Management of Alopecia

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Grand Rounds Presentation
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Management of Alopecia

- Anatomy and Physiology
- Androgenetic Alopecia
- Classification Systems
- Medical Therapy
- Surgical Therapy
Hair
Scalp

- **S:** Skin
- **C:** subCutaneous
- **A:** galea Aponeurotica
- **L:** Loose connective tissue
- **P:** Pericranium
Blood and Nervous Supply

- Frontal
  - Supratrochlear
  - Supraorbital
- Temporal
  - Superficial temporal
  - Zygomaticotemporal
- Parietal
  - Retroauricular
  - Auriculotemporal/Great Auricular/Lesser Occipital
- Occipital
  - Occipital
  - Greater occipital
Hair Follicles

- Embryonic development at 9-12 weeks
- Ectoderm
  - Hair matrix cells
  - Melanocytes
- Mesoderm
  - Erector pili
  - Dermal papilla
  - Follicular Sheath
  - Blood Vessels
Hair Shaft

- Cuticle
- Medulla
- Cortex
- Sheath
Hair Density

- 5 million follicles
- 100,000-150,000 on the scalp
- Birth: 1135/cm²
- 1 year: 795/cm²
- 20-30: 615/cm²
- 30-50: 485/cm²
- 80-90: 435/cm²
Follicular Units

- 1-4 terminal hairs
- 1-2 vellus hairs
- Sebaceous glands
- Erector pili muscles
- Blood vessels
- Nerves
- Connective tissue
Hair Growth Cycle
Types of Alopecia

- Androgenetic Alopecia
- Alopecia Areata
- Cicatricial Alopecia
- Traumatic Alopecia
- Diffuse Alopecia
Androgenetic Alopecia

- Male Pattern Balding
- Female Pattern Balding
- Pathophysiology
  - Miniaturization of follicles
  - Decreased anagen/increased telogen
  - Increased latency
Androgenetic Alopecia

- Autosomal dominant – variable penetrance
- 30% of white men by age 30
- 50% of white men by age 50
Androgenetic Alopecia

- Site-specific action of androgens
  - Pubic/axillary/chest/beard: vellus → terminal
  - Scalp: terminal → vellus
- Men—testosterone
- Women—adrenal androgens
- 5-alpha reductase
  - Testosterone → dihydrotestosterone
- Why the pattern of hair loss?
  - Increased follicle susceptibility
Norwood Classification
Ludwig Classification
Medical Therapy

- **Minoxidil**
  - Antihypertensive
  - Side effect: hypertrichosis
  - Topical 2%, 5%
  - Stop progression and reverse changes
  - Delayed onset
  - Prolonged use

- **Finasteride**
  - Specifically inhibits 5-alpha reductase, type 2
  - Lowers dihydrotestosterone levels
  - 1mg/day
  - Side effect: decreased libido
  - Not used in women
Why treat?

- Lower self-esteem
- Mental distress
- Stereotypes
  - Older
  - Weaker
  - Less productive
  - Less attractive
  - Less virile
Patient evaluation for surgery

- Expectations?
- Motivations?
Patient evaluation for surgery

- Donor Hair
  - Type I
  - Type II
  - Type III
  - Type IV
Patient evaluation for surgery

- Age
  - NOT a contra-indication for surgery
  - Established pattern
  - Hair color
  - Co-existing medical conditions
Surgical Therapy

- Scalp reduction
- Scalp flaps
- Hair grafting
Scalp Reduction

- Unger and Unger, 1978
- Many patterns
  - Sagittal midline ellipse
  - “Y”
  - Lateral pattern
  - Transverse ellipse
  - Crescent ellipse
- Easy to perform
Scalp Reduction--Pitfalls

- **Tension**
  - Excessive reduction
  - Tissue necrosis, widened scar
  - Raposio & Nordstrom
    - 500-1,500 gr
  - Galeotomies
    - 40% reduction in tension

- **“Stretch-back”**
  - Tendency for the remaining bald scalp to expand after a reduction
  - 10-50% of the reduction
  - 2 months
Scalp extenders

- Frechet, 1993
- 1mm thick silastic, two rows titanium hooks
- 200% stretch
- Memory
- Effect: negative stretch-back
Anchoring Galeal Flaps

- Raposio, et al., 1998
- Leave galea attached to one scalp flap
- Create 3 2x3cm galeal flaps
- Suture flaps to undersurface of opposite galea
- 80-88% reduction in stretch-back
Nordstrom Suture

- Nordstrom et al., 2001
- Silicone polymer suture, 2mm diameter, cutting needle
- Running, buried, mattress suture
- Negative stretch-back, 3x greater than with extenders
Tissue Expanders

- Increases total hair-bearing surface area
- Placement/Incisions
- Filling

- Useful in conjunction with scalp reductions or scalp flaps
Scalp Flaps

- Lateral
- Temporoparietal Occipital (TPO), AKA Juri
- Preauricular
- Free flap
Juri Flap

- **Uses:** recreate frontal hairline
- **Parietal branch of superficial temporal artery**
- **Flap**
  - Pedicle: 2-2.5cm
  - Width: 4-6cm
  - Length: 23-25cm
- **Delay**
Juri Flap

- Design hairline
- Elevate flap
- Close donor site
- Inset flap
- Resect bald scalp
Free Juri Flap

- Advantages
  1. Avoid delay
  2. Avoid revision around pedicle
  3. More natural pattern of frontal hair growth
Hair grafting

- Okura, 1939
- Orentreich, 1959

- Punch graft
- Strip graft
- Follicular-unit graft
Punch grafting
Punch grafting
Strip Grafting

- Vallis, 1964
- Free composite graft
- Reconstruct frontal hairline
- Dimensions
  - Length
  - Width
    - Un-operated
    - Previous operation
Strip Grafting

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Follicular-unit Grafting

- Minigrafts
  - 3-4 hairs/graft

- Micrografts
  - 1-2 hairs/graft

- Barrera’s technique
Follicular-unit Grafting
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Epidermis of graft should be slightly superficial to scalp epidermis.

Grafts placed too deep will cause cysts and ingrown hairs.

Correct Depth  Incorrect Depth
Follicular-unit Grafting

CORRECT
Slits parallel to existing hair will avoid damage to existing hair

INCORRECT
Slits perpendicular to native hair growth may damage existing hair
Revision Surgery

- Removal
- Repositioning
- Reduction
- Addition
- Scar revision
Conclusion

- Wide variety of methods for the correction of alopecia
- Don’t forget medical management
- Individualize treatment plans
- Counseling, Counseling, Counseling
• Nordstrom, RE. The Initial Interview. Facial Plastic Surgery. 1985, 2 (3); 179-187.
• Unger, MG. Scalp Reductions. Facial Plastic Surgery. 1985, 2 (3); 253-258.
• Vallis, CP. The Strip Graft. Facial Plastic Surgery. 1985, 2 (3); 245-252.