm-7™) to decrease the sensory irritation of AHA solutions. In one study, when strontium nitrate and 70% glycolic acid were applied to the volar arm, patients exhibited less burning and stinging than when 70% glycolic acid was applied alone to the other arm.²⁵ There is no evidence that the strontium nitrate decreases redness or epidermolysis, but there is good evidence that it decreases the itching and burning sensations without affecting the efficacy of the glycolic preparations. Other agents that increase penetration, such as urea, may affect the efficacy of these topical products; therefore, it is important to know all the ingredients in each topical preparation.

RESORCINOL Resorcinol has been used as a chemical peeling agent since Unna described its use in 1882.²⁶ A phenol derivative, resorcinol (m-dihydroxybenzene) exhibits antipruritic, keratolytic, antimycotic, and antiseptic properties. It is mainly used as a treatment for pigmentary disorders and acne, but is also a lone peeling agent and a common component of combination chemical peels, including the Jessner's peel (Fig. 20-10). In a study of nine patients treated with a 53% concentration of resorcinol once weekly for 10 weeks, all subjects showed an average of 0.03 mm improvement in thickness of their epidermis and five patients exhibited enhanced elastosis. Verhoeff's stain showed an improvement of elastic fibers in all cases.²⁷

Care must be taken to limit the surface area treated because systemic toxicity similar to that seen with phenol has been reported. Prolonged use has been associated with myxedema because the drug has an antithyroid action and methemoglobinemia in children. Resorcinol is a primary irritant and a moderately strong sensitizer that seldom produces allergic contact dermatitis. However, contact allergy to resorcinol in topical acne products and in Castellani's paint have been reported.²⁸ Although resorcinol is very useful in the treatment



▲ **FIGURE 20-10** Resorcinol paste mask.

of hyperpigmentation disorders, it can cause hyperpigmentation in patients with a Fitzpatrick skin type greater than IV and should be used with great care in these patients. The possibility of deeper penetration and achieving a medium-depth peel with resorcinol is also worth consideration.²⁹ This can be achieved by pretreatment with tretinoin, increasing the absorption of the peeling agent.

Other Peels

Several popular peels consist of a combination of active ingredients. The first combination peel to gain wide usage was Jessner's peel. It is still commonly used today. Many peels such as the PCA Peel by Physician's Choice use a formula known as a "modified Jessner's peel." These peels contain many of the same ingredients as the classic Jessner's peel but employ different combinations. They will not be discussed in this chapter but are listed in [Table 20-3](#).

JESSNER'S SOLUTION This popular peel is a combination of resorcinol 14 g, salicylic acid 14 g, and lactic acid 14 g in a sufficient quantity of ethanol (95%) to make 100 cc of solution. It can be purchased already made from many companies. Dr. Max Jessner originally formulated this peel to reduce the concentration and toxicity of each of the individual ingredients while increasing efficacy.³⁰ The strength of the peel is determined by how many layers are applied and if it is used in combination with other peeling formulas. Jessner's peel is popularly used with other peels because it does not have to be neutralized. Once the peel frosts, a second type of peel such as TCA can be applied on top of the Jessner's peel to increase the depth of the overall peel. Although this peel is very safe, it should be used with caution on patients with darker skin types because resorcinol is associated with an increased risk of post-inflammatory hyperpigmentation in those with Fitzpatrick skin type IV and

TABLE 20-3
Examples of Superficial Peels Currently on the Market

Biomedic LHA Peel sold by La Roche-Posay contains 5% or 10% LHA lipohydroxy acid. The Biomedic Pigment Peel Plus™ contains 20% salicylic acid and 30% TCA in a glycerin base. It is sold by La Roche-Posay.

Esthetique Peel is sold by Physician's Choice™. It contains L-lactic acid, L-retinol, polyphenols, and antioxidants.

Jessner's Peel—contains resorcinol 14 g, salicylic acid 14 g and lactic acid 14 g in a sufficient quantity of ethanol (95%) to make 100 cc of solution. It is sold by many companies including Delasco.

