WHEN TO CHOOSE A CHEMICAL PEEL OVER OTHER MODALITIES

INTRO TO PEELS

• According to the American Society of Dermatologic Surgery and the American Society for Aesthetic Plastic Surgery ...

between $59,000 and 603,305 chemical peel procedures were performed in 2015, an increase of 23% compared with the previous year.1,2


PROS & CONS OF A PEEL

Pros

• Low cost
• No need for numbing
• Relatively less risk of post-inflammatory pigmentation (PIH) in skin of color patients (no heat energy)
• Less risk of worsening melasma patients (no heat energy)
• Indicated for treating active acne and acne scarring

Cons

• “Flaking” and “peeling” like a snake peeling vs rough texture/scabs after a laser
• Unpredictable results, varying skin thickness, skincare and prior peel hx dictates depth of penetration and this side effect profile
• Scarring with deep peels, since confluent (not fractionated) necrosis at the level lower reticular dermis
• Hypopigmentation with deep peels
TYPES OF PEELS

1. Salicylic acid (SA)
2. Glycolic acid (GA)
3. Pyruvic acid (PA)
4. Lactic acid (LA)
5. Mandelic acid (MA)
6. Jessner solution (JS)
7. Trichloroacetic acid (TCA)
8. Retinoic acid
9. Phenol
10. Croton Oil
11. Combination Peels

SKIN ANATOMY

Subcutaneous connective tissue, hair follicles, sebaceous glands, skin barrier function.

Lymph ducts, sweat glands, eccrine glands.

Epidermis - Keratinocytes, melanocytes, Merkel cells, keratinocytes.

Basement membrane, skin barrier function.

Epidermis - Basal layer, spinous layer, granular layer, cornified layer.

Corneocytes - synthesis of lipids, permeability.

Nerve endings, smaller vessels, hair follicles, sweat glands.

Fibroblasts, fibrocytes, elastin fibers.
HOW DO YOU CHOOSE THE TYPE OF PEEL?

• Determine main concerns and goals of patient (pigment, pores, wrinkles, acne, acne scarring)
• Determine downtime patient has (2-3 days, vs 1 week)
• Determine budget (deeper peels cost more because have increased risk)
• Establish expectations (next slide)

HOW DO YOU CHOOSE THE TYPE OF PEEL?

Establish expectations:
• Not all brown spots fade, and may require multiple treatments as well as possible laser or electrodesiccation in future
• Prepare patients for days to 1 week of flaking/peeling
• No sun exposure for 2-4 wk pre-post tx depending on depth
• Patient compliance with topicals and sun protection

MOST COMMON SKIN COMPLAINTS – TREATED BY CHEMICAL PEELING?

<table>
<thead>
<tr>
<th>Skin texture:</th>
<th>Skin discoloration</th>
</tr>
</thead>
<tbody>
<tr>
<td>dull skin (scaly, dry, undamaged) YES!</td>
<td>sun spots (ephelides, lentigines) PARTLY</td>
</tr>
<tr>
<td>crepey skin and fine lines (eyes, smoker’s lines, buccal) YES!</td>
<td>melasma PARTLY</td>
</tr>
<tr>
<td>large pores, seborrheic keratoses, sebaceous hyperplasia – PARTLY</td>
<td></td>
</tr>
<tr>
<td>acne YES!</td>
<td></td>
</tr>
<tr>
<td>acne scarring PARTLY</td>
<td></td>
</tr>
</tbody>
</table>

Connective tissue loss: start early to prevent face-lifts
• Hooding, crow's feet and tear trough – PARTLY with DEEPER PEELS, plus volumizers and surgical lifts
TYPES OF PEELS

- Chemical peels induce all 3 stages of tissue replacement: destruction, elimination, and regeneration, all under controlled inflammation.
- Classified based on their histologic depth of skin penetration:
  - **Superficial** peels: destroy keratinocytes down to the level of stratum spinosum and stratum basale
  - **Medium** peels: penetrate to mid-reticular dermis
  - **Deep**: part or all mid-reticular dermis.

