ROLE OF ORTHODONTIST IN CLEFT PALATE CRANIOFACIAL TEAM

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Introduction

- Dictionary meaning of cleft is a crack, fissure, split or a gap.

- Cleft lip & palate is a congenital anomaly, present at birth, affecting upper lip, hard and soft palate of mouth.

- It ranges from a small notch in lip to a complete fissure extending into the roof of mouth.
Classification

• Cleft lip
  • Unilateral with or without an anterior alveolar ridge cleft.
  • Bilateral with or without alveolar ridge clefts complete or incomplete

• Palatal clefts
  • Bifid uvula
  • Soft palate only
  • Both hard & soft palate

• Combined lip & palatal cleft
  • Uni-lateral, bilateral, complete, incomplete.
Incidence

Cleft Lip
- 1: 1000 births
- Occurs more frequently in males (80%)
- Incidence is higher with increased maternal age

Cleft Palate
- Frequency of cleft palate is much lesser than cleft lip, 1: 2500 births
- Occurs more frequently in females
- Not related to maternal age
Relative Frequencies

- Unilateral cleft lip & palate is more common than bilateral cleft lip and palate.

- Cleft lip & palate is more common in boys than in girls

- Unilateral clefts occur more frequently on left side.
Dental Problems

- Adjacent to cleft site, mostly permanent lateral incisors are peg shaped or malformed.
- High incidence of missing teeth especially bicuspids.
- Enamel hypoplasia.
- Supernumerary teeth.
- Ectopically positioned teeth.
- Lack of osseous support for some teeth.
- Collapsed arch form.
- Crossbites.
- Poor oral hygiene, caries & periodontal disease.
Team coordinator

Dentistry
Orthodontics
Pediatric dentistry
Prosthodontics

Surgery
- Plastic
- Oral and maxillofacial surgery
- Neurosurgery

ENT
Audiology

Obstetrics
- Perinatologist
- Sonologist

Speech and language pathology

Pediatrics

Ophthalmology

Psychology

Nursing

Genetics
- Syndromologist
- Dysmorphologist

Social support and service

Team approach to patients with craniofacial anomalies
Orthodontic Treatment For Cleft Palate Patients

- Neonate & Infant (Birth to 2 years).
- Primary Dentition Stage (2 years to 6 years).
- Mixed Dentition Stage (6 years to 12 years).
- Permanent Dentition Stage.
Neonate & Infant (Birth to 2yrs)

- Lip taping
- Lip adhesion
- NAM
- Lip repair
- Palate repair
Neonate & Infant (Birth to 2 yrs)

- Usually carried out by orthodontist but may also be performed by pediatric dentist or Prosthodontist.

- Neonatal maxillary orthopedics is initiated in first or second week following birth.

- Different maxillary orthopaedic solutions are:
  - Light elastic strap across premaxillary segment.
  - Orthodontic appliance pinned to segments for severe cases.
  - Use of feeding plates.

- The rationale behind is orthopedic realignment of ‘collapsed’ segments.

- Is usually performed before surgical repair of lip
Lip Repair

- Molding of segments make lip repair easier.

- Definitive lip repair is achieved by the time the infant is 3 to 6 months old. Repair of palate is delayed until 12 months to 2 years of age.

- Surgical repair & resulting scar tissue is the major cause of cross bites in these patients.

- Patient presenting with cleft lip or soft palate cleft alone may never require orthodontic treatment.
Primary Dentition Stage (2-6 yrs)

- Establishment of primary dentition permits classification of type of developing malocclusion.

- Dentoalveolar compensation.

- In vicinity of cleft alveolus ….delayed eruption, malformation or absence of deciduous lateral incisor.

- Unilateral or bilateral cross bites often present. Continuing crossbites may indicate underlying skeletal discrepancy.  
  - Growth modification & Growth redirection can exhaust patient cooperation.
Determining factors for treatment in primary dentition:

- Ability of child to cooperate.
- Severity of malocclusion.
- Timing of secondary bone grafts.
- Need for future orthodontic treatment.
  - No solid data that for long term benefits of treatment at this stage.
  - Severity of skeletal discrepancy must be considered to determine likelihood of successful growth modification & long term results compared with surgery at later stage.
Mixed Dentition Stage (7-12yrs)

- Eruption of first permanent molars & incisors

- Adjacent to cleft site, as the permanent incisors erupt, they typically are malformed, misplaced, rotated or hypoplastic.

- Incisors may be supernumerary, absent or peg shaped; these characteristics may be due to early disruption of dental lamina at cleft site.

- V shaped maxillary arch is cause of posterior cross bite in mixed dentition.
Orthodontic Treatment Goals

- Correct the incisor position.

- Expansion of maxilla for
  - Correction of crossbites.
  - Improvement of arch form.

- Prepare patient for alveolar bone graft.

- Supporting alveolar bone is compromised
  - care not to move roots into cleft defect
  - Correct root angulation post grafting.
Alveolar Bone Grafting

- Cleft penetrates through dental alveolus in the vicinity of permanent lateral incisors either unilaterally or bilaterally.
Quad Helix to Expand Prior to ABG
Types Of Alveolar Bone Grafting

- Primary.
  - Adverse effects on maxillary growth.

- Secondary.
  - Delayed alveolar bone grafting.
  - Performed after primary lip repair.