Miami Peel S-30 is sold by Quintessence Skin Care. It contains salicylic acid 30%, ascorbic acid (vitamin C), green tea extract, and other antioxidants.

The PCA Peel is sold in 4 oz bottles by Physician's Choice. This peel comes in three forms (each is formulated at a pH of 2.2):

- PCA Peel® with hydroquinone and resorcinol: contains ethanol 52%, lactic acid 14%, resorcinol 14%, salicylic acid 14%, kojic acid 3%, hydroquinone 2%, and citric acid 1%.
- PCA Peel with hydroquinone: contains ethanol 55%, salicylic acid 15%, lactic acid 15%, citric acid 10%, kojic acid 3%, and hydroquinone 2%.
- PCA Peel without hydroquinone: contains ethanol 57%, salicylic acid 15%, lactic acid 15%, citric acid 10%, and kojic acid 3%.

Sensi Peel™ contains 6% TCA, 12% lactic acid, kojic acid, l-arbutin, meadowfoam oil, l-ascorbic acid, azelaic acid, chaste tree extract, and plant and marine polysaccharides. It is sold by Physician's Choice.

Ultra Peel I™ contains 10% TCA, 20% lactic acid, l-ascorbic acid, kojic acid, plant and marine polysaccharides, and chaste tree extract. It is sold by Physician's Choice.

Ultra Peel® II Exfoliating Treatment contains retinol and vitamin C. It can be layered over other peels to increase exfoliation. It is sold by Physician's Choice.

Ultra Peel Forte™ contains 20% TCA, 5% l-lactic acid, l-ascorbic acid, kojic acid, compound Z, and chaste tree extract (plant sourced progesterone). It is sold by Physician's Choice.

greater. Patients may also develop a contact dermatitis to resorcinol that manifests as redness and swelling. Topical or oral steroids may be used to treat this uncommon side effect.

Use of the Jessner's peel The solution can be used in conjunction with other agents like glycolic acid, 5-fluouracil, and TCA as it enhances the effects of each. When used alone, a thin coat of the solution is applied to all areas to be treated. Prior to treatment, a thin layer of Vaseline or Aquaphor is applied to the areas not intended for treatment, such as the nasalar grooves, where the solution tends to pool, and the lips. The practitioner should take precautions to avoid dripping the solution into undesired areas. The first coat is complete once frosting occurs (usually in 3 to 5 minutes). The patient usually experiences noticeable flaking for approximately 7 days. If a deeper peel is desired, two or three coats may be applied with a resulting elevation in peeling, efficacy and, of course, side effects. When using this peel on patients with a tendency to develop dyschromias, such as patients with melasma, postinflammatory hyperpigmentation, etc., it is a good idea to proceed slowly with one coat of the solution every 2 to 3 weeks to avoid exacerbating

the hyperpigmentation. This peel is excellent for use in acne patients because resorcinol is a well-known treatment for acne. It is also effective in rosacea patients because it contains salicylic acid. Modified Jessner's peel combinations containing added ingredients such as hydroquinone and kojic acid (see Chapter 33), or ones that omit resorcinol for individuals that are sensitive to this component, are available. In order to avoid systemic absorption and the combined effects of the resorcinol and salicylic acid, this peel should not be used on large body areas at once.³¹

TRETINOIN PEEL For several years, topical tretinoin has been successfully used in various preparations for the treatment of melasma, acne, and photoaging. Topical tretinoin is known to induce increased collagen deposition,³² and inhibit the metalloproteinases responsible for degrading collagen.³³ The tretinoin peel is not available in the United States; however, it is used in many countries such as Brazil off-label for the treatment of photoaging, melasma, acne, and keratosis pilaris. The peeling solution is orange in color, preserved in brown containers, and painted on the desired treatment site. The patient is advised to wash off the solution after 4 to 6 hours

of treatment. The peeling may be variable and usually begins after 2 days. Kligman et al. studied tretinoin 0.25% in a solution of 50% ethanol and 50% polyethylene glycol 400 in 50 women between 30 and 60 years of age with diagnoses of photoaging, rosacea, and acne. The solution was applied to the face by the patients every other night for 2 weeks and later, on a nightly basis. Patients showed clinical improvements as manifested by a smoother appearance of the epidermis, reduction of fine lines, and improvement of hyperpigmentation. Histologic examination of the skin revealed increased thickness of the basal layer and fibroblasts in the papillary dermis, decreased numbers of melanosomes, diminished SC thickness, and better organized rete ridges. Kligman and colleagues proposed that the effects of using low-strength tretinoin for 6 to 12 months may be achieved by higher strengths in 4 to 6 weeks.³⁴

