

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.



A

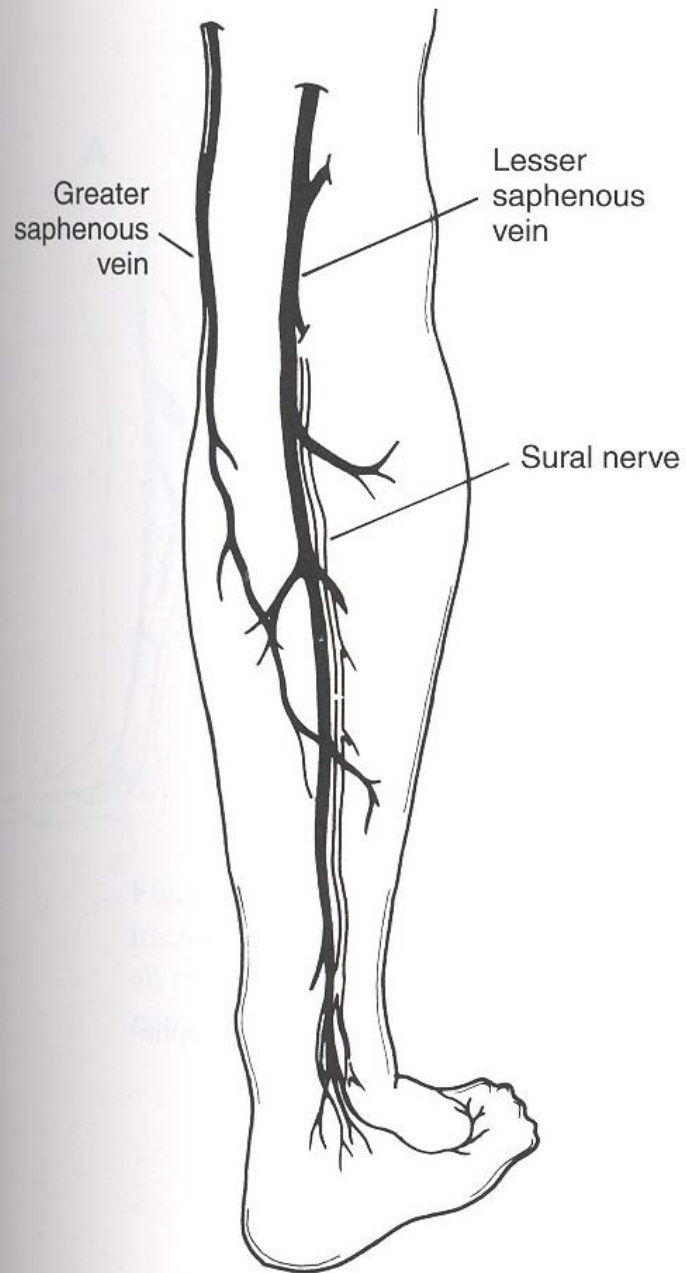