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**ACTION OF VARIOUS CHEMICAL PEELS**

<table>
<thead>
<tr>
<th>Peel</th>
<th>Mechanism of action of various peeling agents in acne</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA</td>
<td>Deregulation, Reduction of sebum production, Anti-inflammatory effect, Neocollagenesis</td>
</tr>
<tr>
<td>MA</td>
<td>Deregulation, Reduction of sebum production, Anti-inflammatory effect</td>
</tr>
<tr>
<td>LA</td>
<td>Reduction of sebum production, Anti-inflammatory effect</td>
</tr>
<tr>
<td>JS</td>
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</tr>
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<td>SA</td>
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<tr>
<td>PA</td>
<td>Reduction of sebum production, Anti-inflammatory effect</td>
</tr>
<tr>
<td>TCA</td>
<td>Reduction of sebum production, Anti-inflammatory effect</td>
</tr>
<tr>
<td>Pho</td>
<td>Reduction of sebum production, Anti-inflammatory effect</td>
</tr>
</tbody>
</table>

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DEPTH OF CHEMICAL PEELS

VARIABLES AFFECTING ACTION & DEPTH OF PEEL:

- Skin type (sebaceous vs crepey/thin)
- Anatomic location of peel: neck/chest vs face (face is safer with more pilosebaceous units)
- Priming of skin with RA/HQ weeks to months leading to the peel (retinols, lightening agents)
- Peeling agent & volume of peeling agent (number of passes)

VARIABLES AFFECTING ACTION & DEPTH OF PEEL (CONT):

- Concentration of peeling agent (i.e. more control with lower concentrations)
- Application pressure and type of gauze (smooth, rough)
- Degreasing prior to peel (alcohol, acetone)
- Immediate preceding procedures (lasers– alter epidermal barrier, recent peels)

4. Jackson
### VIPEEL: LIGHT TO MEDIUM DEPTH PEEL

- The Vi Peel is a premixed formula containing:
  - TCA (10–12% in alcohol)
  - Phenol (10–12%) 
  - Salicylic acid (10–12%)
  - Lactic acid (0.1–0.4%)
  - 4% vitamin C
- Can use on face, eyelids, chest, hands and back
- Phenol is numbing
- Phenol concentration is low, so do not need cardiopulmonary monitoring

### JESSNERS PEEL:

- Light to medium peeling
- Components:
  - Salicylic acid
  - Resorcinol (protein coagulation and necrotizing)
  - AHA (lactic acid)
  - Ethanol (96%)
Classification of Chemical Peels by Depth of Injury

<table>
<thead>
<tr>
<th>Peel Type</th>
<th>Depth (um)</th>
<th>Level of Injury</th>
<th>Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial - very light</td>
<td>&lt;100</td>
<td>Exfoliation of stratum corneum, some dermal papillae</td>
<td>Low potency AHA, salicylic acid, 10-20% TCA, benzoyl peroxide</td>
</tr>
<tr>
<td>Superficial - light</td>
<td>100</td>
<td>Necrosis of entire epidermis to basal layer, stimulates new epithelial formation</td>
<td>20-70% GA/AHA, 22-30% TCA, Jessner solution, ViPeel</td>
</tr>
<tr>
<td>Medium depth</td>
<td>200</td>
<td>Partial destruction of epidermis; stimulates neovascularization, new collagen production</td>
<td>25-30% TCA peel, Jessner + 35% TCA, 70% glycolic + 35% TCA, Baker-Gordon peel</td>
</tr>
<tr>
<td>Deep</td>
<td>&gt;400</td>
<td>Necrosis of part or all mid-reticular dermis; new collagen production</td>
<td>&gt;50% TCA, Baker-Gordon peel</td>
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MEDIUM - DEPTH PEELS

- Medium-depth peels are generally done as a single procedure (or every 3-12 mos) due to the level of wound injury and the continued clinical improvement months after treatment.
- Classic medium-depth peel was 40 to 50% TCA because of its ability to improve fine rhytides, actinic damage, and “preneoplasias”
  - generally no longer used as a single-agent peel due to the high risk of complication, namely, scarring and dyspigmentation, when TCA >50%
- Current use of medium-depth chemical peels utilizes 35% TCA with an initial application of a “priming” agent, such as Jessner solution, 70% glycolic acid
  - As a result of the damage to the epidermis produced with the initial peel, the level of TCA penetration is deep and better controlled.