Cucé et al. conducted a study on 15 women between 23 and 40 years old with Fitzpatrick skin types I to IV to assess the clinical and histologic effects of a 1% tretinoin peel. A pretreatment biopsy was done. The chemical peel was performed with an interval of 2 to 3 days and patients had the peel on for 6 to 8 hours. Fifteen days following the last application a second biopsy was performed, which showed increasing of the epidermal thickness and thinning of the SC.³⁵ These findings also correlated with clinically better looking skin. The histologic and clinical evaluation of patients' skin in this study indicated that to achieve the same effect of a tretinoin peel after 2.5 weeks one must use topical tretinoin for approximately 4 to 6 months. In another study of 10 patients with Fitzpatrick skin types III to V and moderate to severe melasma, a 1% tretinoin peel was compared to a 70% glycolic acid peel. The tretinoin peel was left on the treated area for 4 hours while the glycolic peel was placed for a maximum of 3 minutes. Both peels were found to be equally effective at 3 months posttreatment, though less erythema and desquamation were associated with the tretinoin peel, which was therefore better tolerated by the patients.³⁶

Side Effects of All Types of Superficial Peels

Although superficial chemical peels are very safe when used properly they can all cause erythema, itching, peeling, increased skin sensitivity, and even

epidermolysis. Allergic contact dermatitis has been reported to occur with resorcinol, salicylic acid, kojic acid, lactic acid, and hydroquinone. Irritant contact dermatitis has been linked to glycolic acid. Any peel can cause an irritant dermatitis when used with excessive frequency,

inappropriately high concentrations, or with a vigorous skin preparation using acetone or another “degreasing” solution. Patients with a recent insult to the SC, such as beginning a regimen with tretinoin, facial shaving, use of “exfoliating” scrubs and Buff-Puffs™, or kissing a

person with a heavy beard for prolonged periods, are more susceptible to chemical peels extending deeper than intended. Consequently, it is necessary to closely examine the condition of the skin and get a good history from the patient prior to performing a peel (Box 20-2).

BOX 20-2 How to Use Chemical Peels—Dr. Baumann’s Perspective

There are several brands of superficial chemical peels available on the market. In the case of AHAs, one must know the pH and concentration of free acid in the individual products in order to compare strength and efficacy across products. The practitioner must exercise extra caution when treating patients with darker skin types, regardless of the chemical peel selected, to avoid hyperpigmentation. For such patients, the practitioner should start with the lowest concentration of free acid and slowly increase the concentration.

1. At the first visit, assess the patient’s skin using a UV or Wood’s light to determine the extent of pigmentation abnormalities. This will help convince the patient of the necessity of sunscreen use. Take regular pictures and UV camera photographs if possible. Determine the patient’s Baumann Skin Type (see Chapter 9). Discuss skin care, sunscreen use and the importance of topical retinoid treatments (Chapter 30) and offer product recommendations based on the patient’s skin type. Also at this juncture, it is imperative to caution patients to refrain from using at-home topical AHAs, BHA, and other irritating ingredients such as vitamin C in order to avoid excessive skin irritation. In addition, the physician should make sure that the patient is not using another form of exfoliation such as facial scrubs or Buff-Puffs™. The practitioner should treat each patient, even those with type I skin, with the lowest strength peel of the chosen brand (or the one requiring the shortest duration on the face) on the first visit to ascertain the patient’s level of sensitivity. Explain to patients that they will not notice much difference in their skin after the first peel because it is only a low-strength solution used to determine their ability to tolerate the peel. It is important at each visit, but particularly so at the first visit, to find out if the patient has any significant forthcoming social obligations that might be compromised or made embarrassing owing to erythema or conspicuous skin flaking. There is a low incidence of hypersensitivity reactions (most commonly seen with the Jessner’s peel) that, according to Murphy’s law, occur preferentially in those patients with an important party or lecture coming up. Patients should return within 10 to 14 days for a follow-up and to receive the next peel.



