Cosmetic Dermatology: Peels and Sclerotherapy
Chemical Peels

- improve skin texture
- reduce hyperpigmentation and mild wrinkling
- useful as adjunctive treatment for acne, rosacea, and melasma
- do not improve deep wrinkles or sagging skin
Chemical Peels

- Categorized based on depth of the procedure:
  - superficial: induce necrosis of all or parts of the epidermis
  - medium: necrosis of the epidermis and part or all of the papillary dermis
  - deep: necrosis extends into reticular dermis
Superficial Peels

- alpha hydroxy acids (AHA)
- beta hydroxy acids (BHA)
- Jessner’s solution
- modified Jessner’s
- resorcinol
- trichloroacetic acid (TCA)
AHA’s and BHA

- Naturally occurring organic acids
  - high concentrations cause detachment of keratinocytes and epidermolysis
  - lower concentrations reduce keratinocyte cohesion above granular layer

- 2 major effects:
  - “speeds up” the cell cycle
  - smoothes stratum corneum
AHA’s

- Glycolic acid
- Lactic acid
- Citric acid
- Phytic acid

- sugar cane
- sour milk
- citrus fruits
- rice
Glycolic Acid

- AHA most commonly used in peels
- “lunchtime peel”
- Increases skin thickness and MPS’s in dermis
- Improved quality of elastic fibers
- Increased density of collagen
Lactic Acid

- Found in many OTC and Rx moisturizers
- Lac-Hydrin is AHA used as rx for dry skin
- Not frequently used for in-office peels
BHA

- aka salicylic acid (SA)
- derived from willow bark, wintergreen leaves, and sweet birch
- in-office peels use 20-30% salicylic acid, OTC preps contain ~2% SA
- helps decrease hyperpigmentation, decrease surface roughness, and reduce fine lines
BHA

- increase exfoliation
- exhibits anti-inflammatory capabilities, thus induce less irritation than AHA's.
- useful peel in rosacea and acne patients
- lipophilic and comedolytic
- does not increase collagen synthesis
Disadvantages of Hydroxy Acids

- unrealistic patient expectations
- decreased efficacy with continued use
- ? decrease natural skin barrier to UV light and harmful environmental toxins
Important Considerations When Comparing Preparations

- pH and pKa
- buffered solutions
  - sodium bicarb
  - sodium hydroxide
  - vehicle
Performing a Superficial Peel with AHA or BHA

- Cleanse the skin
  - 4 x4 gauze with 0.25% triclosan
  - rinse with water, then dry
  - apply acetone gauze
- Apply 40-70% glycolic acid with 2x2 gauze, and rinse with water or neutralize with 5%NaHCO₃ after 2-4 min.
- Apply SA with 2x2 gauze. It will precipitate (frost) in approx. 2 min. and does not need to be neutralized
Jessner’s Solution

- Combination of:
  - resorcinol 14g
  - salicylic acid 14g
  - lactic acid 14g
  - ethanol 95% to make 100cc of solution

- formulated to reduce concentration and toxicity of individual ingredients while increasing efficacy
Jessner’s Solution

- strength of the peel determined by how many layers are applied
- does not need neutralization
- can be combined with other peels to increase efficacy (ie. TCA)
- use cautiously in dark skin b/c of risks of post inflammatory hyperpigmentation or contact dermatitis with resorcinol
Performing a Jessner’s Peel

- Cleanse skin
- Apply thin layer of petrolatum to naso-alar grooves and lips
- Apply thin coat of Jessner’s to desired treatment area
- First coat complete when frosting occurs (approx. 3-5 minutes)
- can apply more coats to deepen penetration
- patient will experience flaking for ~7days
Modified Jessner’s

- combinations including hydroquinone and kojic acid
- combination without resorcinol
Resorcinol

- used as peeling agent since 1882
- is $m$-dihydroxybenzene, a phenol derivative
- antipruritic, keratolytic, antimycotic, and antiseptic properties
- used as treatment for pigmentary disorders, acne, and in combo with other peel agents
Resorcinol

