

Peeling back the years

by Dr. Patrick Treacy

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The types of chemical peels.

Before we look at the different types of chemical peels, we should first establish what skin problems we are trying to alleviate. In general most peels are used to reduce the effects of chronological ageing, sun damage, scarring or pigmentary changes. These conditions occur at different levels within the skin and the type of chemical used must reflect that. Some pigmentary problems such as melasma occur in the upper epidermis and can be treated with superficial peels while other defects such as perioral wrinkles around the lip may require a deep peel such as phenol. Either way, these chemicals will tend to result in a more youthful, smoother, less blotchy or more even textured skin. The cosmetic doctor must choose a peel that relates to a certain depth of injury in order to create a desired effect and individually balance this against potential toxicities and complications in each individual patient.

In general peels are divided into three categories superficial, medium and deep. The type of peel a physician uses often also has a lot to do with his personal experience and whether he has had previous problems with the various agents.

Superficial peeling agents

When people talk about superficial peels they generally mean AHA (Alpha-hydroxy Acids) peels involving the use of fruit acids such as glycolic acid derived from cane sugar at concentrations of 50% or higher. These peels are generally used to clear the upper layer of the skin in comedonal acne, to remove fine lines and sometimes to improve dry flaky skin. In general there are five main fruit acids

- Glycolic Acid Peels
- Citric Acid Peels
- Lactic Acid Peels
- Tartaric Acid Peels
- Malic Acid Peels

There is something deeply humbling when we realise that most of these agents have been around since medieval times. We know that the ancient Egyptians used the lactic acid in sour milk to improve the effects of sun damage. Cleopatra is said to have used asses' milk to bathe in. It is known that tartaric acid from wine was popular with French ladies during the seventeenth century and if we look at the other acids, citric from lemons and limes, malic from apples we soon get the emergent picture. These chemicals are generally safe to use and their effect is time dependent. The milder concentrations (<10%) are often used in home kits, the medium (<25%) by beauty therapists and the higher amounts (<70%) by nurses and doctors. The use of another agent such as a pre-peel primer or microdermabrasion can be used to potentiate the effect of an AHA peel. In general, these AHA peels should be neutralised with an alkali after use, but because this reaction is slightly exothermic many practitioners tend to wash them off after use. After they are applied the skin tends to become red, slightly swollen and painful. When you are applying the peel some white patches may appear signifying some epidermal-dermal separation and if this occurs it will tend to heal within seven to ten days. In general we do not want frosting to occur with this type of peel as this tends to signify that the peel is coagulating with albumin in the dermis and it has gone down too far. AHA peels usually exfoliate for about a week and new skin grows back over the area within a few weeks. If another AHA peel is required, one should wait until the skin has fully recovered. It is also preferable to use some sun protection for a limited period after their use.

become one of Germany's greatest dermatologists. In 1881, Unna opened the Dermatologikum private dermatological hospital in Hamburg and the following year he described a chemical peel composed of resorcinol, salicylic acid, phenol, trichloroacetic acid that is still in use today.

In 1903, as Mayor George Mc McClellan was inspecting the final touches to New York's subway system, the Chairman of Dermatology of that city's university told a hushed audience about the advantages of using phenol peels for acne scarring. This means of exfoliation continued to be used and during World War I, its antiseptic properties was used for wound care, especially after the rising number of explosion burns to the face in the dirty trenches. It was during this period that a French physician called LaGasse noted the improved aesthetic outcome of wounds that had been dressed in phenol bandages. It is not known whether any of these soldiers eventually died of cardiac toxicity but we do know after the war ended his techniques were brought to America by his daughter Antoinette who then began a cosmetic practice in California. The art of chemical peeling remained amongst these cosmetic practitioners until the early sixties when Litton and later Baker and Gordon presented patients that they had treated with some of these cosmetic formulations to their dermatological colleagues. The Baker-Gordon peel of about 50-55% phenol is still widely in use today. It is made by combining 3 cc of 88% phenol, 2 cc of distilled water, 2 drops of croton oil, and 8 drops of Septisol. The croton oil and Septisol are added to allow deeper penetration and more absorption of the phenol. In 1966, Baker published results of its effect on 250 patients. It was the same year that John Lennon caused record burnings in the Southern US's "Bible Belt", after he was quoted in the London newspaper, The Evening Standard as saying that the band was now more popular than Jesus.

The history of chemical peels.

