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Cleft lip and palate and their management

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Certification of the Supervisor

I certify that this project entitled **"Cleft Lip and Palate and their management"** was prepared by the fifth-year student **Mohammed Ali Rahi** under my supervision at the College of Dentistry/University of Baghdad in partial fulfilment of the graduation requirements for the Bachelor Degree in Dentistry.

Lect. Heba N. Yassin

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DEDICATION

I'd like to dedicate this project to my beloved **father** and to my beloved **mother** without both I would never make it to this point.

To all my friends, thank you for being always there for me with all you love and support.

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List of Abbreviations

BCLP	Bilateral Cleft lip and palate
CL/P	Cleft lip and palate
CPO	Cleft palate only

IMR	Infant mortality rate
NAM	Nasoalveolar molding
PSIO	Presurgical infant orthopedics
UCLP	Unilateral cleft lip

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	symmetrical although there is an accentuation of the cupid's bow and eversion of the vermillion border	

Introduction

Cleft lip or palate is one of the most common types of cranio-maxillofacial birth anomalies. It accounts for 65% of all head and neck deformities. Maxillary deficiency is a common feature of cleft lip and palate patients due to scar tissue of the lip and palate closure **(Mazen, 2017).**

Although many factors have been associated with this condition, from a practical preventive aspect the a etiology remains undetermined. The incidence varies worldwide between 0.8 and 2.7 cases per 1000 live births and is affected by region, gender, ethnicity and maternal characteristics **(Nigel *et al*., 2008).** Overall incidence of cleft lip and palate is approximately 1 in 600 to 800 live births (1.42 in 1000) and isolated cleft palate occurs approximately in 1 in 2000 live births. Thus, the typical distribution of cleft types are: Cleft lip alone – 15%, Cleft lip and palate – 45% and Isolated cleft palate – 40%. **(Gowri, 2011).**

Patient with oro-facial cleft deformity needs to be treated at right time and at right age to achieve functional and aesthetic well-being **(Banerjee and Dhakar, 2013).**

Successful management of the child born with a cleft lip and palate requires coordinated care provided by a number of different specialties including oral/maxillofacial surgery, otolaryngology, genetics/dysmorphology, speech/language pathology, orthodontics, prosthodontics, and other. This successful reconstruction routinely requires multiple phase of surgical intervention. **(Welbury *et al*., 2005; Chapel, 2011).**

Aim of the study

The aim of present project was to a review about cleft lip and palate and mention their causes and management.

Chapter one

Review of literature

1-Cleft lip

The failure of fusion of the frontonasal and maxillary processes, resulting in a cleft of varying extent through the lip, alveolus, and nasal floor (an incomplete cleft does not extend through the nasal floor, while a complete cleft implies lack of connection between the alar base and the medial labial element) **(Semer , 2001).**

2-Cleft palate

The failure of fusion of the palatal shelves of the maxillary processes, resulting in a cleft of the hard and/or soft palates. Clefts arises during the fourth developmental stage. Exactly where they appears is determined by locations at which fusion of various facial processes failed to occur, this in turn is influenced by the time in embryologic life when some interference with development occurred **(Proffit *et al*., 2012).**

3-Epidemiology

Overall incidence of orofacial clefting is around 1.5 per 1000 live birth (about 220,000 new cases per year) with wide variation across geographic areas, ethnic group and nature of cleft itself **(Allan *et al*., 2014).**

Isolated cleft lip comprises about 25% of all clefts, while combined cleft lip and palate accounts for about 45%. Cleft lip and palate (CL/P) occurs more frequent and more severe in boys than in girls. Unilateral clefts are more common

than bilateral clefts with a ratio of 4:1, and for unilateral clefts, about 70% occur on the left side of the face. Cleft palate is seen more frequently in females than in males. CL/P is frequently associated with other developmental abnormalities and majority of cases are presented as part of a syndrome. Syndromic clefts account for about 50% of the total cases in some reports with about 300 syndromes described. Although the percentage of cases directly linked to genetic factors is estimated to be about 40%, all clefts appear to show a familial tendency **(Allan *et al*., 2014).**

Various epidemiological studies show that, if one parent affected with a cleft has a 3.2% chance of having a child with cleft lip and palate and a 6.8% chance of having a child with isolated cleft palate, presence of a cleft in one parent and in one sibling is associated with a 15.8% chance that the next child will have a cleft lip or palate, and a 14.9% chance that the next child will have a cleft palate **(Banerjee et al., 2013)**

In case where parents with one is child affected with a cleft have a 4.4% chance of having another child with a cleft lip and palate and a 2.5% chance of having a child with isolated cleft palate (Banerjee and Dhakar, 2013).

