MANAGEMENT OF CLEFT MAXILLA

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www.craniofacialinstitute.org
GSR Institute of Facial Plastic Surgery

- Non-profit hospital established in 1996
- Dedicated Cleft & Craniofacial Centre of Excellence
- Presently 1,600 cleft and craniofacial surgeries are done every year
- 3 surgeons and 4 fellows with full support team
- More than 30,000 documented cleft & craniofacial surgeries have been performed since 1996
- 600 primary new born cleft children are registered every year
Correction of cleft maxilla

- Before primary lip repair (NAM)
- At the time of primary lip repair
- At mixed dentition phase
- After completion of growth
Presurgical Nasoalveolar Orthopedic Molding in Primary Correction of the Nose, Lip, and Alveolus of Infants Born With Unilateral and Bilateral Clefts

Dr. Barry H. Grayson, DDS  
Dr. Court B. Cutting, M.D.  
Afroze Incision for Functional Cheiloplasty, Technical Note

Source:
www.craniofacialinstitute.org
Mixed dentition phase
Orthodontics
Orthodontic Procedure in Mixed Dentition

Increase transverse dimension by palatal expansion.

Principles

- Biphasic upper arch expansion.
- Flattening of curve of Spee.
- Creating normal arch template for the mandible.
- Decompensation of upper and lower arches.
- Alignment and levelling of upper arch.
Secondary Cleft Maxilla Surgery
Secondary Cleft Maxilla

Scar

- Scar in the midline of the palate extends not only antero-posteriorly but also superiorly

Skeletal Considerations

- Loss of the bony support anteriorly in the cleft alveolus and medially in the cleft maxilla.
Secondary Cleft Maxilla

Skeletal Considerations

- Midfacial Skeletal Hypoplasia  
  Infraorbital
  Nasolabial
  Maxilla
  Dentoalveolar

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Principles of Correcting Secondary Cleft Maxilla

Surgical:

1. Restore horizontal and vertical dimension of lip

2. Bone grafting and palatal fistula closure

3. Midfacial Advancement (Orthognathic surgery or Distraction)

4. Rhinoplasty (Balanced rotation & Projection)
How to decide the treatment plan
Distraction vs. Orthognathic surgery??
## Distraction vs Osteotomy

<table>
<thead>
<tr>
<th></th>
<th>Distraction</th>
<th>Osteotomy</th>
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</thead>
<tbody>
<tr>
<td><strong>Need for bone grafting</strong></td>
<td>Not necessary even for defects &gt; 20 mm</td>
<td>Necessary for defects &gt; 10 mm</td>
</tr>
<tr>
<td><strong>Control over movement</strong></td>
<td>3 Dimensional</td>
<td>2 Dimensional</td>
</tr>
<tr>
<td><strong>On infants and children</strong></td>
<td>Can be done</td>
<td>Think about permanent teeth and sufficiency of bone</td>
</tr>
<tr>
<td><strong>Distortion and loading of the TMJ</strong></td>
<td>Does not cause</td>
<td>Risk of causing</td>
</tr>
<tr>
<td><strong>Damage to the inferior alveolar nerve</strong></td>
<td>Does not cause</td>
<td>Risk of causing</td>
</tr>
<tr>
<td><strong>Increasing ramus height</strong></td>
<td>Possible</td>
<td>Not Possible</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>Expensive (distractors and equipment )</td>
<td>Relatively inexpensive</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>Takes time</td>
<td>Quick Fix Method</td>
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</table>
Indications of Lefort Osteotomy

- Scarring of the palate is minimal.
- Amount of movement required less than 6 mm
- When pharyngeal flap is not present.

Indications of Distraction

- Scarring of the palate is present
- Amount of movement required more than 6 mm
- When pharyngeal flap is present.
- Tongue flap or any local flap done for Fistula Closure.
High Lefort I Osteotomy

Deficiency affecting at

- Piriform
- Infra orbital
- Malar
- Subzygomatic
Pre surgical work up

• Complete orthodontics
• Restorative dentistry if required
• Oral prophylaxis
• 2 sets of dental cast
• Pre op OPG & Lateral cephalogram
• Extra oral, intra oral & occlusion photos
• Eyelet placement under LA. 6 in each arch
• Splint fabrication
Planning

It remains **same** for either Distraction or Orthognathic surgery.

