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COMMENTARY ARTICLE

Orthodontists Role in THE MANAGEMENT of CLEFT LIP AND PALATE Patients, a Summary

Kholoud F Alazmi*

BDS, JBO (Jordan), Orthodontist, Riyadh Elm University, KSA.

Introduction

The management of cleft lip and palate patients definitely requires a multidisciplinary approach and the orthodontist has proven to be an essential member in the cleft palate team. Most patients will be seen by multiple specialists including the plastic surgeon, oral surgeon, orthodontist, speech and language pathologist, dietitian and others. All efforts are done by the whole team to have a happy patient that his aesthetics, function were restored to an acceptable degree. Orthodontic role may be divided into four distinct developmental periods [1].

I. Presurgical infant orthopaedics.

II. Treatment in the deciduous dentition.

III. Treatment in the mixed dentition.

IV. Treatment in the permanent dentition.

Presurgical infant orthopaedics: The presurgical orthopaedics helps:

- To facilitate feeding
- To establish normal tongue posture
- To stimulate palatal growth
- To reduce the chances of ear infections
- To guide tooth eruption
- To reposition the premaxilla
- To establish proper sutural growth pattern early when sutures are most responsive

The aim of the presurgical orthopaedic appliances is to align the displaced cleft segments before the lip repair which is carried out at 3 months of age [2].

The orthopaedic treatment is divided into two main categories:

Presurgical orthopaedics in unilateral cleft lip and palate

This is subdivided into passive treatment and active treatment [3].

- The passive treatment involves the use of the acrylic plate that will help in:

a. Separating the nasal and the oral cavity allowing normal intraoral propioception.

b. Allowing adequate feeding by helping the neonate to develop suction reflex and normal swallowing.

c. Forcing the tongue to posture anteriorly not allowing it to occupy the cleft area which helps breathing.

d. Guiding the development of the alveolar segments by selective grinding of the passive plate to reduce the width of the cleft and obtain alignment of the skeletal segments.

e. Modifying the morphology of the soft tissue of the lip and nose (the base of the alar cartilage on the cleft side tends to move medially and level with the contralateral side).

f. Easier surgical operation and more favorable functional reconstruction of the lip and nose.

Nasal stents for molding of the nasal cartilage are added if needed within the first six weeks [4]. Adhesive tape is used in conjunction with the passive plate which acts as active component in order to approximate the alveolar segments [3].

The maxillary stumps come in contact after the molding induced by the tape and guided by the presence of the passive palate.

- The active orthopaedic treatment involves the use of the screws or pins which obtain similar result in a shorter time [5].

Presurgical orthopaedics in bilateral cleft lip and palate

At birth, high percentage of patients with bilateral cleft lip and palate present with sever protrusion of the premaxilla [6]. The main objective of this treatment is retraction of the premaxilla.

Different methods are used:

1. External traction
2. Pin retained appliances
3. Nasoalveolar molding (NAM)

Correspondence to: Kholoud F Alazmi, BDS, JBO (Jordan), Orthodontist, Riyadh Elm University, Saudi Arabia; E-mail: Alazmi[DOT]kholod[AT]gmail[DOT]com.

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The most common method used is nasoalveolar molding because it:

- Allows gradual retraction of the premaxilla
- At the same time allows the lengthening of columella as it contains two nasal stents supporting the nostrils [7].
- Usually used in conjunction with lip strapping [8].

Treatment in the deciduous dentition

The most common malocclusion present in this stage is anterior cross bite and lateral cross bite with or without mandibular shift [9]. Treatment indications are limited and fixed orthodontic treatment should be avoided.

In the presence of dental cross bite without mandibular shift, it is advisable not to perform any palatal expansion due to:

a. Risk of widening of pre-existing oro-nasal communication [10].

b. High tendency towards relapse (because of palatal scarring).

c. If expansion is performed early, long retention is needed and any retainers will be extra burden for the child. Removable retainers will inhibit speech and fixed retainers will inhibit oral hygiene.

In the presence of dental cross bite with mandibular shift If possible execute only grinding of premature contacts on deciduous teeth at this stage and then wait for the mixed dentition.

Protraction face mask to be used only in:

- Mild maxillary hypoplasia,in the presence of CO/CR shifts.
- Psychological problems.
- NOT to be used in sever mandibular class III.

