



THE MULTIDISCIPLINARY MANAGEMENT OF CLEFT LIP AND PALATE PATIENTS- ORTHODONTIC POINT OF VIEW

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Abstract. *The management of patients with cleft lip and palate is complex and requires a multidisciplinary team with several interventions and long-term treatment. The regular timing of orthodontic and surgical treatment is important for a successful long-term outcome and for reducing the burden of caring for both the child and the family. This paper will focus on the orthodontic treatment of patients born with cleft lip and palate from an early age to skeletal maturity. Management of patients with cleft lip and cleft palate requires extended orthodontic treatment and interdisciplinary approach in providing these patients with optimal aesthetics, function and stability. Orthodontic therapy in infant phase, primary, mixed and permanent dentition and after the end of growth will be discussed with an appropriate interdisciplinary approach in the planning of treatment and its timing during each phase of orthodontic and surgical treatment.*

Keywords: *cleft; cleft lip; cleft palate; multidisciplinary team; orthodontics.*

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Consent: *All pictures are with a permission of the patients and from free internet library.*

1. INTRODUCTION

Clefts present the most often craniofacial anomaly (circa one newborn baby is born with cleft in a 1000 hundred live born babies). The number ranges higher in some countries. There are two types of clefts: complete or incomplete and unilateral or bilateral. A palatal cleft may occur as an isolated phenomenon. Patients may have a cleft on the primary palatum, secondary palatum or both of them, or their every possible combination. (Fig.1) Clefts are often a part of a congenital anomaly or some syndrome.¹Complete unilateral or bilateral clefts of the lip have an arch that is collapsed into the transversal, especially on the side of the cleft. Treatment of the patients with clefts is a long and multidisciplinary process with the participation of many specialties which form “the cleft team”. The orthodontist enters the team a few days after the baby is born with pre surgical orthodontic therapy in order to prepare it for a further surgical treatment. The first phase of the orthodontic treatment consist out a distraction of the maxillary segments. The second phase of the orthodontic treatment is being conducted in order to incite a normal occlusion or if a skeletal discrepancy exists, to prepare jaw arches for orthognathic surgery leading the patient with normal occlusion, anatomo - morphological and functional face expression, normal chewing, normal speech development, and development of the patient into a healthy person.



Figure 1. Different types of clefts

2. MULTIDISCIPLINARY CLEFT TEAM

Cleft patients need continual special care over a period of almost 20 years. This is why these children should be taken care by a multidisciplinary team (MDT) made of professional's trained to treat cleft patients. The team usually consist of:

- Genetical advising specialist
- Gynecologist ultrasonography specialist
- Micropediatrician
- Nurse specialized in nursing cleft babies
- Maxillofacial surgeon
- Orthodontist
- Otorhinolaryngologist
- Speech therapist
- Doctor of child dentistry
- Prosthodontist
- Psychologist

MDT includes an orthodontist, who is present at all team meetings, and who has the proper education, training, and experience that enable him/her to diagnose and treat patients afflicted by clefts on the lips and/or palate. Modern orthodontics includes treatment of severe deviations of the lip and palate, which are just examples of extreme cases of the normal biological variety amongst people.⁸

3. PREOPERATIVE ORTHODONTIC THERAPY OF CLEFTS

Preoperative orthodontic treatment aims at successful surgical intervention, which has the goal to avoid relapse of all maxillary segments included in the cleft. Our country, as well as all other countries around the world, uses preoperative orthodontic therapy in almost all cleft cases.

It is used only with patients afflicted by the following cleft types:

1. Unilateral cleft of the primary and secondary palate
2. Bilateral complete cleft of the primary and secondary palate
3. Bilateral complete cleft of the primary palate

The deformities that occur in the maxillary arch of these clefts are most severe; the distance among maxillary segments is the greatest, thus there is a necessity to perform an early preoperative orthodontic treatment. Patients with unilateral complete cleft of the primary palate, incomplete cleft of the primary and secondary palate, isolated clefts of the palate and uvula, partial clefts of the lip, as well as all microclefts **DO NOT** exhibit any indications for preoperative orthodontic treatment, since the deformity of the maxillary arch is mild as well as the distance among maxillary segments.