4-Embryology

Cleft lip and palate happen as a result of incomplete mix and integration of rectal protrusions, which generates the delicate and strong tissues that form the roof of their mouth. Cleft lip happens because of the failed mix between 4th and 6th months of pregnancy, whereas the cleft palate occurs between the 6th and 12th months of pregnancy **(Berkowitz, 2005).**

5-Etiology

The etiology of cleft lip and palate is complex and thought to involve genetic influences with variable interactions from environmental factors. The etiological factors of cleft lip and palate can be grouped according to **Lakhanpal *et al*. (2014): A. Non-genetic**: this includes various environmental (teratogenic) risk factors which may cause cleft lip and palate.

B. Genetic: Genetic cause includes:

- Syndromic: Here cleft is associated with other malformation. Usually it is due to a single gene (monogenic or Mendelian) disorder.
- Non-syndromic: Here the cleft is mostly an isolated feature and occurs in the vast majority of individuals having a cleft lip or palate (up to 70% cases). In this form, a cleft is neither a recognized pattern of malformation nor a known cause for the disorder can be identified

5.1Non-genetic factors:

Besides genetic factor environmental factors also play a very important role in etiology of cleft lip and palate **(Kohli, 2012).**

Various environmental factors includes:

5.1.1 Smoking:

The relationship between maternal smoking and CLP is not strong, but it is significant. Several studies have consistently yielded a relative risk of about 1.3–1.5. When maternal smoking was considered together with a positive genetic background, the combined effect was more significant (Beaty et al, 2002).

5.1.2 Alcohol use:

Heavy maternal drinking, apart from causing fetal alcohol syndrome, also increases the risk of CLP showed that maternal drinking increased the risk for CLP

by 1.5–4.7 times in a dose-dependent manner Low-level alcohol consumption, however, did not seem to increase the risk of orofacial clefts. The link between alcohol consumption and genotypes on the risk of CLP has yet to be demonstrated **(Kohli S, Kohli V, 2012).**

5.1.3 Others:

Environmental factor includes maternal diseases, stress during pregnancy chemical exposure **(Lakhanpal *et al*., 2014).** blood supply in nasomaxillary region (Marwah , 2014). increased maternal and parental age are also said to increase risk of cleft lip with and without palate while higher parental age has been associated with cleft palate only **(Bille *et al*., 2005).** Fetal exposure to retinoid drugs can results in severe craniofacial anomalies **(Sousa *et al*., 2009).**

5.2 Genetic factor:

Various epidemiological observation have laid the foundation of role of genetics in etiology of cleft lip and palate. Many studies have shown that monozygotic twins (60%) have considerable higher concordance rate than dizygotic twins and siblings (5-10%) (Lorente and Miller , 1978).

6-Classification of cleft types

Clefts are classified according to localization and extent. Clefts can be partial or complete, unilateral, bilateral or median. According to Fogh-Anderson (1942) there are thee cleft types:

(1) Cleft lip (CL) also including cleft lip and alveolus as far back as the incisive foramen,
(2) Cleft lip and palate (CLP)
(3) Cleft palate (CP) with clefts as far forward as the incisive foramen.