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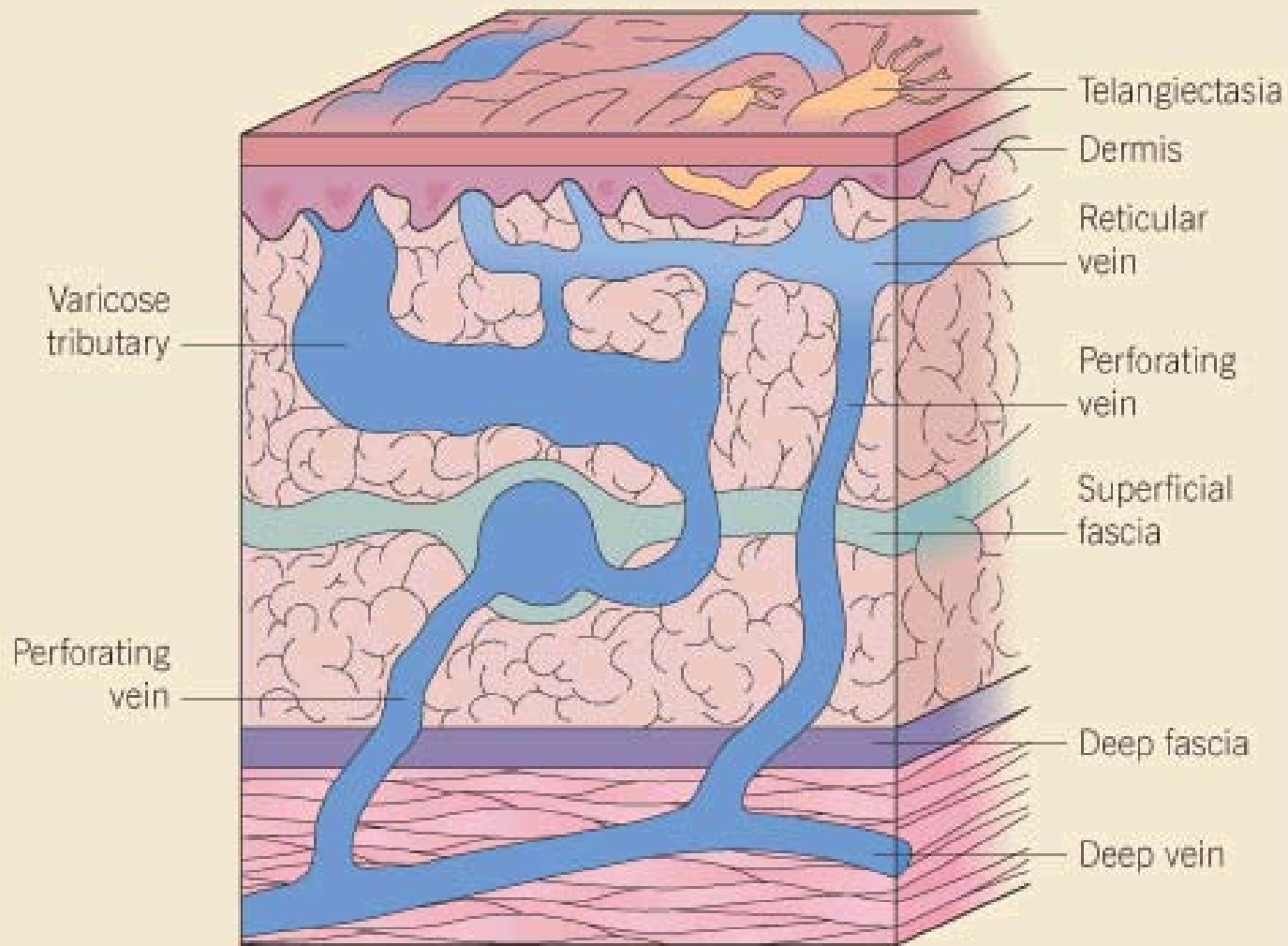
Perioral scarring after 50% TCA peel