3.1. Main Reasons for Early Orthodontic Treatment of Newborns with Cleft

Necessity to correct the deformed maxillary segments and provide a good skeletal basis for surgical treatment of cleft lips and a goal to avoid a postsurgical collapse of the maxillary arch, Improvement of the surgical results, Better feeding of children with complete clefts and achieving a better psychological effect on the parents and ensuring their future collaboration.⁵ The preoperative orthodontic treatment should be performed as soon as possible, 2-3 days after birth, especially in cases of newborns with complete bilateral clefts and end when the children reach the age of 6 – 8 months, since this is when tissues in this area develop the fastest. (Fig.2)

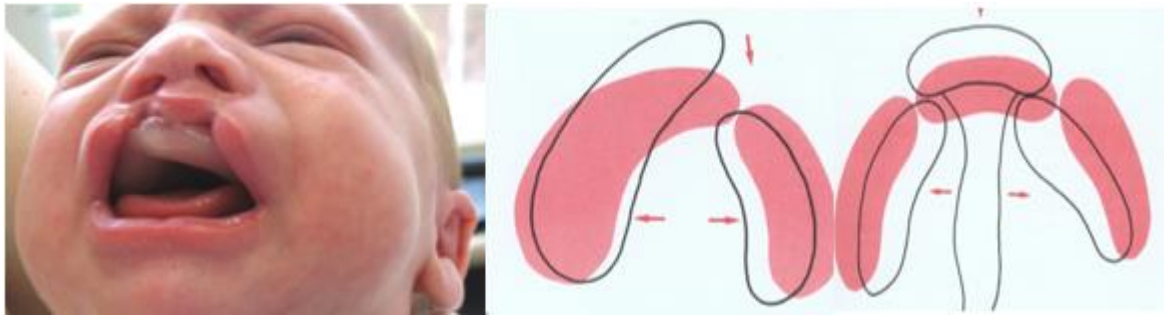


Figure 2. Obturator in unilateral and bilateral cleft

The McNeil treatment, which was the first preoperative orthodontic treatment, is most often executed. Preoperative orthodontic treatment aims at successful surgical intervention, which has the goal to avoid relapse of all maxillary segments included in the cleft.⁶



Figure 3. Preoperative orthodontic treatment aims at successful surgical intervention, which has the goal to avoid relapse of all maxillary segments included in the cleft

4. SURGICAL RECONSTRUCTION OF THE UPPER LIP * CHIELOPLASTICA * AND * PROCESSUS ALVEOLARIS*

The upper lip consists of several important anatomical elements: philtrum, its edges, and the vermillion with its vividly emphasized arches. (Fig,4)

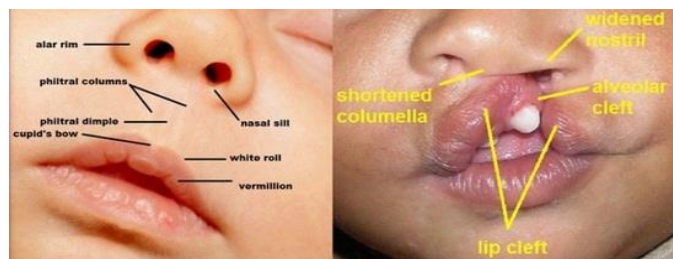


Figure 4. Normal lip versus cleft lip

Lip correction is of great importance since m.orbicularis oris allows facial expressions. This muscle enables nursing, whistling, speech, etc. The permanent pressure that this muscle exerts allows for proper development of the maxilla and alveolar segments along with the dental arches. (Fig 5)



Figure 5.



Figure 6. If the cleft affects only the soft tissue, surgical closure is linear. (Kilner & Peet linear method)

But, if the cleft includes clefting of the primary and/or secondary palate, the maxillary segments and premaxilla of unilateral and bilateral clefts needs maxillary segment leveling in order to acquire tension free lip closure and avoid large discrepancies in future development of the maxilla and dental occlusion. Good preoperative preparations lead to good final results. Most surgeons prefer to postpone surgical treatment of the lip until the age of three months, since the infant, as well as its lip, are bigger at this period. This time period allows the orthodontist to complete the preoperative treatment, which significantly enhances the end results.

