Reconstruction of Ear Defects

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Auricle Aesthetics

- Helical Rim is a Smooth curve
- Symmetry important
- Length: Width—2:1
- Auricle at 20-30° angle from scalp
- Earlobe approx 1.5-2 cm

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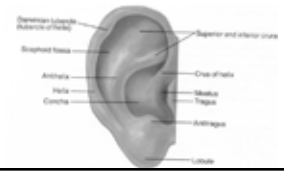
Auricle Anatomy

- Skin and cartilage framework
- Complex topography: Helix; antihelix; triangular fossa; tragus;concha;lobule



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Auricle Anatomy

- Vasculature:
  - Superficial temporal & posterior auricular a.
- Innervation:
  - Greater auricular n (C2 &3)
  - Trigeminal n.
  - Lesser Occipital n.

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General Principles

- Must maintain natural shape and contour
- Can be 20% different in size
- Second intent particularly with concha
- Mohs is best; but if wedge excision, burow's triangles or z-plasty to prevent helical notch
- If cartilage exposed, best to cover (skin graft)

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General Principles

Full thickness skin graft

- Highest chance of survival with intact perichondium
- If not; perforate cartilage with small punch
- Donor Sites: Ipsilateral pre & post auricular
- Indications:
  - Helical rim with intact cartilage
  - Scaphoid fossa
- Dressing: Bolster (dental roll) or Pressure
- Remove at one week

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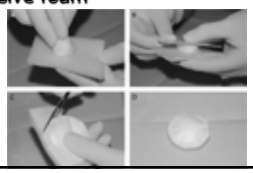
Novel Bolstering Technique for Full-Thickness Skin Grafts on the Ear (Golda & Hruza, Dermatol Surg 2010)

- Use of bolsters help appose graft to wound bed
- Authors use a sandwich bolster of nonadherent gauze-cottonballs—one sided adhesive foam



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Bolster for FTSG's of the Ear

- For the ear, the bolster is trimmed 5 mm larger than the graft
- Another piece of the one sided adhesive foam is trimmed to be 5 mm larger than the graft, and placed on the posterior pinna
- This sandwich bolster is than stapled to each other at their lateral portions beyond the helical rim
- This method is comfortable for the patient
- The posterior foam acts as a splint
- By removing the lateral staples, the surgeon can examine the graft, and then restaple

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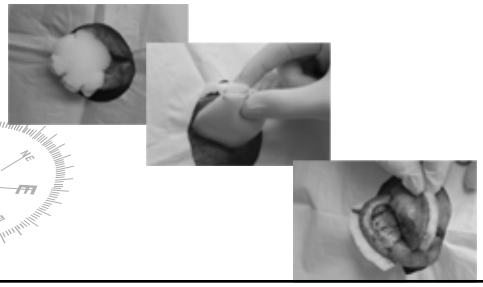
Bolster for FTSG's of the Ear



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General Principles

Adjacent tissue transfer

- Random flaps
- Staged flaps
- May include cartilage
- Wide undermining necessary
- May be tubed for helical rim repair
- May be bivalved for anterior and posterior resurfacing

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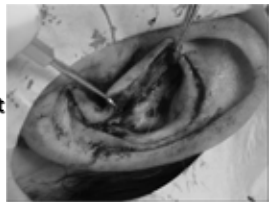
General Principles

Cartilage Grafts

- Donor Sites
  - Conchal bowl
  - Antihelix
- Need to score
- Pressure dressing is important
- Composite grafts
  - Root of helix



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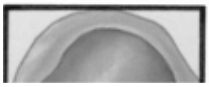
Upper Auricle

- Helical rim: Small skin defect, intact cartilage
  - Full thickness skin graft



- Helical Rim: Small skin and cartilage defect
  - Wedge repair

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Upper Auricle

- Full thickness skin graft

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Combination full thickness and split thickness grafts for superficial auricular wounds

(Lear & Odland Dermatol Surg, 2010)