▲ **FIGURE 20-11** Patient on Retin A with retinoid dermatitis. Peeling this patient will result in excessive redness and scaling. It is best to wait 1 week prior to proceeding with chemical peeling.

2. At the second visit, the practitioner can go to the next level in peel strength if the patient experienced minimal or no peeling after the initial peel. Most patients are started on a topical retinoid on the first visit so care must be taken to avoid peeling skin that exhibits “retinoid dermatitis” (Fig. 20-11). In such a case, the practitioner should refrain from performing a peel until the retinoid dermatitis resolves. On this visit, it is also important to assess how well the patient tolerates the social/psychological impact of peeling. If the patient complains about flaking skin or erythema, the physician should titrate the peels more slowly. If the patient feels that significant erythema and/or flaking are the sine qua non of an adequate peel, the physician may want to proceed more rapidly.
3. Visit Three and Beyond—Manufacturers of most superficial chemical peel brands recommend treatments at 10- to 14-day intervals. One may continue the peelings until the initial presenting symptoms have resolved and, thereafter, perform peels at 4-week intervals for maintenance. One should occasionally inquire about retinoid and sunscreen use to ensure patient compliance. After the third peel, patients should be consistently using the retinoids with no skin irritation. If this is the case, it is a good time to add an at-home AHA or BHA preparation. There are many brands to choose from and skin care product ingredients are discussed at length throughout this text to help you decide which products to recommend.

Postinflammatory hyperpigmentation is a rare complication in superficial chemical peels that are started at low strengths and titrated up very slowly. Grimes followed 25 patients with Fitzpatrick skin types V and VI who were treated with 20% and 30% salicylic acid peels.³⁷ These patients were pretreated with hydroquinone 4% for 2 weeks prior to peeling. Only three patients developed temporary post-inflammatory hyperpigmentation. No residual hyperpigmentation was seen. Several studies have shown that superficial peels can also be used safely in Asian patients.^{38,39} However, most dermatologists agree that these patients should be pretreated with a depigmenting agent and tretinoin and should be advised to use effective sun protection offering broad UVA and UVB coverage.

MEDIUM-DEPTH PEELS

Trichloroacetic Acid 10% to 40%

TCA became popular in the 1960s through the work of Ayres.⁴⁰ Low-strength TCA (10%–15%) is used to ameliorate fine wrinkles and dyschromias and to provide the skin with a smooth, healthy appearance. TCA, at these strengths, does not improve deeper wrinkles or scars.^{41,42} Higher-strength TCA (35%–40%) produces epidermal and dermal necrosis without serious systemic toxicity. It must be used with extreme caution, however, because hyperpigmentation and scarring can result. Practitioners should carefully select patients, noting that patients with darker skin types should not be treated with TCA as they have an increased risk for post-inflammatory hyperpigmentation.

TCA at 35% to 40% is the standard solution for medium-depth peels for the face and hands. When discussing the strength of TCA peels, it is imperative to discuss the strength in weight per volume (wt/vol) measurements. Unfortunately, not all authors use this form of measuring so one must take care when reading and basing a peel on the literature to know how the strength was calculated in order

to avoid underestimating the strength of the peel. This precaution reduces the risk of inducing scarring.⁴³ For instance, 25% TCA cannot be formed by diluting 50% TCA with an equal volume of water because this type of dilution is vol/vol and actually yields a solution stronger than 25% wt/vol TCA. When following a protocol from the literature, the practitioner should calculate the TCA percentage by wt/vol measurements to avoid mistakes. TCA can be purchased according to the desired wt/vol strength.