- must limit surface area treated due to risk of phenol-like systemic toxicity
- prolonged use can be assoc. with myxedema and methemoglobinemia
- can cause allergic contact dermatitis and post-inflammatory hyperpigmentation
Side Effects of Superficial Peels

- erythema, pruritus, peeling
- allergic contact: resorcinol, SA, Lactic acid
- irritant contact: glycolic acid
Superficial Peels

- Increased depth of penetration with:
  - retinoid use
  - recent facial shaving
  - use of exfoliating scrub
- Patient will need 3-6 peels at 2-4 week intervals to see effects and may need “booster” peels 3-6 months after initial series
Microdermabrasion

- Aka Parisian Peel
- is equivalent to superficial peel
- fast moving micro-crystal particles contact the skin to buff epidermis
- “vacuum” used to stimulate to dermal level to induce mild collagen remodeling
- $125/session for six sessions ($750)
Medium Depth Peels

- Trichloroacetic Acid
  - 10-20\% used for superficial peels
  - 35-40\% used for medium peels
    - produces epidermal and papillary dermal necrosis
    - can cause hyperpigmentation and scarring
  - usually used in combination with Jessner’s or 70\% glycolic acid as priming agents
Medium Depth Peels

- Indications:
  - photoaging
  - actinic keratoses
  - pigmentary dyschromias
  - mild acne scarring
- improves fine lines and stimulates collagen remodeling for 3-4 months after the procedure
Performing a Jessner’s/TCA Peel

- Cleanse face, de-grease with acetone
- Apply Jessner’s and wait 1-2 minutes for frosting to occur
- Apply 35% TCA with 1-4 cotton tipped applicators. Allow 30sec-2 min. for white-coated frosting with background erythema.
- May re-apply to areas without adequate frosting
- May apply saline compresses for comfort after frosting
Focal TCA Peels

- Derm Surgery April 2004, Seoul, Korea
- Fitzpatrick skin types IV-V
- TCA applied at various strengths to pigmented lesions with wooden applicator
  - ie. 65% for seb.k’s, 50-65% for lentigines, 10-50% for melasma
- decreased risk of hypo/hyperpigmentation, scarring, erythema
Medium Depth Peels

- Healing time:
  - 5-7 days with TCA alone
  - 7-14 days with Jessner’s/TCA peel

- Contraindications:
  - dark skin types
  - recent treatment with Accutane

- Cost: $28-32/ 2 oz. Bottle ($1/ patient)
Deep-Depth Peels

- Create injury through papillary and into reticular dermis
- TCA >50% or 88% phenol preparations
- largely supplanted by dermabrasions and laser resurfacing due to high incidence of side effects
Post-Op Care

• Superficial Peels
  • minimal down time
  • mild erythema and desquamation for 1-4 days post op
  • wash face with mild cleanser
  • use routine moisturizers and sunscreens
Post-Op Care

- **Medium Depth Peel**
  - apply soaks QID with warm compresses
  - apply petrolatum or Aquaphor following each soak
  - NSAIDs for pain control

- **What to Expect**
  - immediate edema with worsening for 48 hours
  - erythema resolves within 2-4 weeks post op
Post Op Care

- **Deep Depth Peels**
  - biosynthetic dressing applied QD for the first 2-3 days post op
  - debridement with saline soaks and cotton tips
  - D3-14 acetic acid soaks 4-6x/d, followed by ointment

- **What to expect**
  - edema for weeks, erythema for 2-4 months
Complications of Peels

- Excessive depth of tissue injury
- Infection
- Delayed wound healing and erythema
- Scarring
- Post-inflammatory hyperpigmentation
Pseudomonas infection

HSV infection

Side Effects following Baker’s peels
FIG. 8-11. A and B, Erosions of delayed healing 4 weeks after Baker’s phenol peel for photoaging III in two different patients. (Courtesy of Dr. E.H. Szachowicz). C, Erosion with accompanying untoward hyperpigmentation 30 days after 35% TCA applied two times 10 minutes apart for photoaging III.
Perioral scarring after 50% TCA peel
Sclerotherapy

- The art of using sclerosants to destroy endothelial cells and cause vessel fibrosis
- Venous pathology occurs when venous return is impaired for any reason
  - primary muscle pump failure due to venous obstruction
  - valvular incompetence
Sclerotherapy