COMBINATION MEDIUM DEPTH PEELS

- Combination peels are thought to be as effective, but with better safety profile as compared to 35% TCA
  - Coleman peel - 70% glycolic acid + 35% TCA peel
  - Monheit peel - Jessner solution + 35% TCA peel
- Of note: glycolic acid peels need to be neutralized within 2 minutes to inhibit further penetration of the chemical agents.

Table 1. AGENTS FOR MEDIUM-DEPTH CHEMICAL PEELS

<table>
<thead>
<tr>
<th>Agent</th>
<th>TCA 30%</th>
<th>Combination 30% TCA- solid CO2, (Reddy)</th>
<th>Combination 30% TCA- lactic acid (Miyamoto), 70% Glycolic (Coyne), 35% Phenol</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coleman peel - 70% glycolic acid + 35% TCA peel</td>
<td>Not recommended because of risk of scarring</td>
<td>The most potent combination. The most popular combination.</td>
<td>All effective combination. Rarely used.</td>
<td></td>
</tr>
</tbody>
</table>
OBAGI (TCA) BLUE PEEL

- TCA coagulates proteins, smooths deep wrinkles and tightens
- Can be superficial or medium depth peeling
- 10% can be used for epidermal (superficial) peel
- Don’t use greater than 20-25% on skin with decreased pilosebaceous units (i.e. neck/chest), since increased scarring
- However, be aware that VOLUME of TCA peel (even lower concentrations) can be made to penetrate to a particular depth.

TCA-Based Blue Peel: A Standardized Procedure with Depth Control

- Mixing a set volume of TCA and blue dye (glycerin, saponins, nonionic blue color base)
- More homogenous TCA-oil-water solution
- Delayed penetration
- Allows to stop at desired depth if doing medium peel, and increasing safety margin
- This results in SOLID white frost (only ok for facial skin)

Obagi et al. 1999

A Comparison of the Efficacy and Safety of Jessner’s Solution and 35% Trichloroacetic Acid vs 5% Fluorouracil in the Treatment of Widespread Facial Actinic Keratoses

- Split face study of 15 patients with widespread actinic damage
- Jessner-35% TCA has demonstrated similar resolution of widespread facial actinic keratoses as compared with 5-fluorouracil cream
- Prior to peel 2 week course of tretinoin cream at bedtime
- F/u of 12 mos with lasting results in both Jessner/TCA and 5FU group, and both produced 75% reduction in AKs

## Classification of Chemical Peels by Depth of Injury

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<td>Exfoliating stratum corneum, +/- stratum granulosum</td>
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<td>Superficial light</td>
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<td>40-70% GA/AHA, 22-30% TCA, Jessner solution, ViPeel</td>
</tr>
<tr>
<td>Medium depth</td>
<td>200</td>
<td>Wound epidermis and papillary dermis, +/- upper reticular dermis; new collagen production</td>
<td>22-50% TCA, Jessner + 35% TCA, 70% glycolic + 35% TCA, Baker VL (phenol)</td>
</tr>
<tr>
<td>Deep</td>
<td>&gt;400</td>
<td>Necrosis of part or all mid reticular dermis; new collagen production</td>
<td>&gt;50% TCA, Hetter, Baker-Gordon peel</td>
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### PEELING AGENTS IN DEEP PEELS – PHENOL AND CROTON OIL

- **Phenol**
  - Denatures proteins, inactivated enzymes, increasing permeability of cell membranes, inducing cell death, numbs skin
  - Goes to reticular dermis
  - ViPeel 10-14% phenol (light to medium peel) and doesn’t require monitoring

- **Croton oil**
  - Concentration determines the depth of the peel
  - Baker/Gordon Peel: 50% croton oil and phenol (deep)
  - Hetter: 30% croton oil and phenol (deep, more control)
  - Toxic at high concentrations to kidney, used to require IV placement, cardiac monitoring and prior lab testing

