Office-based Cosmetic Procedures

Glen T. Porter, MD
Faculty Advisor: David C. Teller, MD
The University of Texas Medical Branch at Galveston
Department of Otolaryngology
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Office-based Cosmetic Procedures

- Laser applications
- Intense pulsed light
- Chemical peels
- Dermabrasion
- Microdermabrasion
- Botox injection
- Injectable fillers
- Aesthetician-provided procedures
Laser—basics

- **Light Amplification by Stimulated Emission of Radiation**
- **Coherent**
  - photons in phase temporally/spatially
- **Collimated**
  - tight beam, parallel paths
- **Monochromatic**
  - one wavelength
Monochromatic
Coherent
Collimated
Laser--basics

• Fluency = energy per area
  – J/cm²
• Power density = energy rate
  – J/second
• Frequency = wavelength
  – nm

• Light can be:
  – Reflected (bounces off)
  – Scattered (random dispersal)
  – Transmitted (passes through unchanged)
  – Refracted (change in direction)
  – Absorbed (maximal clinical benefit)
Laser – emission modes

- Continuous
  - Uninterrupted beam
  - Relatively constant power
- Pulsed/Superpulsed (microsec)
  - Higher energy/shorter duration pulses
- Q-switched (nanosec)
  - Extremely high energy/short pulse duration
Laser – tissue interaction

- Each tissue differs in absorption characteristics and relaxation time (time necessary to release 50% of energy)
  - Pulse width <relaxation time = chromophore targeted with little collateral spread of energy
- Cutaneous chromophores: water, melanin, hemoglobin
- Penetration is influenced by target chromophore (more absorption = less penetration)
Laser spectrum
# Laser spectrum

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<td>CO2</td>
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Intense Pulsed Light

- Noncoherent
- Multiple wavelengths (500-1200nm)
- Different handles with different ranges used for vascular lesions and hair ablation
- Some reports indicate skin tightening effect
- Well tolerated as outpatient
- May require cooling
Laser -- vascular lesions

- **Telangiectasias**: in order of preference/effectiveness
  - Diode laser (variable-pulsed-width 532nm)-as effective as pulsed-dye without puerperal
  - pulsed-dye laser (puerperal results)
  - IPL
- **Hemangiomas**
  - pulsed-dye laser (585nm wavelength)
    - 2-10 treatments spaced 6-8 weeks apart
- **Port-wine stains**
  - Pulsed-dye laser (585nm)
    - 2-12 treatments spaced 6-8 weeks apart
    - superficial lesions, red lesions, younger than 10, head and neck lesions respond better
Laser – superficial pigmented lesions

- Superficial lesions (generally shorter-wave-length systems)
  - Freckles:
    - Q-switched 532nm Nd:YAG laser
    - recur frequently
  - Café-au-lait lesions:
    - Q-switched Nd:YAG lasers
    - difficult to treat, recur often
  - Lentigos:
    - Q-switched Nd:YAG lasers
    - CO2, Erbium, KTP
    - recurrence uncommon
    - Peels, topicals
Laser – superficial pigmented lesions

- **Nevi:**
  - biopsy if suspicious
  - Q-switched Nd:YAG 532, 694, 755nm lasers
  - respond within 1-3 treatments

- **Melasma:**
  - Q-switched Nd:YAG laser
  - hormonal control
  - bleaching agents
  - sun avoidance
  - tend to recur

- **Rosacea:**
  - topicals (antibiotics, tretinoin)
  - oral abx
  - IPL
  - KTP laser
Laser -- deep pigmented lesions

- Deep lesions-deeper, therefore treated better with longer wavelength (goes deeper): can use ruby, alexandrite, and Nd:YAG
  - blue nevi:
    - 1064 nm Nd:YAG laser
  - nevus of ota and ito:
    - Q-switched 1064nm Nd:YAG laser
    - multiple treatments
    - recurrence is unusual
Laser -- hair removal

- Goal = ablation of hair unit
- Wavelengths between 600 and 1000 nm most effective
- Generally want spot size larger than the depth of the target being treated--5mm to 1 cm for hair
- Optimal situation is dark hair with light skin
- Thermal relaxation time is key: epidermis = 3-10 ms, hair follicle = 80-100 ms. Use of pulse duration < 10 millisecond targets hair without skin. May need longer for darker skinned individuals.
Laser -- hair removal

- Ruby, alexandrite, diode, 1064nm YAG, IPL
  - Ruby (Fitzpatrick skin types I-III)
  - Diode 810nm can treat darker skinned patients (III-IV)
  - 1064 nm YAG safest for skin types IV-VI. IPL appears equally as effective in skin types IV-VI
  - IPL can be used in all skin types
    - Different spectrum applicators
Laser -- hair removal

- Hair follicle must be present
- Good result = erythema/edema around follicle, burning of hair
- Bad result = blanching or “graying” of skin
- Facial hair-- usually requires 5-6 treatments (chin and upper lip) repeated at 4 week intervals
- Body hair--repeated at 6-8 week intervals
- 60-95% removal at 6 months.
- Regrowth usually finer and lighter
Soft tissue augmentation – injectable fillers

• 1899 Gersuny – paraffin
• Problems with nearly all injected fillers:
  – Inflammatory response
  – Foreign body reaction
  – Allergy
Soft tissue augmentation – injected substances