5. SURGICAL RECONSTRUCTION OF THE SOFT AND HARD PALATE - PALATOPLASTICA

Primary palate clefts are usually closed simultaneously with the lip closure. Secondary palate clefts, which may spread from the foramen incisivum to the uvula, is usually made in one step when the patient is 24 months old or in the period of complete deciduous dentition. The aim of this surgery is to provide an intact oral arch, mobility of the soft palate, and a complete contact with the posterior wall of the pharynx, accompanied by a sufficient velopharyngeal closure, which will in return provide for speech development or avoid rhinolalia; a normal upper and lower jaw ration and occlusion; normal anatomical, morphological and functional appearance of the face; normal mastication; normal breathing; normal hearing; normal swallowing; and, development of the patient into a healthy socialized person. (Fig.7) Dissection of palatal flaps can be achieved by Von Langenbeack method or along the palate arteries, i.e. using the Veau Wadil – Kilner Push Back method.⁷



Figure 7.

6. POSTOPERATIVE ORTHODONTIC CLEFT THERAPY: DECIDUOUS DENTITION

Orthodontic treatment of malocclusions in children with clefts in deciduous dentition does not actually have distinct indications. The treatment is most often utilised in children with complete bilateral clefts of the primary and secondary palate. Their early treatment influences the dental arches development and aids towards elimination of many possible future orthodontic problems. There are emphasized treatment indications in this period in children with bilateral cleft, protruded premaxilla, and collapsed lateral segments. In these cases anterior parts of the lateral segments lean on the posterior part of the premaxilla and obstruct its shift oral. A simple mobile orthodontic plate with an extension screw, which is highly successful in treating lateral crossbite, is most often used. In case of bilateral clefts, this plate is cut along the medial line, while in cases of unilateral clefts, the cut is made on site of the cleft. Lateral bite ridges may also be added. The screw is activated each two to three days. The shift of the lateral segments provides for a more acceptable occlusion, thus permanent teeth erupt in a position that is better for future treatment of the patient. Also, the expansion of the maxillary arch provides more space for the tongue, thus enhancing the speech as well. In order to have a successful treatment it is most important that in this period the orthodontist establishes excellent communication with the patient's parents. Not one control check-up must be missed and the appliance must be worn at all times, since the results achieved by a three month treatment may be easily lost within several days. This is the reason why the appliance should be taken out of the child's mouth only for hygiene purposes. Deciduous dentition orthodontic treatment has the aim to maintain most favorable oral conditions, which serve as basis for good orthodontic treatment in mixed and permanent dentition.

6.1. Mixed Dentition

Treatment becomes necessary in this period as soon the first upper permanent incision teeth erupt. Rotated and inclined teeth are corrected by mobile plates in combination with labial arch and rails in palatal position. Fixed appliances are used in more severe cases. The use of orthopedic facial mask is especially emphasized in this period and the results are almost spectacular. The appliance for rapid palatal expansion is often combined with the orthopedic facial mask. (Fig.8 and 9) Depending on its usage, traction is combined with two elastic bands on each side, depending on the collapse. In this case, the elastic force exerted by hooks on the prelabial arch of the mask is the same as in maxillary 81andibular81cies. Traction intensity depends on the case. In order to lateralize and direct fragments anteriorly, an appliance for fast palate adhesion is used in cases where patients are older than 10, who have suffered a total collapse of fragments, and have not been subjected to orthodontic therapy. After sagittal and transversal contact of the mandibular and maxillar alveolar ridges has been acquired, the appliance remains in use for the purpose of retention within a period of 6 – 9 months. The appliance for fast palatal adhesion is often combined with the facial mask. Depending of the usage traction is combined with two elastic bands on each side, depending on the cleft. In this case, the elastic force is applied on hooks on the prelabial arch of the mask .Traction intensity depends on the case. When desired results in all three directions are achieved, stabilization is acquired by use of fixed techniques and the final solution is reached by prosthetic rehabilitation.

During treatment patients must always wear orthodontic devices.