### BAKER GORDON PEEL

- **Baker gordon**
  - Phenol + croton oil + septisol
  - High concentration of croton oil – DENSE FROST
  - Wounding to reticular dermis
  - Significant hypopigmentation can occur = “alabaster statue” appearance
  - Renal, cardiopulmonary toxicity and
  - Requires monitoring
CLINICAL ENDPOINTS OF PEELS

- Crystallization at surface with salicylic acid (do not confuse with frosting – protein denaturation)
- Erythema
- Frost (salicylic acid, TCA)
- Speckled frost (Jessners is not confluent)

*** Frost is different than laser where depth is set, so medium and deeper peels should only be performed by experienced practitioner.

DEFROSTING IN ANY PEEL

- Always watch for defrosting and remember areas already treated, since mistakenly can re-apply to already frosted and denatured area.

SKIN OF COLOR PATIENTS

- Deep peels should be avoided in skin type IV-VI
- Superficial and medium-depth peels can still be reliably used in this population
- Salicylic acid, glycolic acid and Jessners peels used for pseudofolliculitis barbae (PFB)

SKIN OF COLOR PATIENTS

• Ethnic skin patients to avoid retinoids and other exfoliants at least 7 days before a peel to reduce risk of greater peel penetration and potential post-inflammatory pigmentary changes

• Pre-peel regimen that includes bleaching agents, such as hydroquinone, to mitigate induction of dyschromias


PEELING SKIN OF COLOR PATIENTS

• In skin of color pt, it is recommended to start with low concentrations of peeling agents such as tretinoin, glycolic acid, salicylic acid, and Jessners solution

• These peels have a lower risk of postprocedure complications compared with superficial trichloroacetic acid (TCA) (25–30%) peels


PEELING SKIN OF COLOR PATIENTS

• When TCA concentrations of 10 to 30% are utilized in skin types IV to VI, frost is not desired in dark skin because it increases the risk of adverse events such as pigmentation and scarring

• Pre-condition the skin with HQ and retinoid, SPF for weeks to months before peeling

Salicylic Acid Peel for Acne Scars

- Best peel results are achieved in macular scars, and icepick and rolling cannot disappear as easy.
- Best chemical peel for acne scars is salicylic acid peels since help with acne as well.
- Beta-hydroxy acid agent which removes intercellular lipids that are covalently linked to the cornified envelope surrounding cornified epithelioid cells.
- Persistent post-inflammatory hyperpigmentation or scarring are very rare and for this reason it is used to treat dark skin.

SALICYLIC ACID PEEL FOR ACNE SCARS (CONT)

- Salicylic
- Rapid breathing, tinnitus, hearing loss, dizziness, abdominal cramps, and central nervous system symptoms
- Salicylic acid toxicity
- Observed with 20% salicylic acid applied to 50% of the body (be cautious when peeling face, neck and back same day).

Salicylic Acid 20% and 30%, performed at 2 week intervals.
SALICYLIC ACID PEEL AND ISOTRETINOIN FOR ACNE


• Literature classically contraindicated procedures during isotretinoin therapy.
• Recent article showed that non-aggressive procedures such as light peels are safe to use.
• Karr et al in 2013 showed that 20% salicylic acid peels done at 2-wk intervals showed improved MASI scores sooner than isotretinoin alone probably due to decreased sebo-production.
• Potential way to decrease inflammation with isotretinoin tx and see results sooner.

CROSS TECHNIQUE FOR ACNE SCARS

• Chemical reconstruction of skin scars = CROSS
• When you don’t have an ablative or non-ablative laser for acne scars
• When you have many ice-pick scars
• 90% TCA is often used, but lower TCA concentration (50%) has similar results and much less adverse reactions.
• Would not perform in skin of color pt type >IV

TCA VS CO2 FOR XANTHELSMA

• Both TCA peeling 70% and carbon dioxide laser ablation showed more significant clinical efficacy and tolerability with least number of sessions in the treatment of xanthelasma palpebrarum than 30% and 35% TCA peeling
• Post-therapy erythema and hypopigmentation seen more with TCA 70%
• Post-therapy hyperpigmentation was more with TCA (30%)
**COMBINATION TX WITH PEELS FOR ACNE SCARRING**

- Cochrane review did not support use of peel as first line as monotherapy or combination with other non-invasive treatments.
- One study showed combining microneedling with 20% TCA peel, improved with NAPL.
- CROSS technology 100% TCA comparable to 1,550 Erbium:glass fractional.


