

Facial Resurfacing



Options

- Laser resurfacing
- Chemical peels
- Dermabrasion
- Topical therapy

Photoaging

- Most chronic changes occur from UVB light (290 to 320nm) associated with sunburn
- Ultraviolet AII (320-240nm) associated with photaging
- Ultraviolet AI (340-400nm) associated photoaging



Photoaging

- Results in fine wrinkles
- Texture abnormalities
- Pigment dyschromias
- Actinic keratosis



Epidermal Layer

Stratum Corneum

Stratum Lucidum

Stratum Granulosum

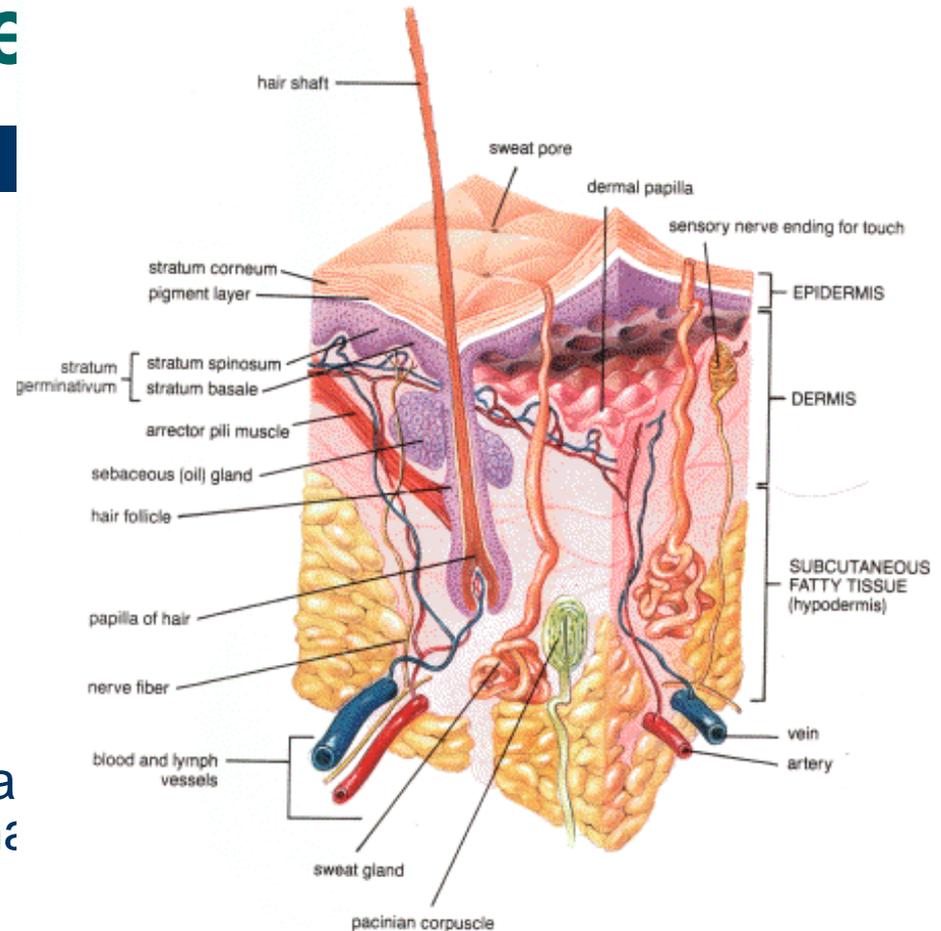
Stratum Spinosum

Stratum Basale

Dermal layers

Papillary: blood supply,
Meissner's corpuscles

Reticular: contains
Pacinian corpuscles, sweat
glands, smooth muscle, hair
follicles, lymph vessels