Following application of a TCA peel, denatured protein causes a “frosting” of the skin, signaling the completion of the peel. The time lag between the application and the appearance of the frost varies according to the acid concentration. The delay might last 5 to 7 seconds after application of 40% TCA, but can last as long as 15 to 20 minutes after application of a more dilute acid. This is crucial for the practitioner to remember in order to avoid overtreatment.

TCA can be applied alone or after use of Jessner’s solution or glycolic acid to achieve a deeper peel. Healing time is usually between 5 and 7 days for patients treated only with TCA and between 7 and 10 days for patients treated with a combination of TCA and either Jessner’s solution or glycolic acid.^{41,42}

Available Brands of TCA Peels

Many physicians use the Delasco brand of liquid TCA, which is available in various concentrations (Fig. 20-12). Other physicians prefer to use chemical peel kits that combine TCA with an indicator that reveals when the peel has frosted. Because there are legal concerns associated with the shipping of TCA, most of the companies that sell these kits require that the practitioner purchase the TCA solution separately. Table 20-4 lists the more commonly used TCA peels on the market. Biomedic developed a combination of TCA and SA called “The Pigment Peel Plus,” which is used for dyschromias and photoaging in addition to acne. Although one coat of these peels produces a superficial peel, several coats can



▲ FIGURE 20-12 Delasco brand trichloroacetic acid in varying strengths. These TCA peels may be used with a prep of glycolic acid (40% shown here) or Jessner’s solution.

be applied to increase the peel to one of medium depth. Other peels, such as the Obagi Blue Peel™, contain only TCA (Figs. 20-13 and 20-14). This peel is also applied in coats. One or two coats produce a superficial peel while three to four coats produce a medium-depth peel.

Pyruvic Acid

Pyruvic acid is an alpha ketoacid that is physiologically converted to lactic acid, thereby rendering it a chemical peeling agent while providing hydration to the skin. Pyruvic acid penetrates down to the papillary dermis and results in increased production of collagen and elastic tissue.⁴⁴ It is important to note that pyruvic acid must not be used in high- or full-strength concentration since there is the potential for scarring.⁴⁵ The pyruvic acid peel has been used



▲ FIGURE 20-13 Obagi Blue Peel kit contains cleanser and blue base. TCA must be purchased separately.

TABLE 20-4

Comparison of Costs and Properties of Available TCA Peels

NAME	COMPANY	STRENGTH	TCA INCLUDED	HOW SUPPLIED	COST	COST PER PATIENT	EASE OF USE	OTHER
TCA 30% liquid	Delasco	30% wt/vol	Yes	2 oz bottle	\$28.00	\$1.00	Fast	Clear, so can drip
TCA 40% liquid	Delasco	40% wt/vol	Yes	2 oz bottle	\$31.75	\$1.00	Fast	Clear, so can drip
Obagi Blue Peel	Obagi	4 coats	No	Box of 6 kits	\$475.00	\$80.00	Time-consuming	Blue, very hard to wash off



▲ **FIGURE 20-14** Obagi Blue Peel applied to hands.

with success in the treatment of moderate acne, photoaging, and melasma.⁴⁶⁻⁴⁸ Given the fact that pyruvic acid is converted into CO_2 and acetaldehyde, the CO_2 buildup in the bottle may lead to explosion if the container is left in place for a while.⁴⁹

This chemical peel is usually used at 40% to 60% concentrations on facial skin, previously prepared with topical retinoids. At such concentrations, it is considered a medium-depth peel and therefore must be used with caution in darker skin types or patients with sensitive or irritated skin. After 2 to 5 minutes, or when adequate frosting is observed, the face is soaked in water, which is more for the patient's comfort rather than neutralizing the peel.⁵⁰ Some authors recommend neutralizing a pyruvic acid peel with 10% sodium bicarbonate and water.⁴⁸ Since the vapors from the chemical peel may be strong and irritating to the upper respiratory tract, the procedure is best done in a well-ventilated room and with use of an electrical fan. Reepithelialization is observed in 1 to 2 weeks, while erythema may last for up to 2 months.⁵⁰ Pyruvic acid has also been used successfully in combination with 5-fluorouracil for the treatment of actinic keratoses and warts.^{51,52}

