

COMBINED CHEMICAL PEELS

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INTRODUCTION

Different types of chemical peelings are now being used in medical practice. Some of these peelings were developed to penetrate deeply in the skin and to cause deep effects in the remodeling of the collagen. These deep chemical peelings produce an extensive necrosis and, in general, they need long periods of healing. The chemical agent that promotes a deep peeling is phenol, introduced in the United States by a German dermatologist in 1930, although it has only been popularized in the seventies, thanks to the histological studies done by Baker and other authors. In the last two decades, another peeling agent, trichloroacetic acid (TCA), became very popular in USA. This new chemical agent, in high concentrations, can produce chemical peelings of medium and great depth without the serious risks that the patients are submitted to when they use phenol peels (nephrotoxicity, hepatotoxicity, cardiac arrest risk and others), although these days several formulations of light phenol are being used, with a low level of these undesirable side effects.

In the final decade of the twentieth century, a new substance, glycolic acid, was added to the arsenal of chemical products that can be used as peeling agents. The clinical developments of Dr. Eugene Van Scott, described a new family of acids known today as AHA (Alpha Hydroxy Acids)⁷. Based on these studies, Dr. Lawrence Moy (UCLA) carried out several comparative histological studies using Phenol, TCA and glycolic acid. These studies clearly demonstrated the possibility of dermal stimulation using glycolic acid which offered a reduced possibility of tissue necrosis.⁸

(Fig 1).

During the last 3 years a series of new peels has been developed by different authors, these peelings use the combination of different chemical substances, to obtain a synergistic effect during contact of these substances with the skin. The most popular of these peels uses an association of **glycolic acid (Alpha Hydroxy Acid)** with **Salicylic Acid (Beta Hydroxy Acid)** as we will see in this chapter.

Probably, the biggest changes that have occurred in the dynamics of the superficial, medium and deep chemical peels, is the possibility to use the Retinoic Acid in concentrations of between 2% and 8% and to promote characteristic superficial peels (**light epidermolysis**), and the possibility of deep dermal stimulation, this may be an option for the **treatment of melasma (light epidermolysis)** (Figs. 1A, 1B, acne scars and **severe photoaging** of the skin (when used to promote **strong erythema with edema**). (Figs.2A, 2B, 2C)

Chemical

%

Infiltration

New

Agents			Collagen
Baker-Gordon		++	+++++
Phenol	25	0	0
Phenol	50	+	++
Phenol	75	+	++
Phenol	88	++	+++++
TCA	25	+	0
TCA	50	+	++
TCA	75	+	+++
Piruvic Acid	100	+	+++
Piruvic Acid	70	+	++

Fig 1. Comparative histological study of skin stimulation by different peeling agents. (21 Days Post-Peel)

The AHA's form a group of substances usually found in fruits and foods and for that reason they are known as fruit acids. Glycolic acid is the most popular of these acids and it is usually found in sugarcane. Other acids in this group are: lactic acid found in the sour milk, citric acid present in the citric fruits, tartaric from grapes, malic and mandelic from apple⁷.

Glycolic acid possesses a small molecule and because of this it has been widely used in the cosmetic industry¹⁰. Other acids of the AHA family also possess potential for clinical use in medicine.

Glycolic acid has been widely used in the treatment of several types skin lesions¹⁰, including the conditions associated with the excessive production of corneocytes such as ictiose¹¹. It reduces the cohesion among the corneocytes by interfering with the ionic connection, destroying the protein that bonds one corneocyte to another.¹² A lot of **epidermal lesions**, including **seborrheic keratosis, acne, vulgar warts and actínica keratosis**, have been successfully treated with the use of glycolic acid⁷. Additionally, glycolic acid has been used in **the treatment of deep, medium and superficial wrinkles, solar lentigos, acne scars, hyperchromic stains caused by several etiologies** (epidermal melasma, and post-inflammatory hyperchromic stains), **flabbiness of the skin, dry skin, furrows, age stains, and isolated phases of some psoriasis lesions**¹.

The mechanism by which the glycolic acid exercises its influence on the treatment of wrinkles **and hyperpigmented** lesions is similar to the mechanism of action of ascorbic acid. The **ascorbic acid** also comes from the family of AHA's and it has been proved to have as action as a stimulator of collagen production¹⁰ and it also reduces the production of melanin^{13, 14}.

Another hypothesis as to how glycolic acid acts in the treatment of wrinkles, is the fact of increasing the synthesis of the glycosaminoglycans and other substances of the intercellular matrix of the human derme¹⁵. The glycosaminoglycans is a multiramification protein it has the property of fastening the H₂O molecule in its endless ramifications. Because of this fact it is possible to keep water inside the derme¹⁶, which contributes to increase the turgidity of the skin and because of this obtain a decrease of the superficial and medium wrinkles.

Another finding that proves the performance of glycolic acid was observed in the laboratory study in which human fibroblasts were incubated in the presence of glycolic

acid were stimulated to produce collagen¹⁷. Crusts and necroses are not the desired effects wanted from chemical peelings and because of this glycolic acid became very popular recently. In histological studies done with mini pigs (Pygmy pig), Dr. Lawrence Moy and al. (UCLA) demonstrated that 12% of lactic acid could form deposits of new collagen in the papillary derme, what didn't happen with the use of TCA at 25% and phenol to 25% after 21 days. (Fig. 1) 8. Histological studies with the **retinoic acid** suggest similar results¹⁸.