Fogh-Anderson showed that the etiologies of CL and CLP were different from CP. This has also been verified in further epidemiological and genetic studies. Consequently, one simple division in two cleft-types is often used: Cleft of the lip and/or palate "CL/P or CL(P)" and cleft palate (CP). Sometimes a U (unilateral) or a B (bilateral) and a C (complete) or I (incomplete) is added to the abbreviations to categorize further (figure 1). A classification that has been commonly used is the one by **Kernahan and Stark (1958).** They classified clefts anterior to the incisive foramen as clefts of the primary palate and clefts posterior to the incisive foramen as clefts of the secondary palate. This can be confusing as the lip is not part of the palate. Kernahan (1971) also proposed a symbolic method for classification, "the striped Y", that has been later modified by others **(Khan *et al.*, 2013).**

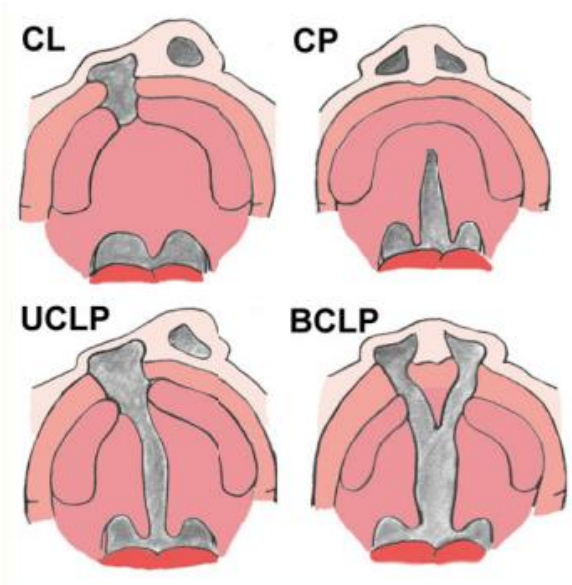

Figure 1. cleft types: CL – Cleft lip and alveolus, CP – Cleft palate, UCLP – Unilateral Cleft lip and palate, BCLP – Bilateral Cleft lip and palate **(Khan *et al.*, 2013).**

7-Anatomy of Unilateral cleft lip

In the untreated complete UCLP there are certain typical anatomical features. There is a cleft from the lip through the alveolus, the hard palate and the soft palate. The cleft means not only separation of tissues that are normally connected but also a lack of tissue to varying degrees. In the lip, the orbicularis oris muscle is interrupted and fibres run upwards and insert in the margin of the cleft along with the vessels **(Seagle and Furlow, 2004).**

In the nose, the cleft in the floor of the nasal cavity causes distortion both of the exterior and interior parts of the nose. The entire nasal pyramid is wide, depressed and asymmetric. The lower part of the septum and the anterior nasal spine is deviated away from the cleft side with an angle up to 90 degrees from the vertical septum. More cranially there is deviation towards the cleft side. The columella is shortened and broadened by the downwards and laterally shifted medial crus of the alar cartilage. The nasal tip is blunt, downshifted, asymmetric and deviated to the non-cleft side. The base of the nasal ala on the cleft side is dislocated downwards, laterally and posteriorly by the separation of maxillary segments by the cleft, flattening the shape of the ala. The lower part of the lateral crus is buckled, collapsed and displaced **(Ahuja, 2001; Ahula, 2002).**

The nasal bones are broad and there may be slight hypertelorism. Surgical repair of the cleft usually corrects some of the nasal deformities but some may remain. The collapse of the alar cartilage, septal deviation, alterations in the nasal floor and scarring can cause narrowing of the nostril and nasal cavity on the cleft side and asymmetric exterior nose. The alveolus and palate in the unrepaired unilateral cleft is divided in two segments, one larger including the premaxilla and one smaller. The cleft in the alveolus is usually located between the lateral incisor tooth in the premaxilla and the canine in the lesser segment. There can be

supernumerary teeth and the teeth can be dislocated or missing especially in the area close to the alveolar cleft. The premaxilla is displaced anterolaterally creating a protrusion and midline shift to the non-cleft side. The lesser segment is displaced dorso-laterally, and the anterior part is slightly curved upwards **(Mishima *et al.*, 2001, Berkowitz, 2013).**

8-Anatomy of Bilateral cleft lip

Clefting can be either symmetrical or asymmetrical. In the bilateral complete cleft lip, both nasal chambers are in direct communication with the oral cavity. The palatal processes are divided into two equal parts and the turbinates are clearly visible within both nasal cavities. The nasal septum forms a midline structure that is firmy attached to the base of the skull but is fairly mobile anteriorly, where it supports the premaxilla and columella **(Angus and Richard, 2008).**

