



Reconstruction of Maxillectomy and Midfacial Defects

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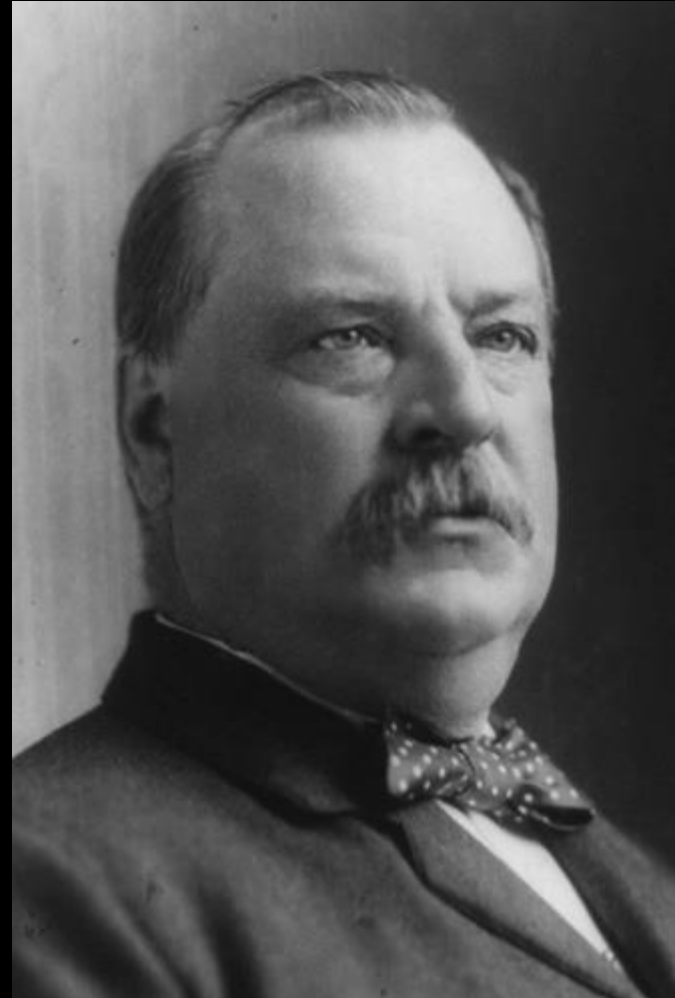
Maxillectomy and Midfacial Defects

- 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

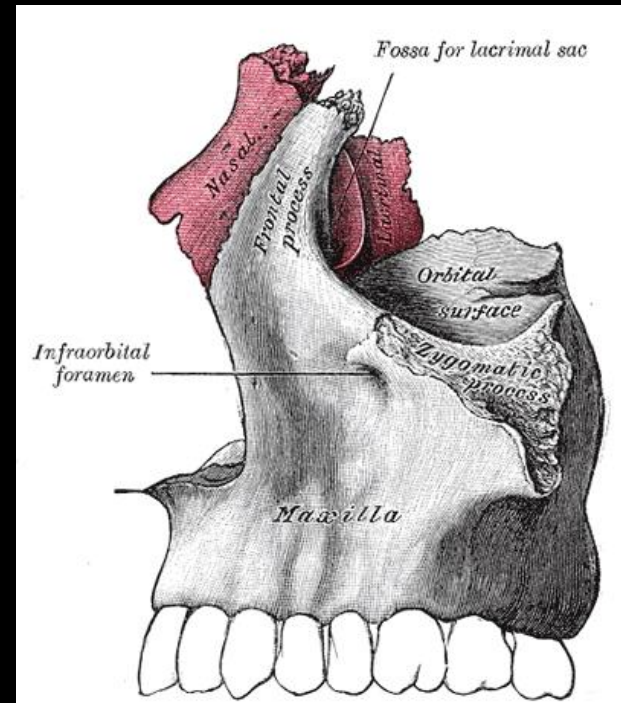
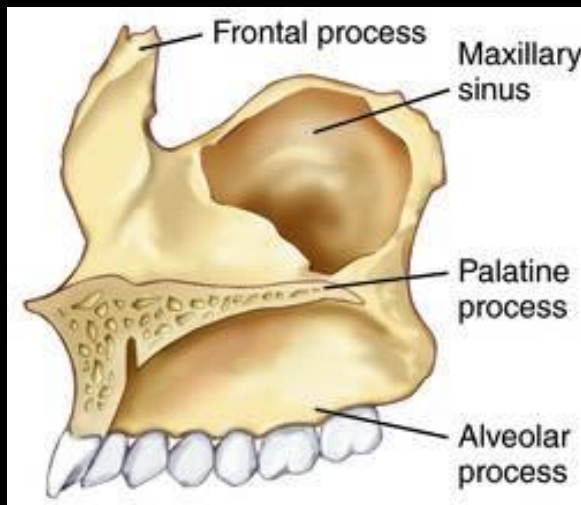


Grover Cleveland on the yacht 'Oneida' prior to maxillectomy (1898)