**Comparison of a 1,550 nm Erbium:Glass Fractional Laser and a Chemical Reconstruction of Skin Scars (CROSS) Method in the Treatment of Acne Scars: A Simultaneous Split-Face Trial**

- Er:Glass fractionated non-ablative laser treated three times 6 weeks apart.
- CROSS treated 2 times every 12 weeks.
- Both as effective for acne scar (including ice-pick), but laser more effective in rolling scars.
- Graded of pain was significantly more for laser.
- Downtime and lasting days of erythema was more for CROSS.
- 3/4 3 days after last treatment.


**MELASMA AND PEELS**

- Peels are most useful for the *epidermal-type melasma*, with the dermal type being almost resistant to the effect of chemical peels.
- In patients with skin of color, however, the correct choice of peel as well as priming and maintenance regimen is essential in ensuring their efficacy while minimizing PIH.
- Combination therapy is best approach to challenging cases.

MELASMA AND PEELS (CONT)

- Recommended superficial peels for melasma include:
  - TCA [10%–30%] peel
  - Twice monthly salicylic acid peels [25%–30%]
  - Combined peel with salicylic acid (23%) and TCA gel (10%)
  - Monthly medium peels using pyruvic acid [40%]


SALICYLIC ACID PEEL FOR MELASMA

- Salicylic acid 20%–30%
- Pre-treated with 4% hydroquinone for 2 wks
- Peels were performed at 2 week intervals
- Although another study showed SA and 4% HQ were equivalent in tx

MELASMA AND PEELS: TCA

• While commonly used in concentrations of between 10–20% in lighter skin types with good short-term results for epidermal melasma, TCA peels should be used with caution in those with skin of color due to the risk of post-peel PIH and scarring.
• Kumari and colleagues found, in a comparative study with 40 Indian women, similar efficacy between six TCA peels and 10–35% GA peels.
• GA peels, however, were more tolerable with fewer side-effects and have rejuvenating properties than TCA peels.
• Combination peels like ViPeels have smaller concentrations of TCA and are more tolerable with less side effects.


DEEP PEELS IN MELASMA AND SKIN OF COLOR

• While peels are a reasonable adjunct in the treatment of melasma, they rarely suffice as monotherapy.
• The decision to use medium peels in those with skin of color must be made with caution due to the risk of PIH.
• In this group, superficial peels are the safest to use with hydroquinone pretreatment priming and careful post-procedure instructions on sun protection and ongoing topical therapy.


Split-face comparative study of 1550 nm fractional photothermolysis and trichloroacetic acid 15% chemical peeling for facial melasma in Asian skin

• Both 1550 FP and 15% TCA peeling improved melasma, but rebound occurred.
• At the 12-week follow-up, patient assessment of improvement had significantly decreased, to approximately 25%, with respect to both treatment modalities.
• No skin prepping was done for participants.

A randomized, observer-blinded, comparison of combined 1064-nm Q-switched neodymium-doped yttrium–aluminium–garnet laser plus 30% glycolic acid peel vs. laser monotherapy to treat melasma

- Mixed type melasma
- Weekly QS Nd:Yag with GA every 2 weeks vs GA alone
- Greater improvement for the combined therapy side 32.6% vs. 22.0%, P < 0.001
- Results maintained 5 months out from last tx


Treatment of melasma in men with low-fluence Q-switched neodymium-doped yttrium-aluminum-garnet laser versus combined laser and glycolic acid peeling.

- Mixed type melasma in men
- 5 weekly sessions of LFQS on one side of the face and LFQS plus 30% GA peeling on the contralateral side and were followed for 12 weeks
- Partially rebound at 12 weeks f/u
- Idiopathic guttate hypopigmentation (8.3%)


THANK YOU! ANY QUESTIONS?