When glycolic acid, in form of gel, at concentrations of 50% and 70%, (pH ± 0,6-1,0), is left on the skin of the Pygmy pig, for 15 minutes, a necrosis can be produced which can be compared to that which happens when a concentration of TCA between 35% and 50% is used⁸. Shorter contact times (times usually used in the conventional peelings of glycolic acid, vary between one and three minutes) glycolic acid 50% to 70% can cause less damages that TCA at 35%⁸.

In summarizing these studies, we can say that glycolic acid possesses a marked **superficial action** (in the level of the **stratum cornea**) and a **deep action** (in the level of the **papillary derme**) that is characterized by a **vasodilatation** in the **superficial derme**.

Clinically we can interpret the **intensity** and the **depth** of the peelings that are done with glycolic acid by the level of color of the surface of the skin, which varies from a rosy erythema to the stronger intensity being a strong red color.. The **erythema** is the result of **sanguine vasodilatation** in the dermal layer. Because of the irregularity of the integrity in the skins surface (**stratum cornea**) these erythemias are not always uniform. Because of this, the doctor that carries out the glycolic acid peel, should pay special attention to certain **fragile areas** of the skin (the **nasolabial furrow**, the skin around the projection of the **malares bones**, the skin around **lower eyelid** and the **area of the lower neck**) where the penetration of the **glycolic acid** occurs quicker and, if badly controlled, the peeling can take to the **hyper penetration** in these areas, with the development of an **intense erythema**, which can even develop into a **white stain** during the peeling (known as **frost** = as in freezing). This white stain can mean a lesion at the derma-epidermal junction, with the consequent formation of crusts in the following two to six days. These crusts, when eliminated, they leave a residual inflammatory lesion that should be treated with specific corticoids (hydrocortisone 1% or 2%). In these cases we can have an deterioration of the lesion, without leaving residues, if the skin is white. If the skin has a the post-inflammatory pigmentation tendency, this lesion can develop into a hyper-chromic stain, that should be treated with home use skin lighteners.

HOW TO SELECT THE CORRECT PATIENT TO BE TREATED

The most important part of any chemical peel is the selection of patients and the type of chemical peel to be used. In the case of Glycolic Acid Peels, there is an additional concern, that is, the choice of the correct type of Glycolic Acid formulation, which should follow some basic recommendations: the concentration of the Glycolic Acid should always be constant, and if possible in the form of a thick gel and have a suitable pH (the most appropriate is 1.8).

Most of the complications that occur with Glycolic Acid peels are due to the lack of knowledge of the physiopathology lesions, to be treated, and the method of action of Glycolic Acid on this particular type of lesion.

It is important to point out that the inadequate preparation of Glycolic Acid, together with the previously mentioned facts, are the main causes of problems that occur during Glycolic Acid peels.

In practice, we use high concentrations of 70% Glycolic Acid Gel only on skin that has a very thick stratum cornea (which is very common in patients that spend long periods in the sun) and those Photo-types I and II of the Fitzpatrick classification. We can comfortably use concentrations of 70%, on cases of Acne Scars and oily skin. On the other hand, we should be extremely careful of patients with sensitive skin, and because of this clinical condition, it is advisable not to use concentrations of Glycolic Acid greater than 30%, in the form of bentonite masks with concentrations of Glycolic Acid varying from 10% to 25%. These latter formulations are the choice for the treatment of juvenile acne.

Probably the Glycolic Acid peel that requires the greatest skill on the part of the medical practitioner, is for the treatment of hyperpigmented lesions of the skin. These lesions require that we should act with extreme care, and do a very superficial (shallow/surface) peel, with the clear objective of obtaining a slight break of cohesion of the superficial corneocytes. This is sufficient to continue home treatment, for three days after the peel, (this break in the integrity of the stratum cornea, improves the penetration of **the blocking agents of the enzyme tyrosinase**, responsible for the production of the melanin).

When we carry out a Glycolic Acid peel on the body, for the treatment of flaccid skin or to recover damage caused by stretch marks, we come across some difficulties relating to the poor penetrating of the Glycolic Acid 70% Gel. For this reason we should, always, try to do a preparatory phase, that we call a pre-peel, which is a **keratolitic** solution, made from Glycolic Acid, Lactic Acid and Acid Salicylic, in an alcohol base. This pre-peeling **keratolitic** solution, quickly opens up the stratum corneum, thereby enabling the rapid penetration of the Glycolic Acid 70% Gel, which is applied over the pre-peeling solution after three to five minutes.

What follows is a routine report of the different types of peeling using Glycolic Acid, we will analyze the peel, step by step, the initial pre-peel stage and the home treatment for each type of lesion.