- Types of secondary ABG:
  - Early (2-5yrs)
  - Intermediate (6-15yrs) &
  - Late (adolescence to adulthood).
Benefits of ABG

- **Bone Support**
  - For un erupted teeth & Teeth adjacent to cleft site.
  - Prevention of tooth loss.
  - Construction of continuous arch form & alveolar ridge.
  - Moving teeth bodily.
  - Root up righting into cleft site
- **Closure of oronasal fistulae.**
- **Support & elevation of alar base on cleft site.**
  - Nasal & lip symmetry.
  - Stable platform for support of nasal structures.
- **Achieve stabilization & some repositioning of pre maxilla in patients with bilateral clefts.**
Timing of Surgery

- Ideal time for an alveolar graft is as late as possible in maxillary growth but before eruption of teeth adjacent to cleft area.

- The permanent canine root should be half to two third formed at the time the graft is placed.

- Graft may be placed earlier to improve the prognosis of lateral incisor.
Sequencing

- Any decayed teeth especially adjacent to cleft are restored before grafting procedure.

- Good oral hygiene practice.

- Reposition maxillary teeth that are in traumatic occlusion.

- Expand severely constricted maxilla.

- Teeth with poor prognosis should be extracted at least two months before surgery to allow healing of mucosal tissue before surgery.
Surgical technique

- Nasal mucosal coverage & oral mucosal coverage over bone graft is necessary.

- Bony margins of cleft must be completely exposed upto the level of nasal floor to ensure good osseous consolidation.

- Cancellous bone is densely packed into the defect.

- Cancellous bone is preferred over cortical bone b/c of decreased chances of infection & increased vascularization.
Orthodontic Considerations Associated With Secondary Bone Grafting

- Transverse dimension;
  - Preoperative expansion may improve occlusion but also widen existing fistula. Expansion provides better access at surgery for incision & elevation of flaps.
  - Post surgical Retension of corrected cross bite.

- Incisor alignment.

- Eruption of maxillary canines.
Eruption Of Maxillary Canine

- **Orthodontic movement creates enough space to allow canines to erupt successfully.**

- Majority of canines erupt spontaneously…others require surgical exposure often in combination with orthodontics.

- Removal of supernumerary teeth is performed at the time of surgery.

- Orthodontic tooth movements should be performed three to six months following placement of bone graft.

- Early movement of roots into grafted bone appears to consolidate alveolar bone & improve crestal height.
Complete Resolution

• The erupting teeth often appear to then stimulate the formation of new alveolar bone.

• The key to complete resolution of alveolar cleft is eruption of permanent tooth through the graft, which leads to complete remodelling & normal bony contours of the area.
Permanent Dentition Stage

- Growth considerations
  - Sagittal Maxillary deficiency
  - Transverse deficiency.
  - Vertical maxillary deficiency causes over closure of mandible thus accentuating class III tendency.

- Goals
  - Close the spaces due to missing teeth.
  - Orthodontic tooth movement may be needed to position teeth as abutments for fixed prosthesis.
  - Orthodontics alone or orthognathic surgery.
Determining The Treatment Plan

- Skeletal facial considerations.
  - Examination of facial balance & proportions.
  - Full face & profile assessment.
  - Cephalometric analysis & prediction tracing.

- Almost never a good idea to attempt class III camouflage treatment.

- AP & vertical deficiency, use of class III elastics can produce downward & forward movement of maxilla & maxillary teeth as possible.
Role of Orthodontist

- 12-18 months of presurgical orthodontics are usually necessary to align teeth.
- Decompensations in axial inclination of teeth.
- Correction of Dental midline discrepancy.
- Coordinate arches.
- Localize space for prosthetic replacement of teeth.
- To provide space for surgical cuts btw crowns & roots of adjacent teeth.
- Occlusal discrepancies that may prevent coordination of arches.
- Detailing occlusion post surgically, should be completed in 4-6 months.
Orthognathic Surgery

- Almost never indicated until growth is over.

- Delay the surgical orthodontic treatment until growth is stabilized may be sound but not always in patient’s best interest.

- Almost always involves moving maxilla forward.

- Mandibular set back at the same time may be required.
Secondary Esthetic Considerations

- As a general rule, skeletal surgery, orthodontic intervention & final prosthetic rehabilitation should be completed before soft tissue revisions / rhinoplasty are instituted.
Retension

- Retainer should be placed immediately.

- Fixed retainer or excellent wear of removable retainer.

- Any transverse expansion of maxilla must be retained indefinitely.
Distraction Osteogenesis

- Distraction Osteogenesis is a surgical technique in which new bone formation is induced by gradual separation of bony segments after an osteotomy.

- Should be considered if distance of movement is unusually large.
benefits

- Simple technique.
- No bone grafting.
- No blood loss.
- Early age
- Great lengthening
- Widening
- More efficient.
- Soft tissue adaptation.
DO
Conclusion

- Orthodontist’s role in cleft palate team requires close collaboration with other team members.

- Need to keep the patients best interests in mind.

- Treatment extends over many years and risks exhausting patient cooperation.

- Ultimate outcome of team based care is to have fully rehabilitated patient who is satisfied with treatment outcomes in terms of speech, occlusion, esthetics & function.
Thankyou.