- Though flaps can be used for combined helical/anti-helical defects, they may lead to contour abnormalities or be multi-stage
- Combining FTSG for helical rim and STSG for anti-helix
- Case series: 4
- Technique:
  - FTSG taken for pre/post auricular or supraclavicular
  - Sewn in with 6-0 FA gut
  - STSG taken from upper thigh with Weck or dermatome
  - Sewed in with 6-0 FA gut plus a basting stitch
  - Bolter dressing applied and removed in 7 days

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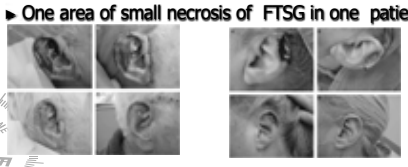
FTSG + STSG for Auricle Reconstruction

- Color match was excellent
- One area of small necrosis of FTSG in one patient



- Limitations: For superficial defects with preferably perichondrium intact. Cartilage must be present
- Is the STSG really necessary—can just use FTSG for anti-helix

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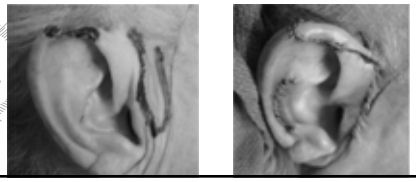
Upper Auricle

- Helical rim: Large skin defect, intact cartilage
  - Tubed flap; "finger" flap



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Upper Auricle

- Medium skin defect, cartilage defect
  - Composite chondrocutaneous flap
  - Superior-based postauricular staged flap

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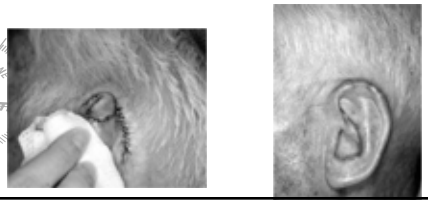
Upper Auricle

Superior-based postauricular staged flap



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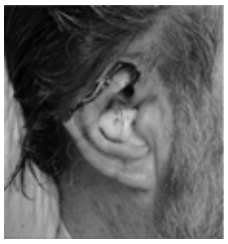
Upper Auricle

- Medium skin defect, cartilage defect
  - Composite chondrocutaneous flap
- Large skin defect, cartilage defect
  - Temporoparietal flap



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Upper Auricle

- Temporoparietal Flap

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Upper Auricle

- Temporoparietal Flap

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Upper Auricle

- Temporoparietal Flap

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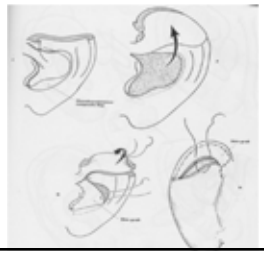
Superior Defect: Chondrocutaneous composite conchal bowl transposition flap



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Superior helical rim-scaphoid defect

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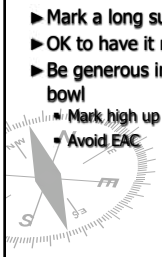
Marking the flap

- Mark a long superior pedicle
- OK to have it narrow
- Be generous in marking conchal bowl
  - Mark high up on lateral bowl
  - Avoid EAC



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Incising the flap

- Incise sharply through the cartilage in one stroke
- Incise high up on lateral bowl; avoid EAC

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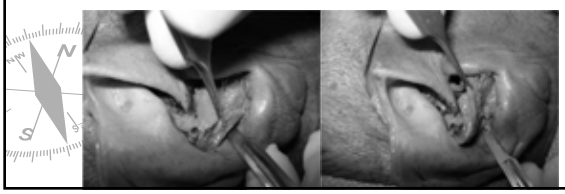
Raising the flap

- Careful to not fracture cartilage—long strokes with the blade



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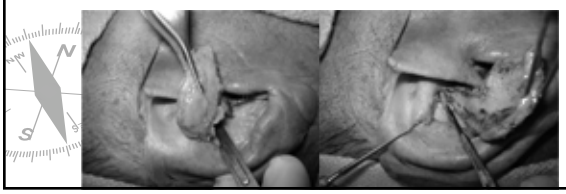
Raising the flap