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



THE VENOUS SYSTEM



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

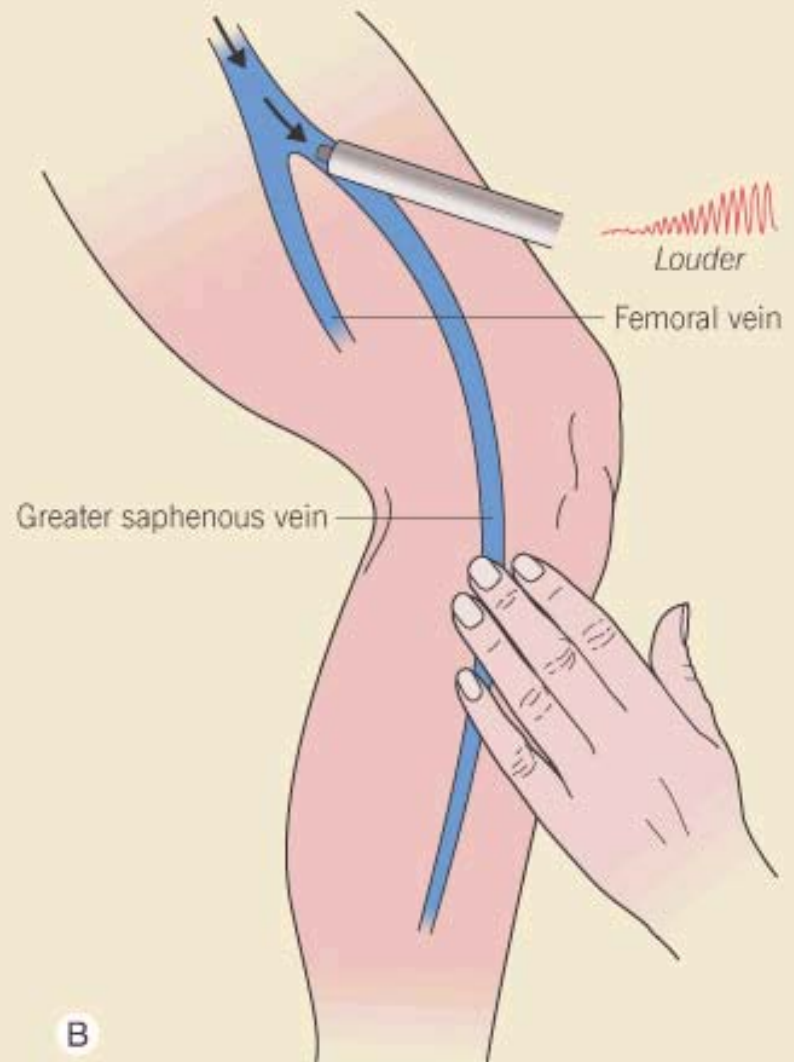
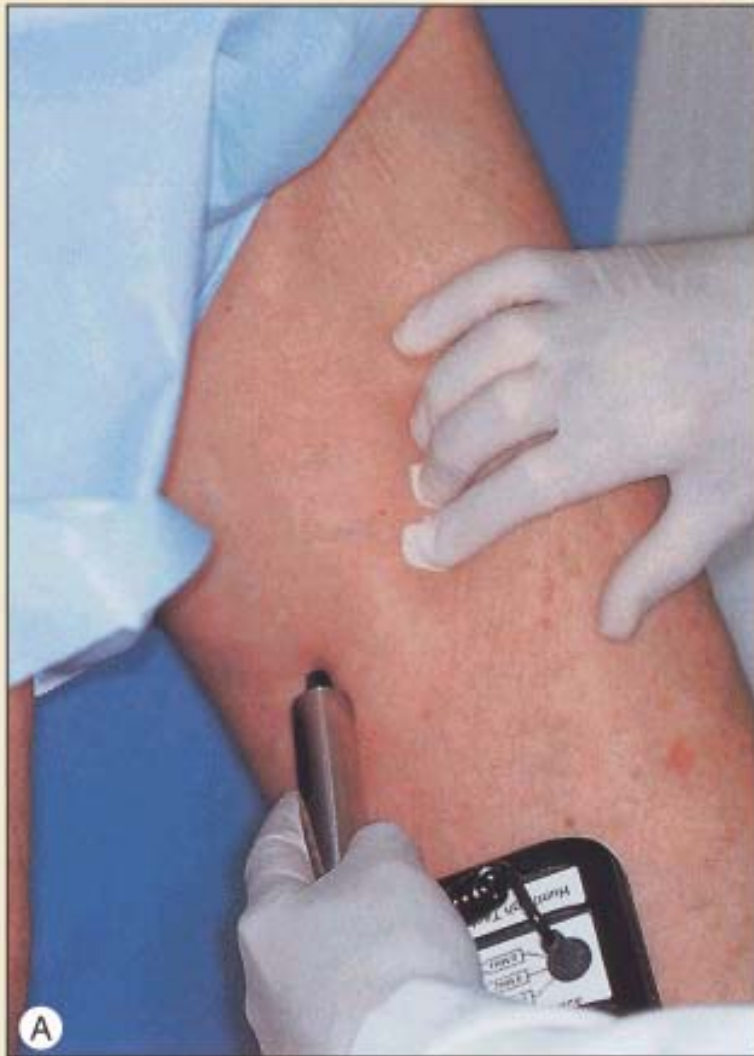




Vascular Testing

- 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

DOPPLER EXAMINATION OF THE LONG SAPHENOUS VEIN



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

Table 156.4 Important characteristics of sclerosing solutions.