- Telangectasias, reticular veins, and varicose veins are influenced by
  - heredity
  - hormones
  - static gravitational pressures
  - incompetent valves
Physical Exam of Patient

- Goal is to determine where the primary or highest points of reflux are located
- Grade insufficiency with Widmer classification
  - Stage I - presence of corona phlebectasia (telangectasias)
  - Stage II - hypo- or hyperpigmentation
  - Stage III - presence of recent or healed ulcer
Vascular Testing

- Indicated for symptomatic patients when reflux source is unclear
- Use of Doppler probe to detect frequency shifts of blood coming towards or going away from probe
Sclerosing Solutions

- Optimal agent produces pan-endothelial destruction without systemic toxicity
  - if too weak, thrombosis without fibrosis and eventual recanalization
  - if too strong, hyperpigmentation, telangectatic matting, and ulceration can occur
### IMPORTANT CHARACTERISTICS OF SCLEROSING SOLUTIONS

<table>
<thead>
<tr>
<th>Sclerosing solution (Brand name)</th>
<th>Class</th>
<th>Allergenicity</th>
<th>Risks</th>
<th>FDA Approval</th>
<th>Dose limitation</th>
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</table>
| Hypertonic saline (HS) [18–30%]  | Hyperosmotic     | None                            | Necrosis of skin  
Pain and cramping  
Hyperpigmentation         | Yes, as abortifacient            | 6–10 ml          |
| Hypertonic saline [10%] and dextrose [25%]  
(HSD) (Sclerodex®) | Hyperosmotic     | Low (due only to added phenethyl alcohol) | Pain (much less than HS) | No (sold in Canada) | 10 ml of undiluted solution |
| Sodium tetradecyl sulfate (STS)  
(Sotradecol®, STD injection,  
Thromboject®)              | Detergent        | Rare anaphylaxis               | Hyperpigmentation  
Necrosis of skin (higher concentrations)  
Pain with perivascular injection | Yes                             | 10 ml of 3%          |
| Polidocanol (POL)  
(Aethoxysklerol®,  
Aetoxiscerol®,  
Sclerovein®)               | Detergent        | Rare anaphylaxis               | Lowest risk of necrosis  
Lowest risk of pain  
Hyperpigmentation at higher concentrations  
Disulfiram-like reaction | No                              | 10 ml of 3%          |
| Sodium morrhuate (SM) (Sclromate®) | Detergent        | Anaphylaxis, highest risk       | Hyperpigmentation  
Necrosis of skin  
Pain         | Yes                             | 10 ml          |
| Ethanolamine oleate             | Detergent        | Urticaria, Anaphylaxis          | Hyperpigmentation  
Necrosis of skin  
Pain  
Viscous, difficult to inject  
Acute renal failure  
Hemolytic reactions | Yes (used primarily for esophageal varices) | 10 ml          |
| Polyiodide iodide (PII) (Varigloban®,  
Variglobin®,  
Sclerodine®)             | Chemical irritant | Anaphylaxis, iodine hypersensitivity reactions | Pain on injection  
Necrosis of skin  
Dark brown color makes intravascular placement more difficult to confirm | No                              | 5 ml of 3%          |
| 72% glycerin with 8% chromium potassium alum (Chromex®) (Sclereme®) | Chemical irritant | Extremely rare anaphylaxis       | Ineffective sclerosis (weak agent)  
Very low risk of hyperpigmentation  
Viscous, difficult to inject  
Pain and cramping  
Ureteral colic/hematuria | No                              | 5 ml          |
Sclerosing Agents

- Hyperosmotic agents
  - hypertonic saline and saline-dextrose (Sclerodex)
    - endothelial damage through dehydration
  - hypertonic saline is FDA approved
  - associated with burning and cramping on injection
  - increased incidence of ulcerative necrosis
Sclerosing Agents

- Detergent sclerosants
  - sodium tetradecyl sulfate (Sotradecol), polidocanol (Sclerovein), sodium morrhuate (Scleromate)
    - vascular injury by altering surface tension around endothelial cells
  - Sotradecol assoc. with allergic hypersensitivity and hyperpigmentation
  - Polidocanol foam
Polidocanol Foam