GENERAL CONSIDERATIONS WHEN USING GLYCOLIC ACID PEEL

1. **LIGHT THE PEELING HOME:** it is important that the peel be carried out using natural light or 'cold' lighting (fluorescent lighting). The objective is to avoid shadows and offer the best possible conditions for the erythema to be seen.
2. **SKIN PREPARATION:** the skin should be cleaned using a soap containing Glycolic Acid 20% to totally remove all lipids and other substances from the skin's surface, thereby reducing potential barriers which may reduce the penetration of the peeling agent. This is the pre-peel, or the 'check up' phase, where small deficiencies in the stratum corneum can be observed, because the soap containing Glycolic Acid 20% penetrates in these irregularities and can cause discreet discomfort at these points. As a safety measure the medical practitioner should avoid peeling in these areas.

THE CONTRA INDICATIONS OF PEELING AND PRECAUTIONS

3. There are **absolute** and **relative** side effects. The first are the situations where the skin been damaged (recent scars, postoperative period of deep peelings, Zoster Herpes active lesions etc). The relative contra-indications are clinical

conditions of highly sensitive skin, skins with erythema, (caused by the use of aggressive medications such as the Retinoic Acid in high concentrations, Hydroquinone in aggressive formulations, patient-using formulations containing exfoliation agents such as resorcine, Salicylic Acid and others). Patients having solar erythema or have had hair removal done by hot wax or any other aggressive method, should not have a Glycolic Acid peel until the skin recovers its condition. It is inadvisable to sun exposure or the use of irritating medications, for up to 72 hours prior to the peel with Glycolic Acid.

4. **PATIENT INFORMATION:** the patient should be made aware of the significance of the peel with Glycolic Acid, how it acts on the skin, it's benefit and its limitations. Normally, we try to tell the patient about the effects of Glycolic Acid on the cutaneous layer removing in a delicate manner, without causing any visible damage to the skin, we also try to show how peels offer the characteristics of revitalizing the skin by causing vasodilatation of the dermis and bring nutrients to the fibroblasts.

When deep stimulation of the skin is required (in the case of wrinkles, flaccid skin, acne scars and stretch marks) and the is a light color skin (types I and II on the Fitzpatrick classification), we can stimulate the skin until an erythema of different colors is obtained. In this case, we need to explain that this is to stimulate the skin, we can cause a vasodilatation of the dermis layer and by doing this we can nourish the skin, thereby improving its texture and elasticity. We must make it very clear that these stimulations will be repeated with regular intervals, between 12 to 15 days, and that the benefits obtained in each session with Glycolic Acid are cumulative, seeking to restructure and offer a better quality skin. It is very common for the patients to ask "How many peelings will I need?" If the patient and the doctor understand what is being discussed in this chapter about Glycolic Acid, the intelligent answer to the question is that the reactions and stimulation's with the Glycolic Acid are individual and they obey some variables such as: the age, the nutritional state of the skin, the degree of the lesion, the frequency of the peelings and the home treatment program that will be prescribed by the doctor for the patient (If the skin is well stimulated, the time of treatment will be less).

5. **PHOTOGRAPHIC EVIDENCE:** all patients should photographed before during and after their treatment Photographs all pre-existent lesions and at each peeling session the patient is shown what changes have occurred. This is, perhaps, the best way to stimulate the patient to continue with the treatment.

FACIAL PEELING PROCEDURE USING GLYCOLIC ACID.

PREPARTION OF THE SKIN: Use Facial Cleanser 20% (a soap containing 20% of Glycolic Acid). This removes the excess of oil on the skin, and prepares the skin for the better penetration of Glycolic Acid during the peeling.

HOW TO DO THE PEEL: we use Glycolic Acid in gel form, with the help of a special fan shaped brush, with suitable bristles. The concentration of the Glycolic Acid gel can vary from 30%, 50% or 70%, in accordance with the resistance of the skin and

the nature of the lesion to be treated. The length of time that the gel is left on the skin will be variable, depending on the desired results. In practice, the following rules apply to our facial peelings: the peel is superficial when we leave the Glycolic Acid gel to act on the skin until the patient begins to feel the first signs of burning (Figs.3A, 3B).

When this happens we interrupt the peeling and apply a suitable Glycolic Acid neutralizer (a lotion containing triethanolamine that acts by inverting immediately the acid pH). It is possible to neutralize the peeling by washing the skin with running water. If we want to obtain a deeper peel and our patient's skin offers suitable conditions, we should leave the Glycolic Acid to act for a longer period and, but we should observe with attention the development of the erythema. (THE LARGER THE ERITHEMA, THE GREATER LEVEL OF PENETRATION).

We should avoid the formation of strong erythemas in patients that are being treated for melasma (cloasma). This lesion should only be treated with superficial peeling, using Glycolic Acid gel in concentrations between 30% and 50%.

Patients with dark skins (Prototypes IV, V and VI on the Fitzpatrick classification) offer a problem during peeling, because it is almost impossible to see the erythema, due to the great amount of melanin in the skin. To do a peel, in these cases, is difficult and we should do only superficial peelings (apply the Glycolic Acid and, when a burning sensation is felt, wash the skin). Young patients or patients with sensitive skin should be treated with Glycolic Acid 30% or with Glycolic Acid masks between 10% or 25%. (Figs. 4A, 4B, 4C) the application of the mask is done with fingertips, spreading a fine layer on the skin. It is allowed to act for 2 to 3 minutes and then removed with running water after the patient refers a strong burning sensation on the skin.