IMPORTANT CHARACTERISTICS OF SCLEROSING SOLUTIONS					
Sclerosing solution (Brand name)	Class	Allergenicity	Risks	FDA Approval	Dose limitation
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 [®] , Aetoxisclerol [®] , 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) (Scleromate [®])	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

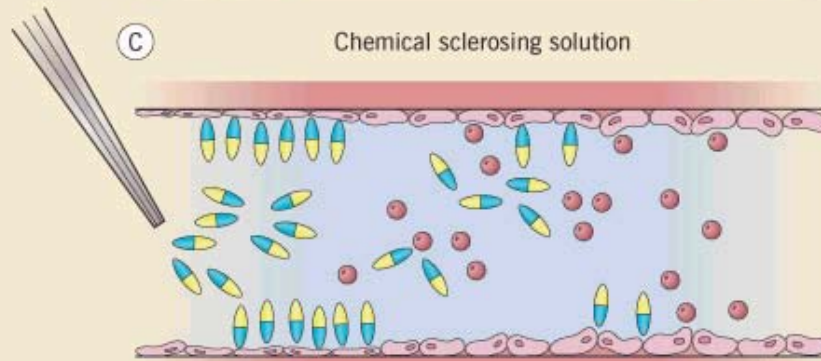
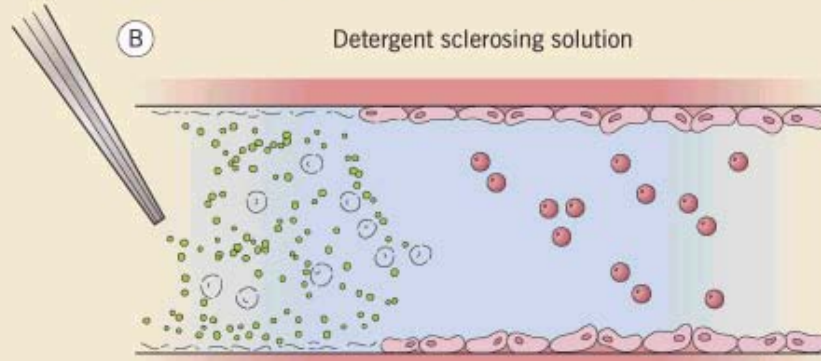
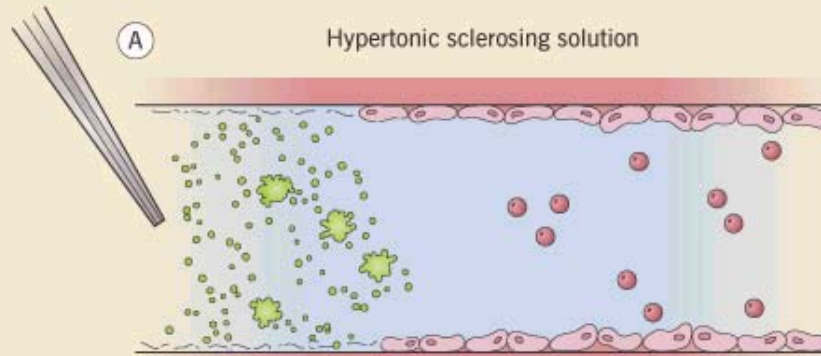
Polidocanol Foam

- 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

MECHANISMS OF ACTION OF SCLEROSING SOLUTIONS



Technique for Telangectasias and Reticular Veins

- Telangectasias: flat red vessels 0.1-1mm
- 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 3days for spider/reticular
- 30-40 mm Hg for 2 weeks for varicose
- Decreases:
 - pigmentation
 - matting
 - edema
 - vessel recurrence
 - phlebitis

Absolute Contraindications to Sclerotherapy

- 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

- Telangectatic 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