Side Effects and Precautions

Patients should be warned that they will look terrible for at least 10 days following a medium-depth peel. During the first 2 days, the skin appears slightly pink. On days 3 and 4 the skin darkens. By day 5

the skin begins to peel off in sheets. The peeling should be complete by day 10; however, the erythema may last until day 14. Patients should be shown pictures of how they will look so that there will be no surprises (Fig. 20-15). Many authors advise against using TCA at greater than 50% concentration. Contraindications for medium-depth peels include patients with darker skin types and those who have been recently treated with isotretinoin or topical radiation.⁵³ Because reepithelialization occurs from adnexal structures, some authors have theorized that patients recently treated for hair removal with lasers may have trouble healing after medium- or deep-depth peels. However, at this point, this complication has not been reported. One should be extra cautious when using medium-depth peels on the mandible, neck, and chest because these areas are more likely to get scars.

Patients should be warned that lesions such as solar lentigos may initially disap-



▲ **FIGURE 20-15** Patient 4 days after four coats of the Obagi Blue Peel. Patient should be told not to peel off the dark skin, but to let it peel naturally.



▲ **FIGURE 20-16** Patient with photodamage prior to one coat of a Jessner's peel followed immediately by the Accu Peel 16%.

pear and then return after the chemical peel. This occurs because the melanocytes that are responsible for pigmentation reside below the level of the chemical peel (see Chapter 13). The results will be improved if patients use retinoids, sunscreen, and hydroquinone or other bleaching agents (Figs. 20-16 to 20-18).

Following medium peels, as with superficial ones, it is important for patients to use sunscreen and to practice sun avoidance. Patients with darker skin types should use hydroquinone after the peel to lower the incidence of hyperpigmentation. Practitioners should administer antiviral medication to patients with a history of herpes simplex infection. Also, it is important for the practitioner to avoid overzealously applying TCA, which can cause scarring. Patients recently treated with isotretinoin are also particularly vulnerable to scarring from medium peels.

COMBINATION OF SUPERFICIAL AND MEDIUM-DEPTH PEELS

Many physicians use a superficial peeling method to decrease and even out the SC and follow that up with the applica-

tion of TCA. Various combinations have been used including glycolic acid followed by TCA ("Coleman peel")⁵⁴ and Jessner's peel followed by TCA ("Monheit peel"). The initial application of Jessner's solution results in reducing the cohesion of the epidermal cells, allowing better and more even penetration of the 35% TCA solution. This combination is effective in mild to moderate photoaging, including lentiginos, pigmentary changes, and rhytides⁵⁵ (Box 20-3). Patients may need mild sedation and would benefit from the anti-inflammatory effects of NSAIDs prior to this procedure. Dr. Harold Brody popularized the use of solid CO₂ (dry ice) followed by 35% TCA. The application of solid CO₂ also causes interruption in the epidermal consistency and deep penetration of TCA.⁵⁶ There are several excellent texts on chemical peeling that further discuss these combination methods.

DEEP-DEPTH PEELS

Laser surgery and dermabrasion have largely supplanted deep-depth peels, having shown superior results with fewer complications. Currently, there



▲ **FIGURE 20-17** Same patient 4 days later. The peeling has begun. The solar lentigo on the right cheek is much improved.



▲ **FIGURE 20-18** Eight days later. The solar lentigo on the right cheek is beginning to reappear, which is often the case with larger lesions.

are modified phenol peels such as the Stone Venner-Kellson peel (composed of phenol, croton oil, water, olive oil, and septisol solution) available, but they are rarely used by physicians in the United States. The Stone Venner-Kellson peel can be ordered from Delasco and the ordering physician must specify the ingredients. Since deep-depth peels are no longer popular and have been replaced by laser surgery, phenol peels and other deep-depth peels will not be discussed here.

