Handy Grafts in the Head and Neck: A How-To Overview

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Grand Rounds Presentation
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In 1908, Harvey Cushing wrote a chapter discussing correction of cranial defects with tibial flaps or osteoperiosteal flaps.
“It is no longer a common practice to use heterogeneous material for this purpose, such as celluloid or silver plates, although nature sometimes endures their insertion with charitable tolerance.”
Grafts in Head and Neck Reconstruction

- **Bone**
  - Calvarium
    - split in situ
    - full thickness
  - Iliac crest

- **Cartilage**
  - Costal
  - Auricular
  - Septal

- **Skin**
  - Split thickness
  - Full thickness

- **Fat**

CLEFT (OR TOP WEDGE) GRAFT
Bone Biology

- Suprisingly, most donor osteoblasts necrose after harvesting.
- Most active osteoclasts and osteoblasts producing new bone are delivered by new blood vessel invasion: osteoconduction.
- The few surviving osteoblasts produce new bone: osteogenesis.
- The grafted bone itself releases active factors that stimulate osteoprogenitor cells from the host to differentiate into osteoblasts for bone production.
Tips on bone grafting to reduce complications

- Limit length of skin incisions.
- Avoid subcutaneous dissection: instead, directly incise superficial fascia and periosteum.
- Periosteal elevators should be sharp, and chosen for width and curvature appropriate to harvested graft.
- Osteotomes are specific to chosen graft: thin for the ilium, thin and short for the calvarium.
- Do not use saws or burrs that are dull as they can burn the bone.
- Retractors specific to anatomic site should be chosen.
- Use swabs compressed under the retractors to obtain hemostasis instead of cautery—more time efficient which leads to less bleeding.
- Use Hemovac in the scalp, but not in the thorax or ilium.
- Bone dust from burring or sawing is useless to fill dead space as it will be resorbed.
- Filler bone chips milled in an osteomicrotome encourage osteoblastic activity and new bone production.
Calvarium
Split in Situ Calvarial Harvest
Full Thickness Calvarial Harvest
Ilium
Cartilage Grafts

- An excellent graft material
  - easy to carve but maintains structural integrity
  - easy to harvest or procure from donor banks
  - easily preserved
- Frequently used in reconstruction of nasal or ear defects and in cosmetic nasal surgery
- Can also be useful for orbital reconstruction and correcting tarsal plate defects
Complications of Costal Cartilage Harvest

- Most commonly pain, chest wall deformity, clicking of the ribs, and donor site scar.
  - Postoperative pain peaks at 7 days, then resolves slowly and steadily. Most patients do not complain of significant pain after three months.
  - Chest wall deformity can be reduced or eliminated with reimplantation of left over cartilage if the perichondrium is preserved during harvest.

- Pneumothorax and infection are less frequent.
  - Pneumothorax or pleural tears may be managed intraoperatively with suturing, patching, or a chest tube if necessary.
  - Preserving the posterior perichondrium in situ decreases risk of pneumothorax
Rib Cartilage for Auricular Reconstruction
Anterior Approach
Posterior Approach
Complications of Conchal Cartilage Harvest

- Most common early complication is hematoma
  - Less common: hypesthesia, anesthesia, and pain at the harvest site

- Most common late complication is hypesthesia at the incision
  - Less common: hyperesthesia of the scar and unsightly scar formation
Clever Bolster to Prevent Hematomas
Septal Cartilage
Skin Grafts
Full Thickness vs. Split Thickness


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Harvesting STSG
Phases of Healing

- Imbibition
- Revascularization
- Organization

“Ms. Jennings, have you seen my ‘ORGANIZATION IS THE KEY TO SUCCESS’ poster?”
Full Thickness Skin Grafts

TAKING A FULL THICKNESS SKIN GRAFT FROM BEHIND THE EAR

evertting mattress sutures

all sutures in place before the first one is tied
Fat Grafting
Fat Grafting
Applications
Fat Transfer Complications


Septoplasty and Turbinate Surgery, DG Becker, Aesthetic Surgery J, 2003;23:393-403


Reconstructive Surgery of the Face and Neck, I. Papel, 2nd Ed Chapter 43, Minimally Invasive Options and Skin Grafts for Cutaneous Reconstruction

Current Diagnosis and Treatment: Surgery, McGraw-Hill publishing company, 13 ed. Chapter 41 Plastic and Reconstructive Surgery, Grafts and Flaps

Ballenger’s Otorhinolaryngology—Head and Neck Surgery, 16th ed., Chapter 41 Flaps and Grafts in the Head and Neck

Diagnosis and Treatment in Otolaryngology—Head and Neck Surgery, McGraw-Hill publishing company, 3rd Ed., Chapter 80 Facial Fillers and Implants

Facial Recontouring with Lipostructure, SR Coleman, Clinics in Plastic Surgery, Vol 24, Number 2, April 1997