There is a malformation of the premaxilla characterized by its protrusion relative to the nasal septum. The columella is usually non-existent, with the lip attaching directly to the nasal tip. The basal bone of the premaxilla articulates with the cartilaginous nasal septum superiorly and the vomer posteriorly. In normal structure the alveolar process of the premaxilla is inferior to the basal component. However, in the bilateral cleft condition the alveolar component is anterior to the basal component, in horizon-tal arrangement. In these clefts, the premaxilla protrudes considerably forward of the facial profile and is attached to a stalk-like vomer and the nasal septum **(Berkowitz, 2005).**

The lip moiety in the medial segment contains only collagenous connective tissue It, therefore, grossly deficient in bulk and lacks the features normally produced by muscle. although the columella would appear to be absent clinically, in anatomical terms it may be present in that the medial crura of the alar cartilages

appear to occupy a normal position relative to the tip of the nose and the nasal septum. There is a deficiency of columellar skin, however, which complicates the re-establishment of normal anatomical relations during treatment. the maxillary arch form generally appears normal at birth, but medial collapse of the maxillary segments occurs soon after. The medial aspects of the palatal processes are often tilted superiorly into the cleft as seen in Figure 2 **(Angus and Richard, 2008).**

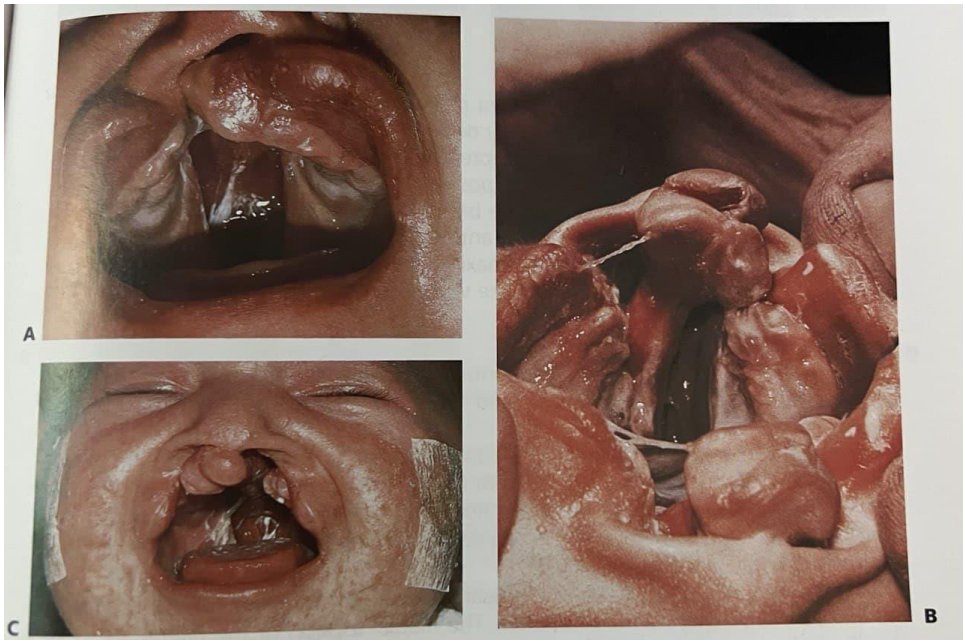

Figure 2: A. Unilateral complete cleft lip and palate, showing the extent of the malformation in the palate. **B** Bilateral complete cleft lip and palate. The premaxillary segment is clearly visible as an extension of the nasal septum. The central incisors are contained within this process. **C** Anterior view of a child with a bilateral complete cleft of the lip and palate. The columella and philtrum are extremely short and there is a wide defect between the segments (Angus and Richard, 2008).