AT-HOME CHEMICAL PEELS

Chemical peels used to be offered by dermatologists or trained professionals at beauty salons. Recently, many companies have developed at-home skin peel kits mostly using AHA as their main ingredient. Considering the potential side effects, especially increased photosensitivity, the FDA's AHA Review Committee and the Cosmetic, Toiletry, and Fragrance Association's (CTFA) Cosmetic Ingredient Review (CIR) Expert Panel reviewed the use of

AHAs in cosmetic products.⁵⁷ In 1998, the CIR Expert Panel came to the following conclusion:

“Based on the available information included in this report, the CIR Expert Panel concludes that glycolic and lactic acid, their common salts and their simple esters, are safe for use in cosmetic products at concentrations $\leq 10\%$, at final formulation pH ≥ 3.5 , when formulated to avoid increasing sun sensitivity or when directions for use include the daily use of sun protection. These ingredients are safe for use in salon products at concentrations $\leq 30\%$, at final formulation pH ≥ 3.0 , in products designed for brief, discontinuous use followed by thorough rinsing from the skin, when applied by trained professionals, and when application is accompanied by directions for the daily use of sun protection.”⁵⁸

There are several AHA products available as at-home peel kits. Resurface Peel by Lancôme (8% glycolic acid and 5% Physio-Peel enhancer), Glytone Boost Mini Peel Gel (10.8% glycolic acid), and Dermo-Expertise ReNoviste Antiaging Glycolic Peel Kit by L'Oréal

BOX 20-3 Superficial Peel Indications

- *Acne and Rosacea*—BHA peels can be used in all skin types. Resorcinol can be used in Fitzpatrick skin types I and II and light type III skin. Do not treat rosacea patients with AHAs and retinoids because it worsens the erythema.
 - *Melasma*—Jessner's peels, modified Jessner's peels and resorcinol are first-line choices here. Resorcinol can be used in Fitzpatrick skin types I and II and light type III skin. AHAs and BHA are also effective.
 - *Photoaging and mild wrinkles*—All of the mentioned chemical peels have been shown to be useful for treatment of photoaging. The choice of which to use should be based on patient history, other concurrent pathology, and the downtime that the patient can tolerate.
 - *Pretreatment for a medium-depth peel*—One can “condition” the skin for a medium peel by pretreating with any of the superficial peels. The likely method of action is the quickening of the cell cycle pace. Most physicians pretreat with topical retinoids, bleaching agents, and three to four superficial peels prior to a medium-depth peel for patients with Fitzpatrick skin type III.
- Medium-depth peel indications*—The indications are the same as those for superficial peels. The pathology is more significant, though. Therefore, severe acne and photoaging would respond better to medium-depth peels. Patients with a history of hyperpigmentation disorders or with Fitzpatrick skin type III or greater skin should be treated very cautiously with medium-depth peels.

(10% glycolic acid with a patented Biosaccharide Complex) are examples of at-home glycolic acid products. Olay Regenerist Microdermabrasion & Peel System is another AHA-containing at-home peel agent in which derma-crystals are applied and gently massaged through the face for approximately 1 minute, followed by application of the activator serum. Advanced Solutions™ Facial Peel by Neutrogena is an at-home chemical peel using CelluZyme™ technology, which is touted for delivering an effect equal to 20% glycolic acid.⁵⁹

At-home chemical peels intended for acne treatment currently on the market primarily contain SA as their main ingredient. L'Oréal's Acne Response Intensive Adult Acne Peel, which is a 2% salicylic acid-based product, and Neutrogena's Advanced Solutions Mask Eliminating

Peel, which also contains 2% SA, in addition to CelluZyme are examples of these products. Also available are peels that combine AHA and BHA, such as the Swiss Formula Peel-Off Hydroxy Masque by St. Ives, which contains both lactic acid and salicylic acid.

SUMMARY

Superficial and medium-depth peels are dynamic tools when used as part of office procedures for the treatment of acne, pigmentation disorders, and photoaging. They should be used in combination with sun avoidance, sunscreen, retinoids, and home care products to achieve maximum efficacy.

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