POST-PEEL PERIOD: Immediately after the neutralization of the peeling, we use specific moisturizers for dry, normal or oily skin. The patient should use moisturizer, on the treated area, for 2 – 3 days, to recover the skin's surface. If, during the peeling, there is an excessive penetration of Glycolic Acid, with appearance of strong erythema, or frost zones, (lesion of the dermoepidermal junction) we recommend the use of an efficient (Hydrocortisone Cream 1% or 2%), for 3 or 4 days or longer should the case require.

POST-PEEL PERIOD 2: on the 3rd or 4th day after the Glycolic Acid peel, the patient should be allowed to treat the lesion at home, according to the table shown below. (Table 2).

Type of Lesion	Recommended Medication	Cleanser
Photoaging	Glycolic Acid Cream 8%-15% + Vitamin C Lotion 20%	FC 20%
Fine Wrinkles	Glycolic Acid Cream 8%-10% + Vitamin C Lotion 20% C	FC 4%
Medium Wrinkles	Glycolic Acid Cream 10%-15% + Vitamin C Lotion 20%	FC 10%
Deep Wrinkles	Glycolic Acid Cream 15%-30% + Vitamin C Lotion 20%	FC 20%
Active Acne	Glycolic Acid Gel 10% com BKC	FC 20%
Acne Scars	Glycolic Acid Gel 15%-18%	FC 20%

Hyperchromic Stains	Cream or gel with 8%-10% Glycolic Acid , Phytic Acid 4%	FC 4%
Stretch Marks/Flaccid Skin	Body Lotion with Glycolic Acid 20%-30%+ vitamin C	FC 20%
Melasma	Cream or Gel with 8%-10% + Phytic Acid 4%	FC 20%

Table 2 – Principal treatments for Glycolic Acid & suggested formulation containing Glycolic Acid. (FC = Facial Cleanser)

HOME TREATMENT: an important part of the home treatment is the correct daily cleaning of the skin. Because of this, we use special soap (Facial Cleanser) with neutral pH for sensitive skins. In the case of normal skin, we can use soaps with concentrations of 4% to 10% of Glycolic Acid. If the skin is resistant and/or oily or with propensity to acne, we can use soaps having concentrations of 10% to 20% of Glycolic Acid. That prior cleansing of the skin, before the use of the home medication, improves the performance of the products that is being used.

Glycolic Acid can be used in formulations on its own, or combined with lightening agents (tyrosinase blocker such as Phytic Acid and Kojic Acid.) or with antibiotics such as erythromycin (acne treatment) or Benzalkonium Chloride.

Over the last six years, Glycolic Acid has been used together with anti-oxidants, such as vitamin C, beta-carotene, vitamin E, Phytic Acid, picrogenol, grapeseed extract and others.

In general, these home products are used twice a day. Patient with oily skin or with a tendency to acne should use formulations based on gels or oil free lotions. Patient with normal or dry skin should use cream formulations or lotions (these will help to moisturize the skin). The area around the eyes should always be treated with great care, with special moisturizing creams (large concentrations of Glycolic Acid or Retinoic Acid can cause drying out of the tissues and thereby accentuate even more the wrinkles of that area).

BODY PEELING WITH GLYCOLIC ACID

Probably, this is the easiest chemical peel. The superficial structure of the body's skin (trunk and members) is, in general, resistant to Glycolic Acid for a longer period, even at high concentrations.

Usually, the most fragile areas are the creases and natural furrows of the body. This peel is suitable for the treatment of very dry skin (xerosis and other conditions where the skin presents a thinning of the stratum corneum), flaccid skin, Photoaging, furrows, stains of several etiologies, acne scars.

If the objective is a superficial peel, the Glycolic Acid can be applied in an uniform manner onto the surface of the skin that is to be treated and it should be removed when the patient notes the first signs of a burning sensation.

If the objective is a medium depth or deep peel, , to stimulate the dermis vessels, the degree of the erythema must be observed, whenever possible. (Remember that with dark skin, you may not always be able to see the erythema) The stratum corneum is very thick in these areas of the body, there is a natural difficulty for the penetration of the Glycolic Acid 70%Gel. In an attempt to decrease the average time of this dermic stimulation (vasodilatation), generally between 8 and 25 minutes, it is wise to use a

keratolytic pre-peeling (as described earlier) This solution is left on the skin for 3 to 5 minutes, and then the Glycolic Acid 70% is applied, without removing the pre-peeling. When the objective of the peel is obtained (the development of a slight erythema) the Glycolic Acid is then washed off with running water, or with the help of a sponge soaked in water.

In cases where the formation of a localized premature erythema is noted, the use a specific Glycolic Acid neutralizer is recommended. (Trienanolamina neutralizing lotion).

The post peeling period, in the case of body peels using Glycolic Acid, is between two to three days, and the use of a dry skin moisturizer is recommended, this should be applied twice a day to the treated area. The home treatment usually consists of the use of a body lotion containing between 15% and 30% of Glycolic Acid, applied twice a day. The body peeling should be repeated between 12 to 15 days. (Fig 5)

PREPARATION OF THE SKIN, WITH GLYCOLIC ACID, FOR LASER TREATMENT

FACIAL TREATMENT: basically we follow the same precautions as the Glycolic Acid facial, described previously.