- Make sure pedicle is undermined deeply



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Extending the pedicle

- Pedicle length needs to be adequate so minimal tension on flap

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Insetting the flap

- Buried 4-0 monocryl; though can line up edges with nylon

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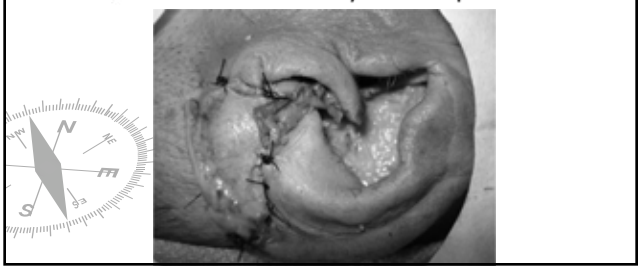
Flap sewn in

- Buried's and then 5-0 nylon interrupteds



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Trimming

- Trimming necessary for proper insetting

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Recreating helical Rim

- Vicryl interrupted to recreate rim

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Backside sewn in

- Full thickness skin graft on posterior

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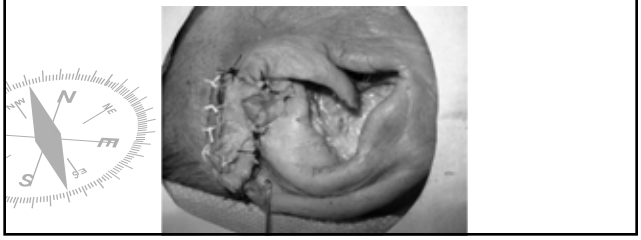
Pedicle Divided

- Can be one stage or two
- FTSG on conchal bowl or 2nd intent



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Middle Auricle

- Rim: Small skin, cartilage defect
  - Wedge excision; primary stellate closure
- Rim: Medium skin, cartilage defect
  - Chondrocutaneous advancement flap

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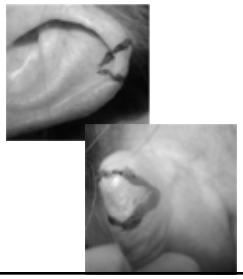
The Wedge

- Essentially an advancement flap
- Can be for larger defects but generally 5mm and less
- Can convert a defect into a wedge for a better result
- Downside is that will remove cartilage



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The Wedge

- Technique
- Use an 11 blade and start at apex of "V"
- Through and through
- Consider removing inferior and superior Burow's triangles to help advance and prevent cupping

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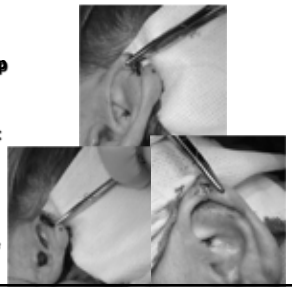
The Wedge

Technique

- Consider incising step offs in the rim and then insetting them
- Close helical rim first with horizontal mattress
- Place buried 4-0 (monocryl) from the posterior aspect and include good bites of cartilage



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The Wedge

Technique

- Though I run my epidermal sutures
- (5-0 FA gut), I place interrupteds adjacent to the mattress on the rim in order to line up the rim

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The Wedge

- Stellate Modification
- Marking
- Making sure it will close

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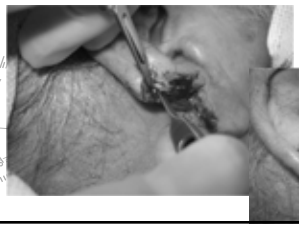
The Wedge

- Incising stellate wedge



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The Wedge

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The Wedge

- Adverse effects and modifications
- Webbing
- Pinching of the helical rim
- Cupping
  - Need to incise deep enough wedge to enhance movement
  - Burow's triangles

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Chondrocutaneous Advancement

- Workhorse for reconstructing helical rim
- Tissue reservoir is mostly from inferior
- Indications include:
  - Medium mid-helical defects
  - Small to medium superior helical defects

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Chondrocutaneous Advancement