It is known from detailed notes on papyrus that medical personnel were using peels formulations to treat dermatological conditions in ancient Egypt as far back as 1550 BC. This was the period just before the coming of Rameses I when the Hysos kings ruled the great land and it is documented that like today skin physicians were in great demand amongst the more affluent women as sun damaged skin was a sign of lower rank in society. In those days, before Botox and skin lasers women used a variety of substances such as alabaster, oils, and salt to improve the skin. Of interest, is the fact that sour milk was highly valued as an exfoliant, most probably because it contained lactic acid, an alpha-hydroxy acid commonly used today. But, time like the sun in the sky passes on and eventu-

ally an Egyptian family from Luxor waged a fierce set of wars against the foreign Hysos kings and finally drove them out of Egypt forever. Many years later a copy of the formulations of these chemical skin cures was found between the legs of a mummy in the Assassif district of the Theben necropolis. The manuscript passed through many hands until it was eventually purchased by Edwin Smith in Luxor in 1862, and thereafter became known as the Ebers Papyrus. In Europe, that year, Otto van Bismarck became premier of Prussia, dissolved parliament and started collecting taxes for a conflict that ended with the Franco-Prussian War. The war had Bismarck's desired effect of unifying the southern Germanic states and unfortunately nearly cost the life of a young German army physician called Paul Gerson Unna. In 1871, in spite of serious injuries he returned to the University of Heidelberg to continue his studies and eventually

Trichloroacetic acid (TCA)

This chemical may also be used at lower (5-15%) concentrations as a superficial to medium peeling agent. It is typically used as an intermediate-to-deep peeling agent in concentrations ranging from 20-50% and the depth of penetration is dose dependent. This peel is very safe at lower concentrations but can reach varying levels of dosage if not treated with caution can leading to scarring and other complications.

Medium-depth peels

Medium depth peels are mostly used for fine lines, wrinkles, superficial scars, stretch marks and to rejuvenate skin. Because of the prolonged period of downtime of about five days and the need to protect the skin from wind and sun for some months afterwards, medium peels are mostly used now in patients that cannot be fully treated with IPL and others who are not bad enough to require Erbium YAG resurfacing. There is little doubt that some patients prefer them as they tend to give a smoother texture and a more immediate effect than three to five courses of more expensive IPL treatments. Although Trichloroacetic acid (TCA) is the most commonly used medium depth peeling agent it can also be used in combination with glycolic acids to reduce the possibility of scarring and to decrease the possibility of hyperpigmentation. TCA is different than more superficial AHA type peels in that the technique is not time dependent and the agent does not require further neutralization. It also produces a frost or whitening of the skin, which is dependent on the concentration used.

Types of TCA medium peels.

- The Obagi Blue Peel
- Jessner's Peel
- Easy TCA

The Obagi Blue peel has become very popular in both the United States and Europe. It was originally developed by Dr. Zein Obagi to be used in all skin types, because some skin types are prone to hyperpigmentation after peeling. Because of this, the Obagi Blue is performed in four different steps that are probably more relevant to the ethnic skin tones of New York Italians, African-America and Asians than they are to downtown Dublin. Unless, there is some other reason to use this complicated method, most Irish and British patients would probably benefit just as well from a less expensive alternative. There is also the downside of having to endure a bluish tinge to your skin for some days post procedure.

The Jessner Peel is more popular in the United States than it is here. The peel has been around for many decades and is made from 14% salicylic acid (a beta hydroxy acid), 14% lactic acid (an alpha hydroxy acid) and 14% resorcinol. Salicylic acid has been used for several decades and is found in medications, such as AcneSal 2% and Whitfield's ointment at 4%. It is able to penetrate acne comedones better than other acids. The effects of the salicylate are similar to Aspirin in that it has an anti-inflammatory and anaesthetic effect, resulting in some decrease in the amount of redness and discomfort associated with chemical peels. Some practitioners use an AHA peel to prepare the face prior to peeling. The proceduralist then waits for a light frost to appear before neutralise the AHA and BHA acids with water or an alkali. Like TCA peels the face becomes slightly painful and a fan may be used to lessen the discomfort. The Jessner's peel frosting may take many hours to dissipate. Easy TCA is one of the most popular safe medium peels. It is



manufactured in Spain and made up to 17.5% concentration. It develops an intense "frosting" that usually dissipates within about 15-30mins after application of a cooling post peel cream that contains anti-inflammatories. The TCA solution dissolves keratin, coagulates skin proteins, and causes precipitation of salts. It is neutralised by tissue fluids. The skin remains red for about 5 days and then turns brown and sheds like a snake skin on the 5-7th day. Some practitioners rub the skin to try and get the solution to penetrate to a deeper level. This peel is usually applied with a cotton bud or a sponge and can be redone every week until the desired effect is obtained.