The objective here is to reduce the lesions, to reduce the depth of the wrinkles, to homogenize the skin, to reduce the need for larger, more aggressive, laser treatment, thereby arriving at the final result after a minimum period of post-peel erythema. (Fig 6)

During the post laser period, we must immediately apply a Collagenase (Iruzol or Fibrase) for 10 days, washing the skin with Neutral Facial Cleanser. After this period, we can use a cream containing Phytic Acid 4% and vitamin C. After the fourth week, this treatment may be modified, and, to if we need to correct problems of residual hyperchromia, we can use skin lightener containing Phytic Acid 4% and vitamin C lotion 5% -10% or 20%.

COMBINED CHEMICAL PEELINGS

These chemical peels are very popular these days, so much so that they already form part of the daily routine of many patients. Different chemical peeling agents are combined into new formulations and allows us to obtain better results with a minimum of undesirable side effects.

Here we will describe the different combinations of the chemical substances used in the formulations of the several chemical peelings, and the possible variation between them.

1st COMBINATION: ALPHA BETA COMPLEX GEL[®]

- Glycolic Acid Gel - 40%
- Salicylic Acid - 10% à 15%

Earlier, we detailed the use of the Glycolic Acid as a superficial chemical peeling agent. Now, we will describe its combination with Salicylic Acid, which produces a very efficient synergic compound. The Salicylic Acid is a Beta Hydroxy Acid with a keratolytic effect with an affinity for fat (lipophilic), anti-inflammatory action and is also a fatty regulator. The clinical indications of this Alpha Beta Complex Gel[®] peel are: Keratosis pilar, (Figs 7A, 7B), comedogenic acne, photo-aging, epidermal melasma and

mainly as a ‘refreshing’ peeling in which the superficial stratum corneum can be removed to leave the skin with a fresh and soft appearance. The main contra indications to this peeling are: recent scars, allergy to the acid acetilsalicilico, photo dermatitis, recent depilation, urticaria and recent chemical peelings or laser resurfacing treatment.

The use of a sunblock is recommended immediate after the post peel period, to the third day)

ALPHA BETA COMPLEX GEL® **PEELING PROCEDURE:**

- 1- Wash the skin with a cleanser that contains 20% Glycolic Acid (**Pre-Peel Cleanser**). Apply the cleanser on the skin for 2-3 minutes and remove with running water. Dry with a soft towel.
 - 2- Apply a layer of **Alpha Beta Complex Gel®** with the help of a fan brush. It is wise to apply the gel to the areas do greater resistance of the face first. (Forehead and nose) allow to act for a few seconds, and follow by applying the gel to the remaining areas of increased sensitivity. The peeling should be halted according to the levels shown below.
- **SUPERFICIAL PEELING:** Remove the gel as soon as the patient reports feeling a heat sensation. (perfect for **epidemic melasma**). Moisturize the skin for 3 days after the peeling.
 - **MEDIUM PEELING:** Remove the gel when the erithema is seen. This peel is perfect for when we want to remove the surface stratum corneum. Moisturize the skin for 3 days after the peeling. (Figs. 7A, 7B, 8A, 8B)
 - **DEEP PEEL:** A peeling is considered ‘Deep’ when we see small plates of “**Frost**” during the development of the erithema. Generally, these frosts are seen on the skin’s surface this is related to the Salicylic Acid contained in the formula. This type of peeling should be used only on Phototype I & II patients, because the frost will eventually turn into crusts, and followed by a healing process between the 2nd and 3rd day. It is recommended the use of 1% - 2% Hydrocortisone cream (Berlison®) for 5 to 6 days.

NOTE: For the three levels of peeling, home treatment (see table 2) should be started only after the 3rd day of peeling, or as per medical practitioners instructions.

2^a COMBINATION: YELLOW PEEL®

- ***Retinoic Acid, with Phytic Acid, Kojic Acid and Azelaic Acid.***

Retinoic Acid can be used as a peeling agent for surface or medium peels. The concentration of Retinoic Acid should be between 2%-8%. **Yellow Peel®** is a combination of Retinoic Acid, in high concentrations, with 3 tyrosinase blocker (skin lighteners) these are: Phytic Acid, Kojic Acid and Azelaic Acid. In this formulation, there is also Vitamin C and Bisabol as anti-oxidant and anti-inflammatory. This is a creamy formulation and should be applied directly to the treated skin.

The main clinical indications for **Yellow Peel®** are: **epidermal melasma**, (Figs.1A, 1B) **surface hyperchromic stains of different** etiologies, epidermal lesions that happen during photo-aging, flaccid skin and acne scars.

The contra-indication for this peel are: Recent aggressive chemical peels, scars, re-occurring herpes infections, pregnancy (confirmed or suspected) sun related activities and mental problems.