Treatment in the mixed dentition

The objectives at this stage are [8]:

a. Expansion of the anterior and posterior maxilla to eliminate the cross bite.

b. Alignment and/or derotation of malpositioned incisors.

c. Improvement of dental function and esthetics.

➢ **Expansion if needed is used for these main reasons**:

- Creation of space needed for incisal alignment or eruption of permanent teeth.
- Preparation for secondary bone grafting [9].
- Reposition of the lesser segment that is collapsed palatally.

Methods used for expansion

1. Removable expanders, which should be avoided in cleft patients as these patients might need speech therapy.
2. Rapid palatal expanders(RPE) which could be:

a. Hi-Rax type RPE when parallel expansion is needed.

b. RPE with fan expansion screw when larger expansion is needed in the anterior region (bilateral complete CLP).

3. RPE with double hinged expanders when an effective posterior and simultaneously wider anterior expansion is needed (opening of all circum-maxillary sutures).
4. Quad helix expanders usually used to obtain both transverse and anterior asymmetrical expansion.

➢ Type and timing of alveolar closure

1. Before the eruption of the lateral incisors (6-8 years of age).
2. Before the eruption of the canines (9-11 years of age).
3. At age 15-16 years prior to implant placement.

➢ RULES for the timing of orthodontic treatment and bone grafting.

o *DO NOT EXPAND THE PALATE IF A BONE GRAFTING IS NOT SCHEDULED SHORTLY*

o *LOOK FOR THE PRESENCE OR ABSENCE OF PERMANENT LATERAL INCISOR*

a. When the permanent lateral incisor is present, bone grafting might be performed at the age of 6-8 years when its root is two thirds of its formation to give the lateral incisor the possibility to erupt through the bone graft but there is a concern that such an early intervention may interfere with maxillary growth [11].

b. When the permanent lateral incisor is missing, bone grafting might be performed at the age of 9-11years of age [11].

c. The recommendation is that the graft to be placed after the age of 9 years or when the radiographic examination shows that the root of the unerupted permanent canine is one third or one half developed [12].

Incisal Alignment

The most common dental malpositions seen in CLP patients are:

- Rotations
- Ectopic eruption of maxillary incisors

The space needed is obtained through the expansion [8] Aims:

1. To eliminate incisal trauma.
2. If before bone graft careful to move the teeth close to the cleft due to the risk of root resorption and periodontal defects [10].
3. Avoid in this phase excessive dental compensation (do not excessively procline incisors).

RULE: It is preferable to keep the incisor roots invested in

the bone at the pre-grafting stage while the correct tooth angulation can be achieved after successful graft placement [13].

Expansion And Grafting Which One Is First?

- If there is a marked collapse of the lesser segment, expansion is executed prior to bone grafting to align the segments.
- If the segments are aligned, bone grafting is executed prior to orthodontic expansion to create space for the eruption of the permanent lateral incisor or the permanent canine.

Protraction Face Mask

Indications for maxillary protraction in mixed dentition:

1. Mechanical indication, if there is an occlusal trauma.
2. Psychological indication, if the child himself is asking for a better esthetics.
3. Mild maxillary hypoplasia [14,15].

RULE: FACE MASK SHOULD NOT BE UTILIZED IN CLASS III PATIENTS WITH SEVER MANDIBULAR PROGNATHISM WHERE A STRONG FAMILY TRAIT FOR MANDIBULAR EXCESS.

Dental Anomalies

a. The most common one is the absence of the permanent lateral incisor in the cleft area, managed by either space closure or implant replacement, the decision depends on the following factors:

1. Position of molars in the affected side.
2. Presence of crowding on the non-cleft side which may need extraction in the treatment planning.
3. Esthetic factors.
4. Financial aspect**.**

b. Supernumerary teeth:

1. Usually localized in the cleft area.
2. Should be extracted once its possible.
3. May be utilized as anchorage before their extraction to help reposition the lateral incisor with the best anatomy.

Treatment in The Permanent Dentition

Not different from the treatment of patients without CLP. The objectives at this stage are:

1. Obtaining good final occlusion.
2. Preparation to subsequent orthognathic surgery.
3. Distraction osteogenesis, in patient with severs labial and palatal scarring which increases the risk of post-surgical relapse [16].

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