9-Non-Syndromic vs. Syndromic Cleft Palate

Cleft palates can be divided into two groups: (1) syndromic CL/P is associated with additional structural abnormalities occurring outside the region of the cleft (also called “nonisolated” cleft palate) or with a syndrome with a known

genetic etiology, and (2) non-syndromic CL/P is an isolated condition unassociated with any recognizable anomalies (also known as "isolated" cleft palate) **(Mai *et al*., 2014; Watkins *et al*., 2014).**

The proportion of oral clefts with additional anomalies is more frequent for cleft palte than for CL/P **(Mossey *et al*., 2009).** About 50% of CL/P are associated with another malformation syndrome, compared with less than 15% of CL/P **(Shprintzen *et al*., 1985).**

The most commonly associated anomalies associated with CL/P are congenital heart defects (31.1%), deformations (22.4%), hydrocephaly (11.2%), urinary tract defects (9.7%), and polydactyly (9.2%) **(Mossey and Catilla, 2003).**

Originally, non-syndromic CL/P was thought to be a distinct condition with its own genetic etiology, separate from all forms of syndromic CL/P, partially due to the low occurrence of non-syndromic and syndromic forms of CL/P within the same family. However, recent research has shown both conditions may be opposite ends of a large spectrum of CL/P, largely due to advances in genome sequencing and recognition of subclinical phenotypes. For CL/P associated with a syndrome with a known genetic cause, many of these syndromes were thought to have a set group of physical features when first discovered. As genome sequencing has become more common in the clinical setting, new cases of these syndromes are now being diagnosed in patients who have the genetic marker but do not always display all of the characteristic features, and may display additional features as well. In non-syndromic CL/P, recent recognition of subclinical phenotypes, such as bifid uvula and submucous cleft palate, has led to an increase in the number of affected family members for some patients, shedding light on possible inheritance patterns **(Reiter *et al*., 2012; Watkins *et al*., 2014).**

In both non-syndromic and syndromic forms of CL/P, the diagnostic criteria have been reevaluated to include new associated features that were not initially considered and subclinical forms that were not originally diagnosed. Recent research has also shown that some genes responsible for syndromic CPO may also be candidate genes for non-syndromic CPO, further indicating that these conditions may represent different portions of a single spectrum **(Stanier and Moore, 2004).**

10-Clinical Features

Few studies have evaluated the knowledge and experience of primary care physicians regarding the physical, dental, and behavioural/emotional needs of a child with an oral cleft **(Grow and Lehman, 2002).**

The various clinical findings in patient with cleft lip and palate can be categorized under two headings:

10.1 Dental problems in cleft lip and palate

Various abnormal dental conditions includes:

- 10.1.1 Natal and neonatal teeth:

  Presence of neonatal teeth does not appear to influence primary or secondary dentition in clefts. Most natal teeth among clefts are located in the lateral margin of the premaxillary and maxillary segments unlike in non-cleft neonates **(Al Jamal *et al*., 2010; Kadam *et al*., 2013).**

- 10.1.2 Microdontia:

  Small teeth (microdonts) frequently are found with CL/P. This is usually more common in cases where lateral incisors are not missing **(Stahl *et al*.,**

2006; Rawashdeh and Bakir, 2007). Generally peg shaped upper lateral incisors are seen **(Kadam *et al*., 2013).**

- 10.1.3 Taurodontism:

It has been reported to be associated with certain syndromes and dental developmental disorders **(Cichon and Pack, 1985).**

- 10.1.4 Ectopic eruption:

Clefts also contribute to the ectopic eruption of primary lateral incisors which may erupt palatally adjacent to or within the cleft side while permanent canine on side of alveolar clefts may erupt palatally. Delayed eruption of permanent incisors may be seen **(Al Jamal *et al*., 2010; Qureshi *et al*., 2012).**

- 10.1.5 Enamel hypoplasia:

Enamel hypoplasia was found to occur more frequently in CL/P subjects compared with non-cleft populations, especially involving the maxillary central incisors **(Vichi and Franchi, 1995).**

- 10.1.6 Delayed tooth maturation:

Several growth factors are of major importance during craniofacial development, and these factors may be overexpressed or underexpressed when a cleft defect occurs. This aberrant expression can modify odontogenesis and cause abnormalities of the dental lamina **(Tan *et al*., 2012).**

10.2 Other associated conditions:

1. Speech difficulties

Due to the dysfunction of levator veli palatini muscle phonation are affected. Retardation of consonant sound (p, b, t, d, k, g) is most common findings.