**Splint**

- To guide the maxilla into the desired occlusion.
- To counter the unfavorable movements due scar formation.
- Cross bar prevents posterior collapse of the arch.
- Fixation of the long rigid plate for arch stability.
Surgical Procedure: Orthognathic Surgery (6 mm)
Lefort I Advancement (4 mm) + BSSO (6 mm set back) + Genioplasty
10 mm Discrepancy
Indications of Lefort III Osteotomy

- Deficiency affecting
  - Maxilla
  - Malar
  - Infraorbital area
  - Naso-frontal area

  **Total Midface Hypoplasia**

- Von Binders syndrome *(Maxillo-nasal dysplasia)*
Lefort III Osteotomy + BSSO

Osteotomy at LeFort III level with calvarial bone graft for inter positioning and BSSO

Pre op  
1 year post op

Osteotomy cuts at LeFort III level with calvarial bone graft for inter positioning
LeFort I+III Osteotomy (Binders Syndrome)
Midface Distraction for Secondary Cleft Maxilla
Different methods of distraction

- Internal Pull Distraction
- External Pull Distraction
- Internal Push Distraction
Surgical Procedure Distraction

NEED FOR ANTERIOR BONE PLATE

• The anterior bone plate holds all cleft segments together thereby ensuring equal forward movement for all segments.

• It also provides an ideal anchorage for the distraction wires.
Performing a LeFort I Osteotomy

Osteotomy Cut

• The osteotomy cuts are placed 2-3mm higher than the conventional Lefort I osteotomy, to provide a cuff to place the plate and stability to the distracting segment.
Performing a LeFort I Osteotomy

Anterior buccal osteotomy

• Done with reciprocating Saw with copious irrigation.
Performing a LeFort I Osteotomy

Medial and posterior wall osteotomy

- A thin guarded osteotome is used to and tap gently and carefully to fracture the medial (lateral nasal wall) and posterior wall of maxilla.

**LeFort I maxillary osteotomy with pterygoid disjunction & down fracture of maxilla is done.** (radical mobilization in case of orthognathic surgery & minimal mobilization in distraction)
Holes are made on upper & lower segments with #703 fissure bur

3-0 Catgut Stay suture is used for stabilization of segment
Attach double wire to plates in empty holes.

Pierce 18 gauge cannula at alar base.

Bring out the double wires through alar base.
• Removal of head drape

• Painting with betadine in b/l temporal region.

• Marking on the face on forehead.
  Vertical: - Midline
  Horizontal: - 1 inch above & parallel to Supra orbital ridge
• PLACEMENT OF DISTRACTER
• Anteriorly ensure it placed about 1 inch superiorly to the superior orbital rims
• Laterally ensure it is placed superior to the lateral temporal fossa
Fix Double wire to Frame

Check for complete movement of maxilla with distraction keys & Tie the catgut Suture
V – Y Closure of surgical site with 3-0 vicryl.

Placement of B/L Temporal Betadine Dressing.
## Distraction Protocol

- **Latency period:** 5 days following osteotomy and application of the device.

- **Active distraction:** 1 mm per day (Morning, evening).

- **Frame removal (under LA):** After 1 month of IMF.

- **Rigid retention (Wire IMF):** After complete distraction for 2 months.

- **Elastic retention (2 oz elastics):**
  - 8 weeks - 24Hrs (box type)
  - 8 weeks – night use only

- **Radiographs (Post op):**
  - Lateral Cephalogram
  - Immediate post op, 3 months, 6 months, 1 year
Long term outcomes..
LeFort III Distraction
Complications

• **Intra operative Complications**
  - Hemorrhage
  - Bad Split/ Fracture
  - Nerve injury
  - Damage to the tooth buds

**Postoperative Complications**
- Intradistraction
  - Pin infections, Pin and device loosening
  - Device failure
  - Inappropriate distraction vector/Frame migration
  - Premature consolidation
- Coronoid process interference
- Fibrous Pseudoarthrosis
- Trismus

**Postdistraction**
- Delayed Consolidation
- Premature Consolidation
- Malocclusion
- Growth Disturbances
Anterior Maxillary Distraction
Anterior Maxillary Distraction

Indications

• Unilateral or bilateral cleft with normal transverse relation at the molars
• Arch length
• Class I molar relation but anterior reverse overjet.
• In cases where maxillary length are severely compromised to work with in orthodontic perspective

Contraindications

• Unilateral or bilateral cleft with posterior cross bite
• With missing anchor teeth
• Clefts with anterior open bite
• Severe maxillary deficiency
• Cases with adequate arch length
• Cases with severe scarring.
  Eg-
  Anterior fistula closure with tongue flap,
  Buccal myomucosal flap.
## Anterior Maxillary Distraction (Advantages over High LeFort I Distraction)

### Benefits
- Less morbidity
- Less cumbersome for the patient comparative to RED
- Easy activation
- Easy retention
- Gives chance for alignment of premolars which are most often sacrificed due to arch length discrepancies
- Minimal or no post operative change in speech adaptation

### Drawbacks
- Vector control
- Precise surgical cuts between the roots of anchor teeth
- Selective cases
- Limitation if length of expansion and may require second appliance to be fabricated to achieve the desired length of distraction.
- Appliance failure
Pre and Post-Op (Modified AMD with winged osteotomy)
Modified AMD with winged osteotomy
Bring the Smile Back

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