Photoaging

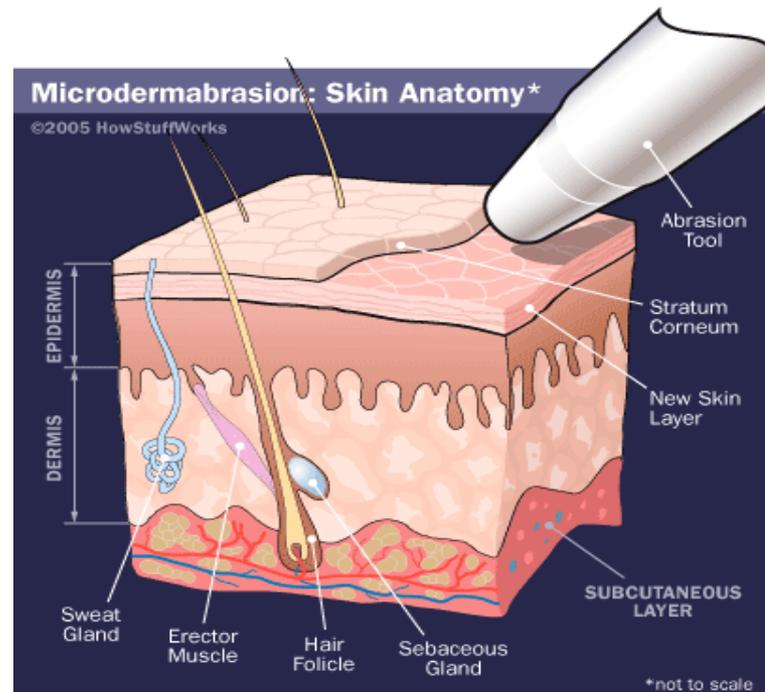
- Extrinsic vs intrinsic aging
- Intrinsic (chronologic aging)
 - Expression lines, subcutaneous tissue atrophy, effects of gravity
 - Thinning of dermis, flattening of dermal-epidermal junction, loss of elasticity.
 - Slower wound healing

Extrinsic

- Photoaging: chronic UV exposure
 - Results in thickening of stratum corneum, melanocytic clumping, dermal elastosis and basement membrane thickening
 - Seen as pigmentary changes, wrinkling, actinic keratosis, increased skin laxity, loss of rete pegs.
- Chemical
- Wind

Microdermabrasion

- Developed in 1985
- Mechanical procedure using a stream of fine abrasives (aluminum oxide crystals)
- Skin exfoliation to a depth of 15 – 25µm with two passes
- Often uses multiple sessions
- Improves fine wrinkles, decrease size of dilated pores, decreased sebum content



Microdermabrasion Histology

- Fibroblast stimulation
- New dermal collagen deposition
- Epidermal thickening
- Normalization of stratum corneum
- Deposition of elastin

Topical therapy

- Retinoids
- Kinerase
- Alpha Hydroxy Acids
- Hydroxyquinone
- Kojic acid
- Azelaic acid



Retinoids

- Retin-A
- Tazorac
- Furfuryladenine (Kinerase)
- Vitamin C

Topical therapy

- Topical retinoids, vitamin A based agents
- Tretinoin produces effects binding retinoic acid receptors on chromosome 17
- Produces increased collagen synthesis, new blood vessel formation, fibroblast activity, mitotic activity, cellular turnover in epidermis.
- Normalization of epidermal atypia, increased thickness of granular layer and decrease number of melanocytes
- Optimal effects in 10-12 months

Retinoids

- Broken down by sunlight
- Apply at night
- Sensitize to sun exposure
- Can cause transient irritation

Tazorac

- New acetylenic retinoid
- Selective binding to RAR-gamma which make up 90% of skin retinoid receptors
- Also binds to Beta receptors

Alpha Hydroxy Acids

- Glycolic acid (smallest)
- Lactic acid
- Citric, malic, tartaric
 - Usually up to 30% concentration
- Salicylic acid (beta hydroxy acid)
 - Used for acne
 - Polyhydroxy for sensitive skin
 - Less skin sensitivity to sun exposure
 - Can be combined with tretinoins

Vitamin C

- Antioxidant
 - Ascorbate is a catalyst for hydroxylation of procollagen
 - Neutralizes free radicals
 - L ascorbic acid isomer needed for cutaneous absorption.
- Can reduce thinning of epidermis
- Improve wrinkles, roughness and colour
- Some bleaching ability

Bleaching agents

- Hydroxyquinone, kojic and azelaic acid
- Inhibit tyrosinase
- Results in a reduction in melanin

Chemical Peels

- Superficial
 - Epidermal
- Medium
 - Superficial dermal to papillary dermis
- Deep
 - Mid dermal injury to reticular dermis