Abnormal nasal resonance and difficulty in articulation are another characteristic feature in most individuals with cleft lip and palate **(Mitchell and Robert Wood, 2000).**

2. Ear infection:

Due to improper function of tensor veli palatini muscle, which opens the Eustachian tube, otitis media is observed in these patients. In a case where infections frequently occur, results that can lead to hearing loss may occur. The incidence, however, increases sharply when there is associated submucous cleft palate **(Mitchell and Robert Wood, 2000; Sharma and Nanda, 2009).**

3. Feeding problems:

A child with a cleft palate can have difficulty sucking through a regular nipple due to the gap in the roof of the mouth. An infant's ability to suck is related to two factors: the ability of the external lips to perform the necessary sucking movements and the ability of the palate to allow the necessary build-up of pressure inside the mouth so that foodstuff can be propelled into the mouth. Most babies require a personalized or special nipple to properly feed. It may take a couple of days for the baby and parents to adjust to using the nipple before going home. Most babies learn to feed normally with a cleft palate nipple **(Mitchell, Robert Wood, 2000).**

11-The cleft palate team

Treatment is generally undertaken in a coordinated interdisciplinary 'team' environment with a team leader. Cleft palate teams are located in the major paediatric hospitals throughout the world. A typical cleft palate team according to **Angus and Richard (2008)** comprises:

- Plastic surgeons.
- Pediatric dentists
- Orthodontists.
- Speech pathologists.
- Maxillofacial surgeons.
- Paediatricians.
- ENT surgeons.
- Nurses.
- Social workers.
- A team coordinator.

While there are many variations in techniques, sequencing and timing of treatment, there are, some commonly accepted aims and principles of treatment.The appropriate specialists within a team aim to provide a rapid initial evaluation, often within hours of birth. Subsequent regular contact with family members through frequent review clinics ensures that social and psychological problems are identified and resolved early. Treatment plans can then be formulated and implemented in collaboration with fellow specialists. Regular follow-up appointments enable the accumulation of data on the outcome of clinical procedures, the psycho logical wellbeing of the patients, the effects of treatment on growth, postoperative function and appearance, which must then be used to help future patients under the care of that team **(Angus and Richard, 2008).**

12-Morbidity and Mortality

Children born with oral clefts have been shown to have higher mortality rates, especially in the presence of other birth defects **(Vallino-Napoli *et al*., 2006; Carlson *et al*., 2013).**

Kang *et al*.(2012) found a 15 times greater risk of mortality in CPO patients when compared to the general population, and a 10 times greater risk when compared to other types of clefts.

A 14-year study of Dutch patients found an infant mortality rate (IMR) of 2.45% for all CPO, with the most common cause of death for all oral clefts being congenital malformations of the heart (40.6%) **(Van Nunen *et al*., 2014).**

Congenital heart defects commonly present with oral clefts, and are reported to occur in 1.3 to 27% of affected individuals, although the mechanism is still unknown **(Setó-Salvia and Stanier, 2014).**

Epidemiological studies have assessed the relationship between cancer and clefts. **Bille *et al*.(2005)** found an increased risk of breast cancer and primary brain cancer in females with cleft palate while **Lima *et al*.(2013)** found breast, colorectal, stomach, prostate, and uterine cancers to be the most common among those with oral clefts.

Recent research has also shown differences in cerebellar morphology in patients with oral clefts. **DeVolder *et al*.(2013)** found that males with cleft palate had regional changes in the cerebellum but not reductions in volume, while females with cleft palate had reduced cerebellum volumes.