- **Synthetics**
  - Silicone – outlawed in 1991
  - Polymethylmethacrylate beads (Artecoll)
    - Injected into subdermis for deeper rhytids
    - Fibroblastic ingrowth/encapsulation
    - Skin test required
    - Permanent
- **Xenografts**
  - Bovine collagen (**Zyderm, Zyplast**)
    - Requires skin test
    - Lasts 3-4 months
    - Zyderm requires overinjection by 30-60%
  - Hyaluronic acid derivatives
    - Does not require skin test (identical across species)
    - Cock’s comb (Hylaform)
    - Microbial culture (**Restylane**, **Perlane**)
    - Lasts 9-12 months
Soft tissue augmentation – injectable fillers

• Homografts
  – Cadaveric dermal tissues (Dermalogen, Cymetra, Cosmoderm)
    • Acellular (little cross-reactivity)
    • Overcorrection required (20-30%)
    • No skin testing required
    • No studies on long-term effects

• Autografts
  – Fat
    • Inconsistent survival volume
  – Fibroblasts (Isologen, Autologen)
    • Requires skin harvest (up to 2cm2 for 1 ml injectable)
    • Delay of 4-6 weeks for cell growth
    • Expensive
    • 75-100% volume at 5 years
    • No skin test
Soft tissue augmentation – injectable fillers

- 30-gauge needle
- Most rhytids effaced by injection into mid-reticular dermis
- Deeper rhytids require subdermal or deep dermal injection. May require lysis of deep adhesions (defects which will flatten with tension usually do not have deep adhesions)
- 2 methods of injection:
  - Serial injection (glabella)
  - Threading (lips)
- Many product lines come in a variety of particle sizes. Smaller particles can be injected in more superficial planes. This can efface shallow rhytids or be used to fine-tune the effects of deeper injections.
Soft tissue augmentation – injectable fillers

Restylane
Perlane
Dermabrasion

- Time-honored method of skin resurfacing
- Abrasive brushes and friezes to mechanically remove superficial layers of the skin
- Results similar to laser/chemical peels
- Requires experience to perform well—felt to have increased incidence of scarring and hypopigmentation
- Still the best application for deep scarring, deep rhytids, acne-related pits/scars
- Requires sedation, assistant, protection from bodily fluids
- Learning points:
  - Hand dermabrasion of thin-skinned areas
  - Carry dermabrasion across vermillion border
  - Rotation of brush/frieze should be toward nearby vital structures to avoid tearing of tissues
Dermabrasion -- results
Microdermabrasion

- Aluminum oxide crystals pumped at high speeds toward skin surface. Suction applied to remove crystals and debris.
- Less operator-dependent than dermabrasion
- Consistent depth of tissue loss (adjustable)
- Less blood exposure than dermabrasion
- Usually two passes to remove epidermis (pinpoint bleeding)
- Results not as dramatic, may need several treatments
- Erythema resolves after 24 hours
- Risks of hyper/hypopigmentation and scarring low
- Indicated for minor degrees of sun damage, wrinkling, acne scarring, blending of treatment boundaries
- Little outcome data available
Microdermabrasion -- results
Peels

- Chemical cutaneous injury to specific level
- Limitations of facial peeling:
  - Cannot reduce pore size, eliminate telangiectasias, eliminate deep scars, efface deep wrinkles
  - Can improve appearance of sun-damaged skin, flatten mild scarring, smooth out rhytids, destroy epidermal lesions, help with acne, remove pigmented lesions, blend other interventions
- Lower preoperative Fitzpatrick’s type translates into lower risk of pigmentation problems
- History of Accutane therapy in last 6 months, XRT, previous facial cosmetic surgery, abnormal scar formation, rosacea, seborrheic dermatitis, atopic dermatitis, psoriasis should give pause
Peels

- Multiple formulations with differing peel depths:
  - Superficial = epidermal loss
  - Medium = injury to superficial dermis
  - Deep = mid-dermal injury
- Depth of peel dictated by level of skin aging
- Patients with severe aging changes usually best treated with surgical intervention
Peels
Peels – preoperative intervention

• Superficial peel:
  – No intervention necessary

• Medium/Deep peel
  – Antiviral agent (continued x 10d-2wk)
  – Weak tretinoin solution 1-2 wks before
  – 4-8% hydroquinone gel for patients with Fitzpatrick skin types III or higher
  – Evaluate for cardiac status, kidney disease
Peels

- **Superficial**
  - **Very light**
    - Injure stratum corneum
    - 10-20% TCA
    - Jessner's
    - Tretinoin
    - Salicylic acid
  - **Light**
    - Injure entire epidermis
    - 70% glycolic acid (must be rinsed)
    - 25-35% TCA
    - Solid CO2 slush

- **Medium**
  - 35% TCA + Jessner’s vs. 70% glycolic acid vs. CO2
    - Risk of scarring with 50% TCA

- **Deep**
  - **Baker-Gordon solution**
    - Phenol, water, septisol, croton oil
    - Phenol cardiac toxicity precautions
    - Diluent
    - Taped vs. untaped
  - **Laser**
Peels -- results
The role of an Aesthetician

• Topical treatments
  – Cleanser, toner, sunblock
  – Tretinoin, exfoliants, bleaching agents
• Non-ablative procedures
  – IPL
  – Microdermabrasion
  – Light chemical peels
  – Other skin treatments
• Interval skin evaluation/patient education
• Post-operative care
• Makeup application/cosmetic camouflage
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