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

Maxillary Defects



Type 1



Type 2



Type 3a

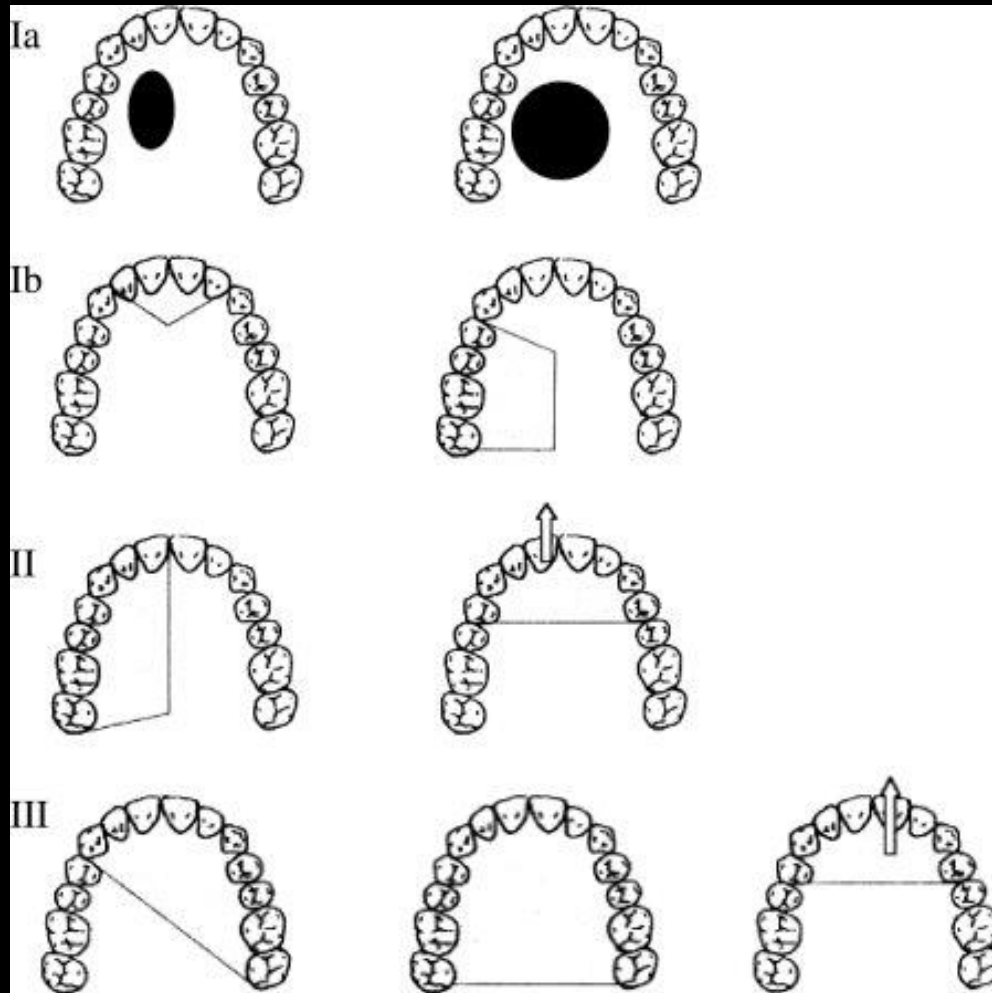


Type 3b

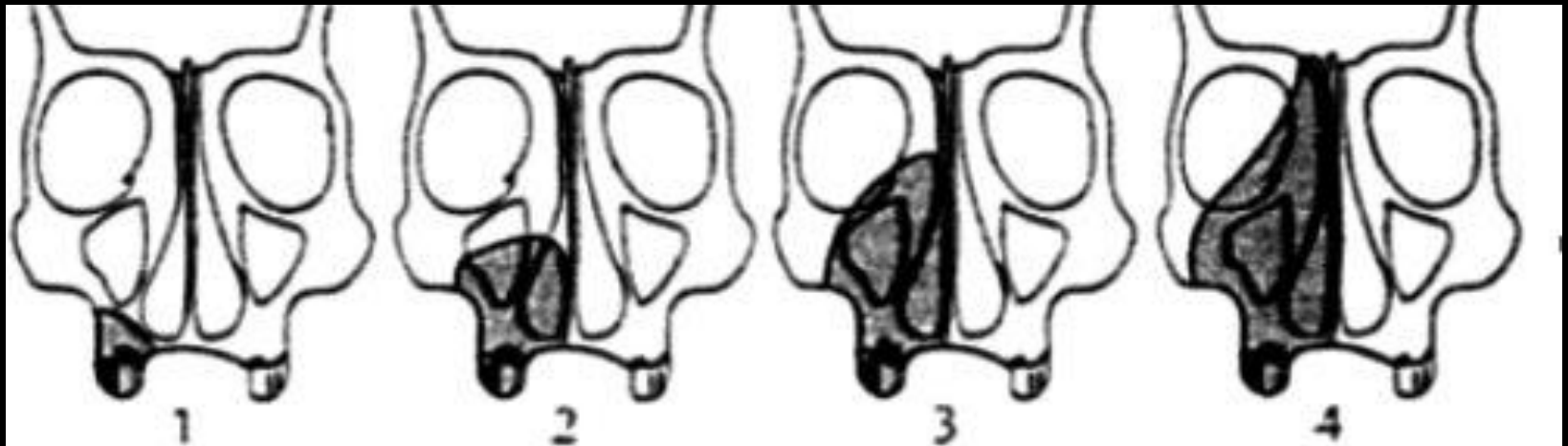


Type 4

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 commissure, 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

Obturator





Courtesy of Dr Ghassan Sinada

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
- Temporalis
 - 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

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