Indications

- Actinic damage
- Remove pigment dyschromias
- Smooth out fine wrinkles
- Flatten mild scarring
- Acne

Assessment

- Document Fitzpatrick skin type
 - I-III are OK for all depths
 - IV-VI more of a problem
- Texture
- Glogau aging changes
 - Type I, no wrinkles, II wrinkles in motion, III wrinkles at rest, IV only wrinkles
- Complexion
- Rhytids
- Skin excess

Glogau



Preparation

- Nothing for superficial peels
- Antivirals for deeper peels as they can cause herpetic outbreaks
- Cleansing with an exfoliant
 - Acetone can be used and increases depth of penetration of peel
- Mild sedative, NSAID for deeper peels

Superficial Peel

- Healing time 1-4 days
- For mild photoaging
- Glycolic acid (10-50%)
- Tricarboxylic acid (10-20%)
- Jessner's solution
 - (salicylic acid 14g, lactic acid 14mL, ethanol 10 mL)

Medium depth peel

Injury to a depth of 0.6mm

Coleman technique: 35% tricarboxylic acid with 70% glycolic acid

- Moheit technique: 35% tricarboxylic acid with Jessner's solution

Deep Peel

- Stimulate production of new collagen
- Baker-Gordon formula (3mL SUP liquid phenol, 2mL tap water, 8 drops liquid soap, 3 drops cotton oil)
- Consider sedation

Deep Peel complications

- Altered pigment
- Adverse texture changes
- Scarring
- Milia , infection, skin atrophy
- Cardiotoxicity (Phenol)
 - Renal and hepatic elimination
- For Glogau III and IV photoaging



Laser Resurfacing

- Work by Selective thermolysis
 - Three criteria to achieve this
 - Laser's wavelength must be preferentially absorbed by the target tissue (chromophore)
 - It must deliver sufficient level of energy per unit area (ie fluence) to reach a temperature where ablation occurs
 - Exposure duration of the laser must be less than or equal to tissues thermal relaxation time. (time for tissue to cool by 50%). Ie before heat diffusion can begin

Definitions

- Fluence: energy density (joules/cm²)
- Thermal relaxation time
- Irradiance: joules/s/cm²
- Power = Watts = Joules/second

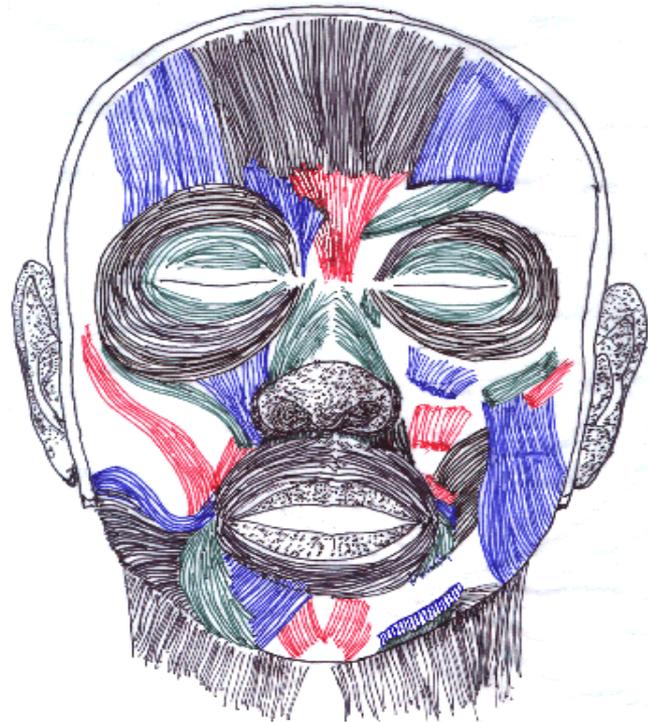


Lasers

- Hybrid Lasers most promising
- CO2 Lasers
 - Emits energy at 10,600 nm
- Er Yag
 - Emits energy at 2,940 nm
 - Much more efficiently absorbed by water than CO2
 - More precise ablation with minimal thermal damage