- Combination of liquid sclerosant with gas
- Creation of micro-bubbles in solution:
  - Increases surface area, with displacement of blood
  - Increases contact of sclerosant with endothelium
- Inject less than with liquid form
- Higher risk of TVD and migraine
- Not yet FDA approved
Sclerosing Agents

- Chemical irritants
  - chromated glycerin (Scleremo) and polyiodide iodide (Variglobin)
    - injure cells by acting as corrosives
    - cauterizing effect due to the associated heavy metal
  - neither are FDA approved
  - SE: anaphylaxis, pain, necrosis
Technique for Telangectasias and Reticular Veins

- **Telangectasias**: flat red vessels 0.1-1 mm
- **Venulectasias**: bluish vessels 1-2 mm
- **Reticular veins**: have a cyanotic hue, 2-4 mm
- treat proximal and larger vessels first with the minimal sclerosant concentration (MSC)
Techniques

- Aspiration technique
- Puncture-fill technique
- Air bolus technique
- Empty vein technique
- Foaming
Injection technique

- Choose one of previous techniques
- Insert 30g needle at 30 degree angle, maintaining hand traction
- Inject larger vessels first
- Inject 0.1-0.4 cc into each injection site at 3cm intervals
- Wait 6-8 weeks between treatments
Treatment of Varicose Veins

- Must understand precise anatomy of varicosity to be treated
- May need Duplex ultrasound to determine primary source of reflux
- Sotradecol and hypertonic saline commonly used
Treatment of Varicose Veins

- **Supine Direct Cannulation technique**
  - map out injection sites while patient is standing
  - inject 0.5-1.5 mL of sclerosant at sites separated by 3-4 cm along the vein

- **Multiple Precannulation Sites technique**
  - 23g butterfly needles inserted into one proximal and distal site on vein
  - 2-3 mL of sclerosant infused into cannulas
Post-Treatment Care

• compression hose
• avoid intense exercise, hot tubs, saunas, and sunburn for the first few days post-op
• avoid ASA and NSAID’s for 48 hours
What’s the deal with compression hose?

- 20-30 mm Hg x 3 days for spider/reticular
- 30-40 mm Hg for 2 weeks for varicose

Decreases:
- pigmentation
- matting
- edema
- vessel recurrence
- phlebitis
Absolute Contraindications to Sclerothpery

- known allergy to sclerosant
- acute superficial or deep vein thrombosis
- infection in the area to be treated
- advanced peripheral arterial disease
- pregnancy
Sclerotherapy Complications

- Hyperpigmentation (10-30%)
  - usually lasts for 6-12 months
  - avoid NSAID’s and minocycline
  - elevate leg during treatment
  - use sclerosant concentration appropriate for vessel size
  - apply compression immediately post-op
Sclerotherapy Complications

- Telangiectatic Matting (5-14%)
  - usually resolves within 3-12 months
  - risk factors: obesity, use of estrogen containing medications, pregnancy, Fhx, excess post-op inflammation
  - use minimal sclerosant concentration
  - may discontinue OCP’s for 1 month prior and 2 months following treatment
GM
MATTING
ON
AMOXIFEN
Sclerotherapy Complications

- Ulceration
  - due to extravasation of sclerosing agent, injection into dermal arteriole, or reactive vasospasm
  - hemorrhagic bulla may form within 12-24 hours
  - may apply 2% nitroglycerin ointment to try and prevent ulceration
Serious Complications

- Systemic allergic reaction
  - Sotradecol has low allergic potential (0.3%)
- Arterial Injection
  - produces sludge embolus
  - most commonly occurs in posterior or medial malleolar region
  - immed. pain, decreased pulses, cyanosis, pallor
  - tx with immediate periarterial 1% procaine, heparin for 7-10 days, and IV dextran for 3 days
Miscellaneous Complications

- Localized urticaria
- Compression ulcers, dermatitis, folliculitis
- Nerve damage
- Superficial thrombophlebitis
- Transient visual disturbances