DENTAL MANAGEMENT OF CLEFT LIP AND PALATE

J Harewood DDS MA MS
CLEFT LIP/PALATE: INCIDENCE

- Cleft lip and/or palate
  - 1:1000
  - Varies with race
    - Japan: 20: 10 000
    - Western Europe: 12: 10 000
    - USA: 10.2:10 000
    - Sub-Saharan Africa 3:10 000

- Isolated cleft lip
  - 3.32:10 000

- Cleft lip and palate
  - 6.6:10 000

CLEFT LIP/PALATE: HIGH RISK

- Cosanguinous unions
- Smokers
- Diabetics
- Women on anticonvulsants
- Increased maternal age
- Deficiency of certain vitamins
CLEFT LIP AND/OR PALATE: EMBRYOLOGY

Cleft lip
● Failure of medial frontonasal process fusion with maxillary process
● Complete failure of fusion leads to cleft lip and cleft alveolus (primary palate)

Simonart’s band
● Weblike band of tissue partially filling the gap between the medial and lateral portions of a cleft lip

Cleft palate

- Failure of fusion between palatal shelves of maxillary processes
<table>
<thead>
<tr>
<th>Stage</th>
<th>Time (post-fertilization)</th>
<th>Related Syndromes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germ layer formation and initial organization of craniofacial structures</td>
<td>Day 17</td>
<td>Fetal alcohol syndrome (FAS)</td>
</tr>
<tr>
<td>Neural Tube Formation</td>
<td>Days 18-23</td>
<td>Anencephaly, craniofacial microsomia</td>
</tr>
<tr>
<td>Origin, migration, interaction of cell populations</td>
<td>Days 19-28</td>
<td>Mandibulofacial Dysostosis (Treacher Collins Syndrome), Limb abnormalities</td>
</tr>
<tr>
<td>Organ system formation (pharyngeal arches, primary and secondary palate)</td>
<td>Days 28-38</td>
<td>Cleft lip a/o palate, facial clefts</td>
</tr>
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<td></td>
<td>Days 42-55</td>
<td>Cleft palate</td>
</tr>
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<td>Final differentiation of tissues</td>
<td>Day 50-birth</td>
<td>Synostosis syndromes (Crouzon’s, Apert’s etc.)</td>
</tr>
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</table>
## CLASSIFICATION AND ANATOMY

### Cleft type
- Cleft lip vs. Cleft Palate vs. Cleft Lip and Palate

### Cleft Location: Primary Palate
- Lip
- Alveolus

### Cleft Location: Secondary Palate
- Hard palate
- Soft palate
- Uvula
<table>
<thead>
<tr>
<th>Laterality</th>
<th>Severity</th>
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<tbody>
<tr>
<td>• Unilateral</td>
<td>• Complete</td>
</tr>
<tr>
<td>• Bilateral</td>
<td>• Incomplete</td>
</tr>
<tr>
<td>• Midline</td>
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**CLASSIFICATION AND ANATOMY**
**SUBMUCOUS CLEFT**

Congenital defect under part or all of mucous membrane covering the soft palate

How to diagnose:
- bifid uvula
- Notch in hard palate
- Blue/white midpalatal line

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<tr>
<th>Normal palate</th>
<th>Submucous cleft palate</th>
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<tbody>
<tr>
<td><img src="image1" alt="Normal palate image" /></td>
<td><img src="image2" alt="Submucous cleft palate image" /></td>
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- **Uvula**: Uvula split in two
- **Muscles under a normal palate**: Notch in the bone
- **Muscles under a submucous cleft palate**: Bluish or white line

SUBMUCOUS CLEFT

Problems
- Feeding
- Speech
- Ear

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Retrieved from:
UNILATERAL COMPLETE CLEFT LIP AND PALATE

- Lip, alveolar ridge, palate
- More common than isolated cleft palate
- Less likely associated with syndrome
  - Van der Woude
- More common in males
- More common on Left

BILATERAL COMPLETE CLEFT LIP AND PALATE

- Most severe classification
- Maxilla separated into 3 parts:
  - premaxilla + prolabium
  - 2 lateral segments

BILATERAL COMPLETE CLEFT LIP AND PALATE

- Severe maxillary constriction
- Increased premaxillary prognathism
- Severe extrusion premaxillary segment
- Need for premaxillary osteotomy

ISOLATED INCOMPLETE CLEFT PALATE

- Less common than cleft lip/palate
- More likely associated with syndrome
  - Stickler
- More common in females
- More challenging prenatal diagnosis

ISOLATED COMPLETE CLEFT PALATE

- Less common than cleft lip/palate
- More common in females
- More likely associated with syndrome
  - Stickler
- More challenging prenatal diagnosis

DENTAL PROBLEMS ASSOCIATED WITH CLEFT LIP AND OR PALATE

- Neonatal teeth
- Ectopic eruption
- Supernumerary teeth
- Anomalies of tooth shape and size
- Micro and macrodontia
- Fused teeth
- Enamel hypoplasia
- Deep bite
- Maxillary transverse deficiency
- Crowding or spacing
PRENATAL DIAGNOSIS

- Cleft lip and or palate can be diagnosed via ultrasound
  - 2D ultrasound –
    - 16-75% detection rate
  - 3D ultrasound –
    - Up to 100% detection rate

** isolated cleft lip difficult to diagnose prenatally
Factors that limit sensitivity of diagnosis:
- Unfavorable fetal position
- Maternal obesity
- Multiple gestation (twins, triplets etc.)
- Prior abdominal surgeries
PRENATAL DIAGNOSIS

Advantages

• Psychological preparation
• Opportunity to provide parents with prenatal education on clefts
• Preparation for care and feeding
• Impetus to test for other abnormalities
• Fetal surgery (?)

