Reconstruction of Maxillectomy and Midfacial Defects

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Maxillectomy and Midfacial Defects

• Due to resection of tumors involving orbit, nasal cavity, palate, paranasal sinuses, intraoral mucosa
• Cause major functional consequences
  – Deglutition
  – Speech
  – Orbital function
  – Aesthetics
Maxillectomy – A Historical Perspective

• Total maxillectomies performed by Dupuytren and Gensoul in 1820 and 1824?

• First recorded maxillectomy by Liston in 1841

• Extensive review published by Ohngren in 1933
Grover Cleveland on the yacht ‘Oneida’ prior to maxillectomy (1898)
Maxillary Bone

- Two horizontal and three vertical buttresses
- Insertion for most muscles of facial expression and mastication
- Geometrical structure with 6 walls (hexahedron)
- Roof supports orbital contents
- Floor forms anterior hard palate.
Classification System (Santamaria & Cordeiro)

- **Type I** (Limited maxillectomy)
  - One or two walls, preservation of palate
- **Type II** (Subtotal maxillectomy)
  - Lower 5 walls, preservation of orbital floor
- **Type III** (Total maxillectomy)
  - Resection of all six walls
  - Orbital preservation (IIIa) vs exoneration (IIIb)
- **Type IV** (Orbitomaxillectomy)
  - Upper 5 walls, preservation of palate

Santamaria & Cordeiro, 2000. *Plast Recon Surg*
Maxillary Defects

Okay et al. 2001
Brown et al. 2000
Approach to Reconstruction

• Extent of resection
  – Volume vs. surface area requirements

• Assessment of critical structures
  – Palate, oral commisure, nasal airway, eyelids

• Need for bone replacement
  – Orbital floor
  – Anterior arch of maxilla

• Need for soft tissue bulk or resurfacing
Reconstruction of Maxilla – The Past

• Skin grafts
• Cervicofacial flaps
• Pectoralis myocutaneous flap
  – Usually requires two stage procedure
Prosthetics (Obturation)

- **Advantages**
  - Shorter operative time
  - Shorter postop hospital stay
  - Better visualization of maxillectomy cavity for surveillance

- **Disadvantages**
  - Hypernasal speech
  - Regurgitation of foods and liquids into nasal cavity
  - Difficulty maintaining hygiene
  - Need for repeated adjustments
Obturators
Local and Regional Flaps

- **Palatal mucoperichondrial island flap**
  - Up to 15 cm² surface area
  - Strong enough for through-and-through defects
  - Can rotate 180 deg on pedicle

- **Buccal fat pad**
  - Rich vascular supply
  - Best for defects up to 4 cm in diameter
  - Can be used in combination with free bone grafts

- **Submental island**
  - 7-15 cm in size
  - Well hidden donor site scar

- **Temporalsis**
  - Good for orbital support
Free Flaps

• Indicated for large defects
• Matching to three-dimensional shape of defect
  – Provide bone, palatal and nasal lining, skin, soft tissue
• Requires vascular pedicle 10-15 cm long
• Multiple different options
  – Myocutaneous
  – Osteomyocutaneous
  – Combination with free bone grafts
Free Flaps

• Advantages
  – Allows for dental restoration (osseointegrated implants)
  – Freedom to orient, shape and inset flap as needed

• Disadvantages
  – Longer surgical and recovery times
  – Increased potential for complications
  – Delay in diagnosis of local recurrence
Radial Forearm

- Large surface area with minimal soft tissue
- Vascularized bone segment up to 12 cm
- Good for skin and internal lining.
Rectus Abdominus

- Large skin surface area and large volume of soft tissue
- Can be divided into 2-3 flaps
- Up to 18-20 cm pedicle length
- Best for Type III and IV defects
Fibula

• Easy to harvest
• Excellent bone stock
• Long vascular pedicle
• Minimal donor site mobility
Other Options

• Iliac crest
  – Excellent bone source
  – Short pedicle length

• Scapula
  – Soft tissue can be rotated freely around bone
  – May require secondary bone grafting

• Anterolateral thigh
  – Shorter pedicle
  – May be overly bulky
Functional Outcomes: Obturator vs. Free Flap

• 113 Patients
  – 73 obturator
  – 40 free flap

• Comparable postoperative speech and diet except for large defects

• Function improved with free flap for large defects

• No change in time to recurrence

Take-home Points

- Maxillectomy and midface defects result in major functional and aesthetic abnormalities
- Reconstruction depends on the size and individual components of the resected tissue
- Large defects often require the use of free tissue transfer
- Obturation can result in good functional results, but requires constant patient care
References