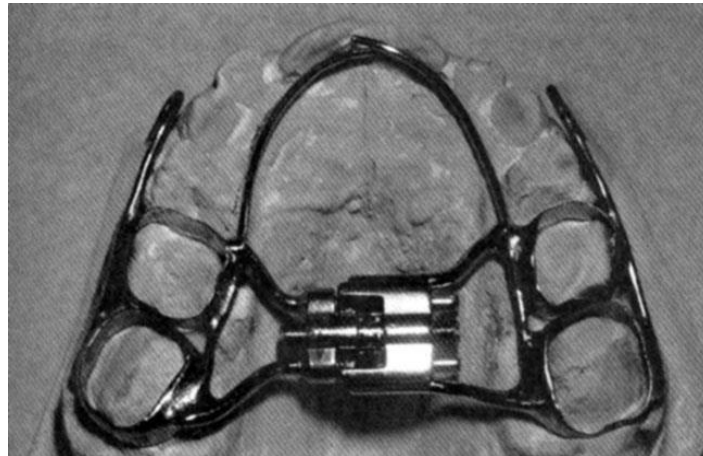


Figure 8. Rapid Palatal Expander

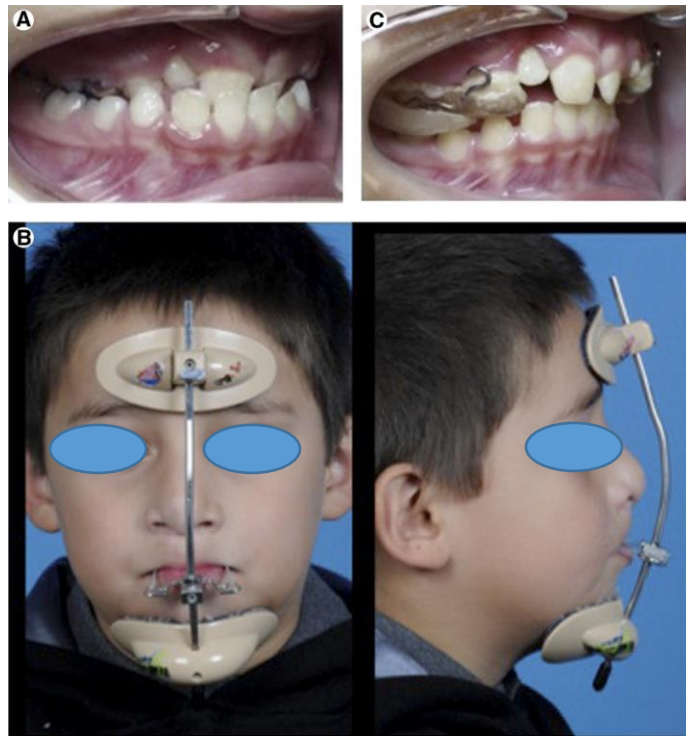


Figure 9. Orthopedic facial mask – Delaire type

6.2. Permanent Dentition

As soon as permanent dentition emerges, time comes to start fixed orthodontic treatments of clefts and all of their special characteristics. (Fig.10) Most often these defects are related to certain teeth and maxillary segments position. Provided there is no satisfactory result, orthognatic surgery is used as well.



Figure 10.

7. RETENTION

Compared to routine cases, the retention treatment period is much longer here. Patients whose maxillary arches have been widened need a lifelong retention, which may be orthodontic or prosthetic. Orthodontic retention is in fact a very simple plate that must be fitted immediately after the removal of the fixed appliance, since recidivism is highly possible. If necessary, the appliance is corrected on site, by a self-adhesive acrylic. Prosthetic retention appliances may be mobile and fixed. Missing teeth are often replaced after maxillary arch correction. This is achieved by bridges or partial prosthesis that serve as retention as well.

8. CONCLUSION

- The orthodontist's role in the multidisciplinary team is of primary importance and starts almost at the birth of patients with cleft lips and/or palates.
- Preoperative orthodontic therapy should be carried out continuously since birth until the first surgical procedure (cheiloplasty), i.e. the age of three months and later until palatoplasty, i.e. the age of 24 months, when deciduous dentition is complete.
- Preoperative orthodontic treatment of cleft palates as part of complete unilateral and bilateral clefts, as well as their subtypes, is compulsory and carried out with the help of an obturator until time comes for surgical intervention, i.e. palatoplasty at the age of 24 months.
- Preoperative orthodontic treatment of complete, i.e. bilateral clefts, as well as their subtypes, which always exhibit cleft lips, is compulsory in order to draw the upper lip segments together and give them direction, and allow for tension free cheiloplasty. Thus, the upper lip acquires continuity and proper form.
- The postoperative orthodontic treatment starts immediately after rehabilitation from palatoplasty and uses mobile and fixed therapy and follows the growth and development of the maxilla, until the adult period.

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