YELLOW PEEL® PEELING PROCEDURE

- 1- Detailed Photographic Evidence.
- 2- Detailed information for the patient about the advantages and disadvantages of this peeling.
- 3- Wash the skin with **Pre-Peel Cleanser** (cleanser with 20% Glycolic Acid). Apply a superficial peel to lower the resistance of the skin and to ease the penetration of **Yellow Peel®**. The perfect surface peel is **Alpha Beta Complex Gel** for medium depth peels, as described in the first part of this chapter.
- 4- Apply the **Yellow Peel®** cream to the area being treated, spreading it with the fingertips, until the cream is absorbed. The cream should stay on the skin for 1-3 hours, then be removed with running water and a neutral cleanser. What follows are some specific treatments using **Yellow Peel®**, for different clinical cases

EPIDERMIC MELASMA: it is advisable to accurately diagnose the levels of the melasma and to inform the patient about the possible treatment with Yellow Peel®. In general, the melasma is of a mixed form, made up from melanin deposited in the epidermis and in the dermal layer. The melanin deposited below the basal layer cannot be removed using peelings that only cause epidermolysis, as it is the case of Yellow Peel®. Until the present date, there is no safe treatment for the removal of melanin deposited in the dermis, without the risk of causing serious damages to the germinative layer and with consequent undesirable effects (hypochromia). On the other hand, it is very easy to remove the melanin deposited in the epidermal layer. Initially, it is advisable to do superficial peel, when this procedure is going to be done using Yellow Peel®, the irritation with Yellow Peel®, should be kept to as low as possible. Usually, one or two applications of Yellow Peel®, with interval of two hours, cause an irritation with same characteristics as of a solar erithema. This is the ideal point to stop the irritation then moisturize the skin copiously using Vaseline® or 1% or 2% hydrocortisone ointment, (Berlison®) for 3 to 4 days. Skin flaking will happen in the next 36 - 72 hours and the moisturizing with Vaseline® should continue until the 6th or 8th day, depending on the sensitivity of the skin or the inflammatory process caused by the peeling. The treatment of the residual melasma, which was not removed by the peeling, should be started after the 8th day, with a moisturizing cream containing 4% Phytic Acid, (lightener), for two to three weeks. The use of lightening creams containing Glycolic Acid or other irritating acids, should be evaluated carefully by the medical practitioner. The Yellow Peel®, treatment can be repeated for epidermal melasma after 30 to 40 days and, during the whole period of the treatment, it is advisable to use a Facial Sunblock. (Figs 9A, 9B)

PHOTOAGING : In the treatment of sundamaged skin, Yellow Peel® can help remove the lesions, contained in the epidermis, besides leaving the skin refreshed and with a special sheen. For the phototype I, II and III the progressive erithema, created by the hourly application of Yellow Peel®, can reach a strong degree, including an edema, (the more intense the larger dermal stimulation is caused). (Figs. 2A, 2B, 2C) The flaking should happen in between 36 and 96 hours. The skin should be moisturized with Vaseline® for 6 to 8 days. The phase of post treatment peeling is shown in Table 2.

DOUBLE YELLOW PEEL: Ideal peel for the treatment of the severe sundamaged skin, acne scars and flaccid skin, found in Phototypes I and II. To carry out a peeling with a great dermal stimulation effect, firstly it is necessary to irritate the skin until a large erythema and strong edema is obtained, proceed as described (YELLOW PEEL® PEELING PROCEDURE), repeating the **Yellow Peel®** application every hour. If, at the end of the first day of stimulation the skin doesn't present a strong erythema and edema, the doctor should evaluate the need of doing another Alpha Beta peel on the second day followed by hourly stimulating with the Yellow Peel®, until the skin show clear signs of the erythema and edema. In this case, the post peel period is longer and the use of Vaseline® be maintained for 8 to 10 days (Figs. 10A, 10B, 11A, 11B)

3rd COMBINATION: CHELATED TCA LOTION 20% & 30%

- **Chelated Trichloroacetic Acid**
- **Glycolic Acid 30%**

Chelated Trichloroacetic Acid (TCA) is a peeling agent that promotes important proteic coagulation when in contact with the skin. Classically TCA is used in the liquid form, in concentrations between 15% and 50% to promote chemical peelings on the face. ⁽⁴⁻⁵⁾ This peeling in the liquid form should be done by medical professionals with a high level of training in the use of chemical peels, because of the need to choose the patients correctly and knowledge of the type of lesion that can be treated with Trichloroacetic Acid. TCA, in the liquid form, and concentration of 30%, can provoke necrosis (coagulation proteic) of the epidermis and papillary dermis and/or reticular and consequently it can cause a deep epidermolysis with a residual process that can last for between 3-8 weeks. The undesirable side effects are frequent (post-inflammatory hyperchromia, hypochromia, infections and hypertrophic scars).

A new form of using Trichloroacetic Acid (TCA) as a selective peeling agent, is in association with Glycolic Acid (it helps to promote a greater efficacy in the penetration of TCA). On the other hand, the chelation of the TCA molecule (linking the TCA to aminoacids) does not allow this molecule to penetrate deeply into the skin and, because of this, unnecessary necrosis of the dermal layer can be avoided.