Regional Esthetic units

- Forehead
- Eyes
- Nose
- Cheeks
- Mouth
 - Upper lip
 - Lower lip
 - chin

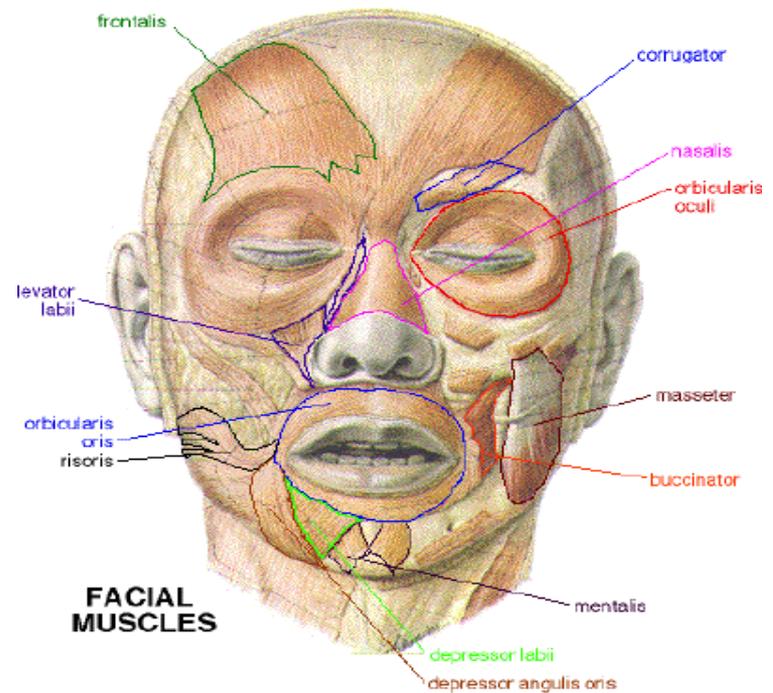


Skin Thickness

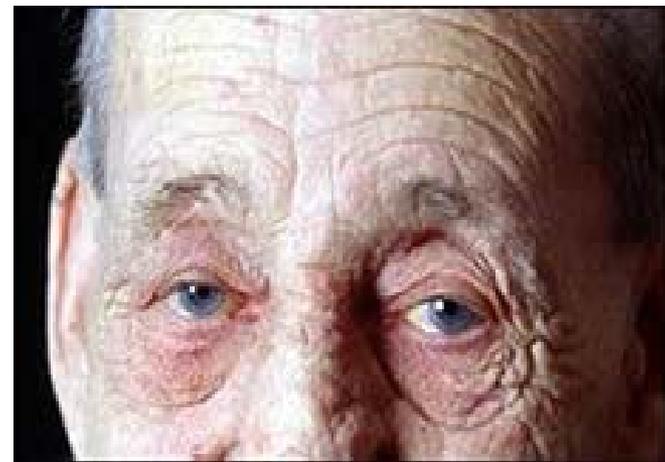
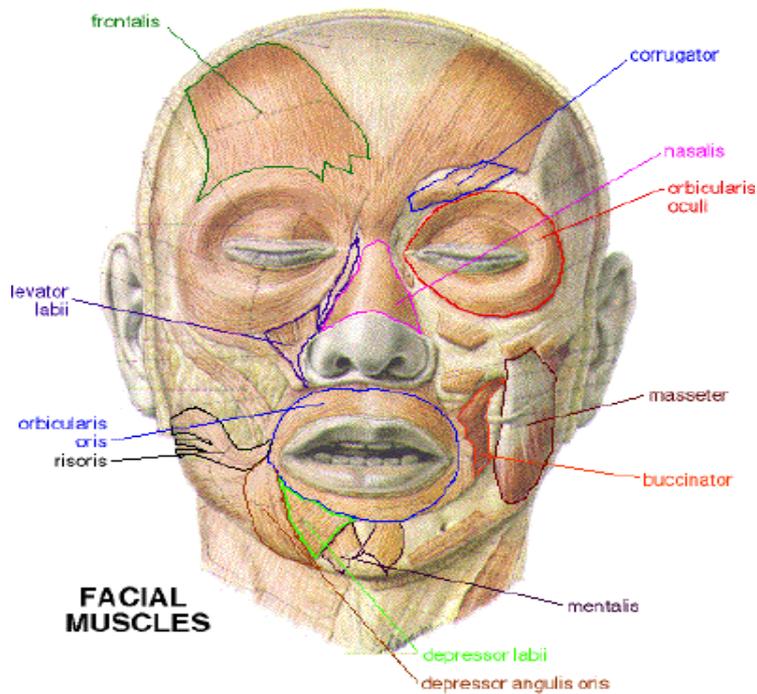
- Very thin areas
 - Eyelid
 - Ear
- Thin areas
 - Neck
 - Temple
- Medium areas
 - Cheek, Lips, Nasal Dorsum
- Thick areas
 - Chin, Nasal Tip
 - Forehead