Technique

- Skin Only
  - Standard bilateral advancement
- Skin and cartilage
- Anita and Buch (1967): Leave posterior skin intact
  - Full thickness advancement flaps
  - Inferior flap is going to be much longer than superior
  - Incise all the way to earlobe if needed
  - Suture cartilage first
  - Line up skin edges with mattress sutures
  - Suture posterior burieds (4-0 or 5-0) first; then selectively place anterior burieds
  - Epidermal sutures with 6-0

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Biomechanics of helical rim advancement vs. wedge

- Closure by chondrocutaneous advancement flaps caused:
- Minor shortening
- Moderate cupping
- Tension of closure decreased by:
- Extending inferior incision into earlobe
- Creating Burow's triangle
- Shaving cartilage from the scapha
- However both burow's and shaving may increase cupping
- Satisfactory for helical rim defects 2 cm and less
- From: Calhoun et al. Arch. Otolaryngology HNS, 1996.

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Chondrocutaneous Advancement Flap: Technique

- Incising full thickness advancement flaps

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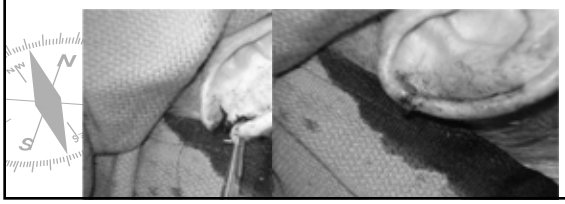
Chondrocutaneous Advancement Flap: Technique

- Horizontal Mattress sitich—lines up rim



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Chondrocutaneous Advancement Flap: Technique

- Sewing posterior and anterior aspects

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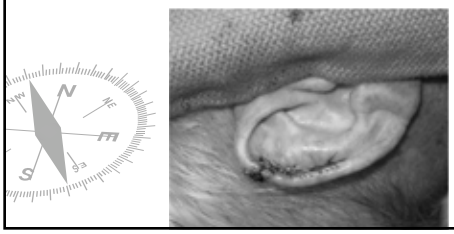
Chondrocutaneous Advancement Flap: Technique

- Completed flap



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Middle Auricle Defect

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Middle Auricle

- Chondrocutaneous advancement flap

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Middle Auricle

- **Rim Large skin and cartilage including anti-helix**
  - **Post auricular staged flap**

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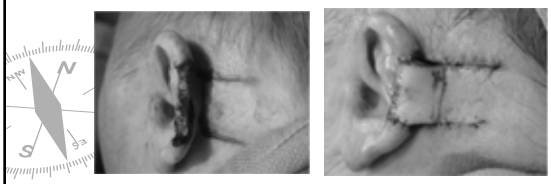
Middle Auricle

- **Post auricular staged flap**



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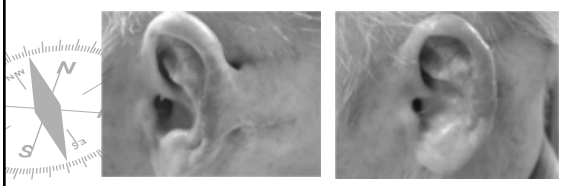
Middle Auricle

- **Post auricular staged flap**



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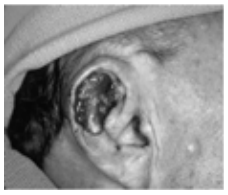
Middle Auricle

- Antihelix; scapha defects
  - Island pedicle
  - Bivalved flap



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Middle Auricle

- **Island Pedicle**

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Middle Auricle

- **Island Pedicle**

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Middle Auricle

- **Island Pedicle**

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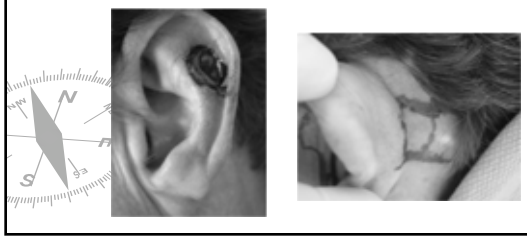
Middle Auricle