THE BENEFITS ARE:

- 1- Necrosis occurs exclusively in the epidermis, and it also allows a selective and clear epidermolysis.
- 2- If there is no necrosis at dermal level, we can avoid the lingering inflammation (common when we use liquid TCA).
- 3- After the flaking that happens between the 4th and 5th day, the residual inflammatory process is up to a maximum of 4 to 6 days. (Fig 12)

The main clinical indications for this peel, Chelated TCA 20% / 30% are: Stains superficial hiperocrômicas caused by the sun, fine wrinkles, ephelide and post acne residual Hyperchromia post acne. It is not recommended for melasma treatment (because of its possibility to cause an inflammatory process that can retard the lesion's healing).

This peel is not recommended for patients with: any inflammatory process in the area to be treated, scars, re-occurring herpes infections, pregnancy (confirmed or suspected) sun related activities and mental problems.

PEELING PROCEDURE

- 1- Photographic Evidence
- 2- Request the patient to sign a form, where the patient confirms that the medical practitioner has informed him/her about the advantages, disadvantages, undesirable side effects, time of recovery, and recovery procedures for the proposed peeling.
- 3- Select the correct type of patient for the TCA peeling (the ideal photo-type is I, II and III) also select the lesion type to be treated and never to propose this type of peel for melasma (due to the high percentage of reoccurrence).
- 4- Wash the skin with **Pre-Peel Cleanser 20%** (Soap with Glycolic Acid 20%).
- 5- Apply a superficial peel to the area to be treated (ideal is **ALFA BETA COMPLEX GEL**). This peel causes the opening of the stratum cornea, to increase the penetration of the TCA. Remove the superficial peel using running water and use a soft towel to dry the skin.
- 6- Apply the chelated TCA 20% or 30% lotion, onto the skin to be treated, using a suitable fan brush. Remove the lotion after 1 to 2 minutes, by washing the skin with running water. At this time, it is important to evaluate the degree of frost which has been obtained, (the stronger the coloration of the stronger the epidermolysis). The frost should be obtained across the whole face and it should be as uniform as possible. (For facial peelings).
- 7- The period immediately after the peeling: The skin should be moisturized copiously with a Vaseline® ointment, or hydrocortisone 1% or 2% (Berlison® ointment), several times a day for a minimum period of 8 to 10 days. Use only neutral soap for a period of 15 to 20 days. After the 10th day after peeling the skin can be moisturized with a cream containing 4% of Phytic Acid (anti-inflammatory, antioxidant and lightener) for 10 to 20 days. After this period it is possible to use other products containing Glycolic Acid (see picture 2).
- 8- Sun Protection is very important during this type of peeling, therefore a sunblock protector, must be used. The ideal type is one that contains zinc oxide and titanium dioxide.
- 9- This peel may be repeated after 30-40 days, if the results were not up to expectations.

NOTES:

- 1- The procedure described above is for the peeling of Chelated TCA 20% and 30% applied to the face. The decision to use the 20% or the 30% concentration should be left to the medical practitioner and his decision should take into account the sensitivity of the skin to be treated.

- 2- When Chelated TCA lotion is applied for body treatment of trunk, back, hands, arms and legs, the choice should be the 30% concentration. The contact time with the skin should be between 5 to 8 minutes and the presence of the frost should not be intense, or uniform, there should only be a few frost points for the peeling to be efficient. Flaking happens between the 10th and 15th day of the peeling.
- 3- 3- Chelated TCA lotion, when applied to the neck and chest should be left in contact with the skin for 2 – 3 minutes, depending on the sensitivity of the skin. The frost should be weak, so as to not cause a deepening of the lesion.

SUMMARY

The authors compare the different types of chemical peels that are in use at the present time, commenting on their advantages and disadvantages. Comparisons show the actions of different chemical peeling agents. The main focus is on the superficial and medium chemical peels, mainly using Glycolic Acid, and the new combinations of Glycolic Acid + Salicylic Acid (Alpha Beta Complex Gel), and Retinoic Acid in high concentrations with clearing agents and Trichloroacetic Acid 20%-30% blended with Glycolic Acid. Post peel home therapy is discussed thoroughly in the article.

BIBLIOGRAPHY

1. Moy LS, Mene R. Glycolic acid chemical peels. In: Roenigk RK, Roenigk HH (eds). *Dermatologic surgery, principles and practice*. New York: Marcel Dekker, Inc., 1997. p. 1103-1113.
2. Stegman SJ, Tromovitch TA. Chemical peels in cosmetic dermatologic surgery. In: Stegman SS, Tromovitch TA, Glocau RG (eds). *Cosmetic Dermatologic Surgery*. Chicago: Year Book, 1984. p. 27-46.
3. Baker TJ, Gordon H, Mosienko P, Seckinger DL. Long term histological study of skin after chemical peel and dermabrasion. *Plast Reconstr Surg*, 1974; 53:522-525.
4. Greenbaum SS, Lask GP. Facial peeling: trichloroacetic acid. In: Parish LC, Lask GP (eds). *Aesthetic dermatology*. New York: McGraw-Hill, 1991. p. 139-143.
5. Rubin MG. *Manual of chemical peels: Superficial and medium depth*. Philadelphia: JB Lippincott Company, 1995.
6. Truppmann ES, Ellenberg JD. Major electrocardiographic changes during chemical face peeling. *Plast Reconstr Surg*, 1979; 64: 44-48.