Facial Dynamic Lines (RSTL)

- Perpendicular to muscle pull
- Major muscles
 - Frontalis
 - Orbicularis oculi
 - Corrugator supercilii
 - Orbicularis oris



Facial Dynamic Lines (RSTL)



Chromophore

- CO₂ and Er:Yag are both preferentially absorbed by water
- Water makes up 70% of skin by volume

IPL

- Intermittent Pulsed Light
- Skin relaxation time is 695 microseconds
- Pulse duration is 600 microseconds to 1 millisecond

Indications

- Epidermal problems
 - Actinic keratosis
- Dermal pathology
 - Nevi, lumpy scars (keloid vs hypertrophic)
- Wrinkling
- Hyperpigmentation
- Scarring

Contraindications

- Unrealistic expectations
- Active infection
 - Bacterial, herpetic
- Use of Accutane
- Previous surgery
 - Flaps
- Dark skin
- UV exposure
- Cutaneous disease
 - Scleroderma, vitiligo
- General medical conditions

Levulan

- Aminolevulinic acid (ALA)
- Also called Kerastick (20%)
- Used in combination with blue photodynamic therapy.
- Enriched photosensitizer
- Used for actinic keratosis, sun damaged areas

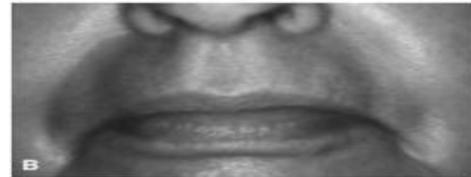
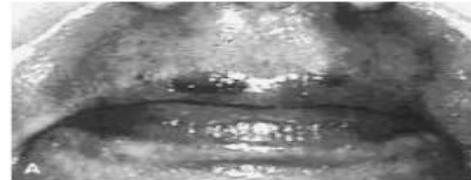
Complications

- Persistent erythema
- Post inflammatory Hyperpigmentation
- Hypopigmentation
- Scarring
- Wound infection
 - Herpetic (10%)
 - Candida (1%)
 - Bacterial (5% without prophylaxis)
- Milia (11%)
- Ectropion
- Pain
- Acneiform eruptions
- Pruritis
- Contact dermatitis
- Prolonged wound healing



Herpetic

- Most common skin infections
- 10% of patients regardless of history
- 33% if history of previous outbreak
- Occurs in first week
- Atrophic scarring may result if not treated
- Treat with Famvir



Bacterial Infections

- 5 % of cases without prophylaxis
- 2-10 days post op
- Pain and or pruritis
- Excessive patchy erythema, crusts, and exudate
- Polymicrobial
 - Staph aureus, Pseudomonas, Staph epidermidis



Fungal

- Candida 1%
- Ketoconazole prophylaxis
- Diflucan treatment
- Nystatin topical creams
- May extend beyond the boundary of laser treatment



Milia

- Most resolve spontaneously
- Epidermal cysts from occlusion of eccrine duct openings
- Remove with 30 gauge needle if necessary



Acneiform eruptions

- 10%
- During healing phase
- More often in patients with black skin or history of acne
- Must not have had Acutane (Isotretinoin) 1-2 years before laser resurfacing
- Treat with oral antibiotics, benzamycin gel, prophylaxis



Summary

- Numerous options for facial rejuvenation
- Chemical peels rarely used
- Lasers offer more precise control of depth and duration of injury
- Topical therapy useful adjunct for laser therapy and prior to more aggressive treatment modalities but limited effects