It is sometimes useful to apply Ane-Stop topical anaesthetic or Emla after the procedure in order to decrease any residual burning sensation and increase patient comfort. Re-epithelialisation of the skin is normally complete within 10-14 days. TCA 50% is seldom used because of a higher risk of scarring and the availability of the combination peels.

Deep peels

Deep peels are usually done to improve moderate wrinkling of the skin. They are usually performed with 88% phenol as it provides a relatively deep and predictable injury to the dermis. Phenol is the hydroxylated form of benzene and when it is used at this full strength it immediately coagulates the skin tissue and prevents further absorption. If phenol is diluted a different reaction occurs with disulphide bonds in the dermis and deeper penetration of the skin is technically possible. This phenomenon becomes important if a patient's skin 'cracks' or 'tears' during a peel, because deeper wrinkles may then form as the diluted phenol can cause further skin lysis. We can also use this effect to our advantage as post peel occlusion with a zinc oxide waterproof mask will deepen the level of the peel and the amount of time required to grow new skin. Full face phenol peels are more popular in Spain and the United States than in Britain or Ireland, where they tend to be used in more local applications such as the upper lip or around the eyes. Phenol peels also may be performed in various formulations, such as

pure phenol (88%) or phenol mixed with soap, water, croton oil or olive oil. The names of these formulations are

- Grade
- Baker-Gordon
- Venner-Kellson include
- Maschek-Trupman

The most popular phenol peel is the Baker Gordon formulation as it produces the most dramatic results and is the most effective peeling agent currently used to smooth out moderate wrinkles. The solution contains phenol 88%, 2-ml water; eight drops liquid soap (Septisol); and three drops croton oil. Because this formulation is quite dilute with irritants, it penetrates deeper than pure phenol and may permanently affect the ability of the skin to tan. This peel is similar to an Erbium YAG laser in that it is reserved for the face as it can cause scarring of the neck, arms and legs. It also causes more discomfort than any of the other peels and often should be done under a regional block or general anaesthesia. Patients should be aware they may require analgesia and anxiolytics for most of the first night after this peel.

The biggest problem with phenol peels is their ability to cause cardiac arrhythmias. To avoid this complication, no more than 25% of the face should be peeled before a 10-20 minute break is taken and the entire peel should take 60 mins or more. A patient should remain attached to a cardiac monitor during the procedure with lignocaine on standby. Having said that, I have seen better results from using full strength phenol peels to treat wrinkles in upper lips than I have with the most modern Erbium YAG laser. Intravenous fluids should be used for hydration and renal flushing. Patients should remember that redness after a phenol peel may last nearly six months and they have to use a very high sun protection factor during this period. There is also a higher risk of scarring and other pigmentation changes following this deeper peel. I note that the skin of some patients may also appear unnaturally 'graven' or 'waxy' with a type of bluish hue, which is probably also related to damage to the skin's pigmentation system.

Complications of peels

Most of the common problems with peels can be prevented by proper screening of patients. We have already mentioned that Irish patients with Fitzpatrick skin types 1 and 11 are probably the best candidates for peeling. Fitzpatrick skin types 11-14 are preferably pretreated with a bleaching agent such as 4% hydroquinone or 4% kojic acid to prevent post inflammatory hyperpigmentation. Patients with a history of herpetic infection should be put on anti-viral medication prior to the procedure. This normally would mean taking Zovirax (acyclovir) for three days prior to the procedure and up to two weeks afterwards. I also like to use Isotrex (tretinoin) as part of a pretreatment regimen as it thins the outer horny layer of the skin to allow better penetration and helps remodel new collagen in the dermis. Patients should also be aware that oral retinoids such as Roaccutane (isotretinoin) should have been discontinued for a period of twelve months prior to peeling as there is an increased risk of hypertrophic scarring.



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For further information log onto www.ailesburyclinic.ie



Fan during TCA peel



Early frosting TCA peel



Icing post TCA peels



Late frosting TCA peel