- **Bivalve Flap**



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Middle Auricle

- **Bivalve Flap**

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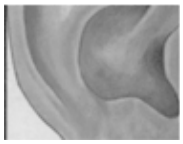
Lower Auricle

- Similar to middle auricle repairs
- Important to take advantage of incision down to lobule



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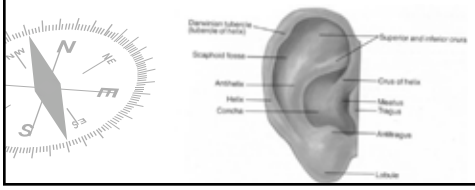
Anti-helix chondrocutaneous composite transposition flap

- Best for straight rather than curved rims
- Robust pedicle important



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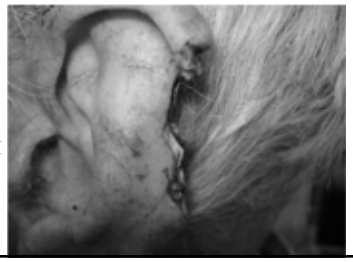
Lateral Helical-scaphoid defect



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Marking the flap

- Use the whole anti- helix and tubercle

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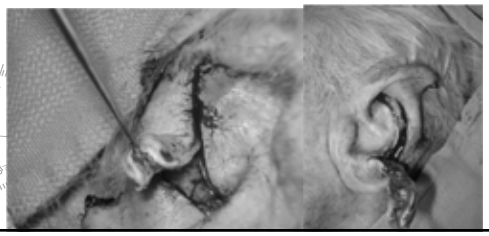
Raising the flap

- Length very important can go down to lobular base



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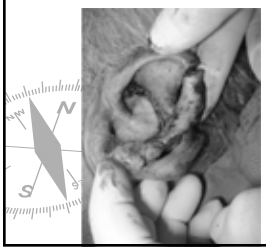
Insetting the flap



Minimize tension

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Trimming the flap

- **Trim to fit without tension**

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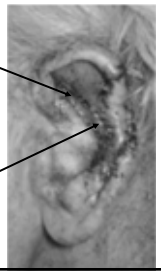
Flap sewn in

- May need FTSG
- Rim is flattened
- Dressing bolster should keep rim in proper position since cartilage elasticity may "bend back"
- Consider dental roll



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Lobule

- Important to maintain shape, length and symmetry
- Simple wedge: Reduces size, but maintains shape and symmetry
- Transposition flap
  - Usually staged

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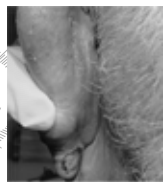
Lobule

- **Transposition flap**



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Lobule

- **Transposition flap**

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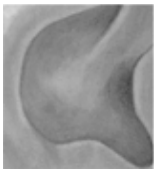
Concha

- Small to medium defects
  - Second Intent
- Medium defects
  - Full thickness skin graft
- Medium outer conchal defects
  - Advancement flaps
- Medium to large defects
  - Preauricular flaps



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Concha

- **Medium outer conchal defects**
  - **Advancement flaps**

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Concha

- **Advancement flaps**

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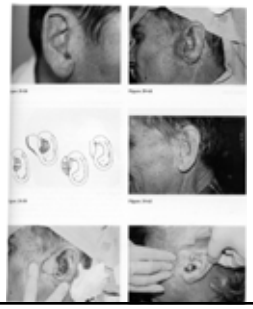
Concha

- **Preauricular Flaps**

(from Mellette, Principles of Derm Surg. Ed Lask & Moy)



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Posterior Auricle

- Small to medium skin defects
  - Second intent
  - Rotation/advancement/transposition flaps
  - Wide undermining is key
- Large defects
  - Staged postauricular defects

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Other options

- Using a biocompatible substance for the framework: Medpor
- Advantages
  - Don't have to harvest cartilage
  - Less morbidity
  - Less operating time
  - Easy to use
- Disadvantages
  - Expense
  - May migrate/extrude

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Summary

- Choose the simplest repair option
- Need to replace cartilage framework if defect involves it
- If large defect, know when to hand off
  - Usually > 1/3rd of auricle; will need rib graft
  - Consider prosethesis

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