Disadvantages

• High maternal anxiety
• Potential for false positive
• Increased termination of pregnancy
Craniofacial Team

- Pediatrics
- Genetics
- OMFS
- Orthodontics
- ENT
- Pediatric Dentistry
- Plastic Surgery
- Psychology/Social Work
- Speech–language pathology

Craniofacial Team
DENTAL ROLE: PRENATAL

- Orthodontics
  - Nothing
- Pediatric Dentistry
  - Supportive care
  - Inform parent re: neonatal tx options (presurgical infant orthopedics)
  - Minimize transmission cariogenic bacteria from parent to child
CONCERNS IN INFANCY

- Airway maintenance
  - Cleft lip and/or cleft palate – no concerns

- Feeding and Nutrition
  - Isolated cleft lip
    - May be able to breast feed
  - Isolated cleft palate
    - Feed by bottle
DENTAL ROLE: NEONATE AND INFANT

Orthodontist and/or Pediatric Dentist

Pre-surgical infant orthopedics

- Aligns maxillary segments, creates less tension on surgical closure, reduces severity of clefts
- Latham appliance
- Nasoalveolar molding (NAM)
- Taping
DENTAL ROLE: NEONATE AND INFANT

- Initiated in first week of birth
- Appliance inserted and secured with surgical tape
- Weekly adjustments to bring segments closer
- Includes nasal stent
- Treatment lasts 3-5 months
Presurgical infant orthodontics: Controversy

- No long-term benefit on growth of midface and dentoalveolus
- Occlusal results are similar to those without early intervention if assessed at 10 years of age
LIP REPAIR

10 weeks

10 lbs

Hemoglobin of 10

Cleft Lip Repair
DENTAL ROLE: NEONATE AND INFANT

- Palatal closure can occur when child is
  - 6 months – 18 months of age
  - Depends on size of cleft
  - Depends on speech, nasal regurgitation
# DENTAL ROLE: PRIMARY DENTITION

<table>
<thead>
<tr>
<th>Orthodontist</th>
<th>Pediatric Dentist</th>
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<tbody>
<tr>
<td>• Monitor</td>
<td>• Reassure, inform, prevent, acclimatize</td>
</tr>
<tr>
<td></td>
<td>• Encourage proper diet and oral hygiene techniques</td>
</tr>
<tr>
<td></td>
<td>• Avoid early extraction of primary teeth</td>
</tr>
<tr>
<td></td>
<td>• Keep up with medications</td>
</tr>
<tr>
<td></td>
<td>• Communicate with craniofacial team</td>
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DENTAL ROLE: MIXED DENTITION

- **Orthodontist**
  - Interceptive orthodontics
  - Expansion prior to secondary alveolar bone graft
  - Anterior crossbite correction (facemask, removable appliance)

- **Pediatric Dentist**
  - Maintain oral hygiene **
  - Support during tooth brushing
  - Pit and fissure sealants
DENTAL ROLE: MIXED DENTITION

- 7 year old male
- Early mixed dentition
- Unilateral left lip and palate
DENTAL ROLE: MIXED DENTITION

- Early mixed dentition
- Missing both upper permanent lateral incisors
DENTAL ROLE: MIXED DENTITION

Fan-shaped rapid palatal expander
DENTAL ROLE: MIXED DENTITION

- Reverse-pull headgear (aka facemask)
4 MONTHS REVERSE PULL HEADGEAR

Dental Role: Mixed Dentition
DENTAL ROLE: PERMANENT DENTITION

- Orthodontist
  - Comprehensive Orthodontics
    - Presurgical orthodontics
      - Maxillary distraction, segmental maxillary distraction, orthognathic surgery

- Pediatric Dentist
  - Maintain oral hygiene during ortho tx
  - Educate about hypocalcification
DENTAL ROLE:
PERMANENT DENTITION

- 10 yo male
- Unilateral CLP
- Oculocutaneous albinism
DENTAL ROLE: PERMANENT DENTITION

- Maxillary transverse deficiency
- Missing maxillary lateral incisors
- Palatally impacted upper second premolars
DENTAL ROLE: PERMANENT DENTITION
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- 15 yo female
- Unilateral CLP
- Hx of failed bone graft
DENTAL ROLE: PERMANENT DENTITION
DENTAL ROLE: PERMANENT DENTITION

- Missing upper left lateral incisor

Which tooth/teeth would you remove?
DENTAL ROLE: PERMANENT DENTITION
DENTAL ROLE: PERMANENT DENTITION
DENTAL ROLE: PERMANENT DENTITION
END