7. Van Scott EJ, Yu RJ. Substances that modify the stratum corneum by modulating its formation. In: Frost P, Horwitz SN (eds). Principles of cosmetic for the dermatologist. St. Louis: CV Mosby, 1982. p. 70-74.
8. Moy LS, Piece S, Moy RL. Epidermal and dermal histologic effects of different peeling agents on the skin of guinea pigs and minipigs. In press.
9. Letessier SM. Chemical peel with resorcin. In: Roenigk RK, Roenigk HH (eds). Dermatologic surgery: Principles and practice. New York: Marcel Dekker, 1997. p. 1114-1121.
10. Van Scott EJ, Yu RJ. Alpha hydroxy acids: therapeutic potentials. *Cac J Dermatol* 1989; 1(5): 108-112.
11. Van Scott EJ, Yu RJ. Hyperkeratinization, corneocyte cohesion and alpha hydroxy acids. *J Am Acad Dermatol*, 1984; 5: 867-879.
12. Moy LS, Murad H, Moy RL. Superficial chemical peel. *Cutaneous surgery*. Philadelphia: WB Saunder Company, 1994; p. 462-478.
13. Haas JE. The effect of ascorbic acid and potassium ferricyanide as melanogenesis inhibitors on the development of pigmentation in Mexican axolotls. *Am Osteopath*, 1974; 73: 674.
14. Lotter AM. Human pigment factors relative to chemical face peeling. *Ann Plast Surg*, 1979; 3: 231-239.
15. Brody HJ. Complications of chemical peeling. *J Dermatol Surg Oncol*, 1989; 15: 1010-1019.
16. Hay ED. Cell biology of extracellular matrix. New York: Plenum Press, 1981.
17. Moy LS, Murad H, Moy RL. Effect of glycolic acid on collagen production by human skin fibroblast. In press.
18. Moy RL, Moy LS, Bennett RG et al. Effects of systemic 13-cisretinoic acid on dermal wound healing in rabbit ears in vivo. *J. Dermatol Surg Oncol*. In press.
19. Lima JRA. Teoria e prática do ácido glicólico. Monografia apresentada no curso de pós-graduação da Universidade John Kennedy. Buenos Aires, 1996.

			
FIG. 1A H.B. 50 Y.O. – Mixed Melasma (Prior to Treatment)		FIG. 1B H.B. 50 Y.O. – After 30 Days of treatment with Yellow Peel	
			
FIG. 2A C.A.70 Y.O. Photoaging (Pre-Treatment)	FIG. 2B C.A. 70 Y.O. 15 days after one sequence of Yellow Peel	FIG. 2C C.A. 70 Y.O. Level of edema & erythema needed for dermal stimulation with retinoic acid.(Yellow Peel)	
			
FIG. 3A A.P.L. 52 Y.O. Photoaging (Pre-Treatment)		FIG. 3B A.P.L. 52 Y.O. After 30 Days treatment of Superficial Peelings with Glycolic Acids 70%	
			
FIG. 4A L.C., 23 Y.O. Juvenile Acne (Pre-Treatment)	FIG. 4B L.C., 23 Y.O. Treatment with Glycolic Acid Masque 25%	FIG. 4C L.C., 23 Y.O. 90 Days Post Treatment.	
			
FIG. 5 P.L., 52 Y.O. Treatment for lesions caused by the sun. (Right arm was not treated. Method used was 4 body peels with Glycolic Acid 70%)		FIG. 6 N.L., 60 Y.O. Patient submitted to 4 superficial Peelings with Glycolic Acid, in preparation for Laser Resurfacing	

			
<p>FIG. 7A C.R, 25 Y.O. Keratosis Pilaris (Pre-Treatment)</p>	<p>FIG. 7B C.R, 25 Y.O. Immediate Results. Post treatment with Alpha Beta Complex Gel</p>	<p>FIG.8A M.F.S, 46 Y.O. Photoaging with superficial Keratose Solar plates (Pre-Treatment)</p>	<p>FIG.8B M.F.S, 46 Y.O. Straight after (5 mins) a superficial Peel with Alpha Beta Complex Gel. The Stratum Corneum Lucid is evident .</p>
			
<p>FIG. 9A R.O, 30 Y.O. Mixed melasma. (Pre-Treatment.)</p>	<p>FIG. 9B R.O, 30 Y.O. 11 months after Treatment with Yellow Peel and home use of Phytic Acid</p>	<p>FIG. 10A D.A, 66 Y.O. Photoaging (Pre-treatment)</p>	<p>FIG. 10B D.A, 66 Y.O. Result shown 15 days after the treatment of a cycle of double Yellow Peels with home treatment. Vitamin C 20% & Glycolic Acid 7%+Phytic Acid 4%</p>
			
<p>FIG. 11A M.A. R, 40 Y.O. Photoaging (Pre-Treatment.)</p>	<p>FIG. 11B M.A. R, 40 Y.O. 6 days after a double Yellow Peel</p>	<p>FIG. 12 C.N, 27 Y.O. On the 5th day after a 30% TCA Chelated. Notice the good flaking process and the lack of residual inflammation.</p>	<p>FIG.13 V. R, 74 Y.O. Patient underwent treatment with Chelated TCA 30%. Notice that on the 10th Day the partial elimination of the necrosed skin occurred.</p>