13-Treatment of Cleft Lip and Palate

This correction involves surgically producing a face that does not attract attention, a vocal apparatus that permits intelligible speech and a dentition that allows optimal function and aesthetics. The cleft palate team concept has evolved from that need. Because optimal care is best achieved by multiple types of clinical expertise, the team may be composed of individual in: (1) the dental specialties (orthodontics, oral surgery, pediatric dentistry, and prosthodontics), (2) the medical

specialties (genetics, otolaryngology, pediatrics, plastic surgery, and psychiatry), and (3) allied health care fields (audiology, nursing, psychology, social work, and speech pathology) **(Dean *et al*., 2012).**

14-Aims of cleft treatment

The ultimate goal is to attain normal form and function (especially speech and mastication) with the least possible damage to growth and development through surgical intervention, according to **Angus and Richard, (2008)** Specific treatment objectives are:

- Provide a long mobile palate capable of completely closing off the oropharynx from the nasopharynx.
- Produce a full upper lip with a symmetrical cupid's bow and reconstruction of the columella and the alar architecture of the nose
- Achieve an intact, well-aligned dental arch with a stable inter-arch occlusion.
- Provide a pleasing facial appearance.

15-Surgery Treatment

Unlike the artistic nature of the cleft lip repair, the cleft palate repair is very functional in nature. A team approach has decreased the morbidity and secondary deformities caused by the cleft and mostly focuses quality of speech **(Agrawal, 2009).**

Soft palate repair techniques may be used in isolation or combined with hard palate procedures, as necessary. Most surgeons today perform either some modification of an intravelar veloplasty, vs. a two flap palatoplasty with double

opposing z-plasty to achieve levator muscular repositioning **(Sitzman and Marcus, 2014).**

Maxillary distraction is increasingly used for the correction of severe maxillary retrusion in patients with cleft lip and palate **(Susami *et al*., 2018).**

Cleft lip and palate children benefit from team approach special treatment requirements. such a team lead by the plastic surgeon should include a speech therapist and orthodontist having ready access to pediatric, ENT and dental treatment facilities **(Yasin, 2020).**

Nasoalveolar molding (NAM) cleft lip and palate children benefit from team approach special treatment requirements. such a team lead by the plastic surgeon should include a speech therapist and orthodontist having ready access to pediatric, ENT and dental treatment facilities does not alter skeletal facial growth when compared with the samples that did not receive PSIO (Presurgical infant orthopedics). Nevertheless, the published studies on NAM show evidence of benefits to the patient, caregivers, the surgeon, and society. These benefits include documented reduction in severity of the cleft deformity prior to surgery and as a consequence improved surgical outcomes, reduced burden of care on the caregivers, reduction in the need for revision surgery and consequent reduced overall cost of care to the patient and society **(Esenlik *et al*., 2020).**

Robotic cleft surgery is a new and exciting field that holds numerous advantages to both patients and surgeons. Previous research in allied health specialities has paved the way to the feasibility studies of robotic cleft surgery. Finally, the use of surgical robots at present introduces economic challenges to implementation because of increased operative time and high capital and operating costs and it is hoped that over time, costs will reduce and

performance will increase as more systems are developed in the future **(Al Omran *et al*., 2019).**

16-Timing of surgery

Many surgical techniques have been described for the primary closure of cleft lip and palate. Unfortunately, there is still controversy regarding the precise timing of surgery and which is the most reliable technique that is consistent with ensuring optimal growth of the face and development of speech ,Lip repair is generally undertaken at 10-12 weeks and almost certainly by 6 months of age, provided the infant is otherwise developing well. The timing of lip repair is less controversial than is palate repair and aims to restore the continuity of the orbicularis oris muscle of the lip, and with it, the appearance and notion of the upper lip (Figure 3). Recently introduced techniques that include the additional re-attachment of the muscles at the base of the nose have improved both the aesthetic result as well as the growth potential of the midface. Palate repair aims to reconstruct the abnormally inserted musculature of the soft palate to normalize movements of the soft palate and permit the development of normal speech. The extent and timing of palatal surgery is one of the major and continuing controversies in cleft management and relates to the perceived balance between the benefits of good speech development versus the deleterious effects on midfacial growth through surgical trauma and associated scarring, Depending on the institution, "early closure is carried out prior to the development of speech, between 6 and 18 months of age. It is likely to disturb the subsequent growth of the midface **(Angus and Richard, 2008).**

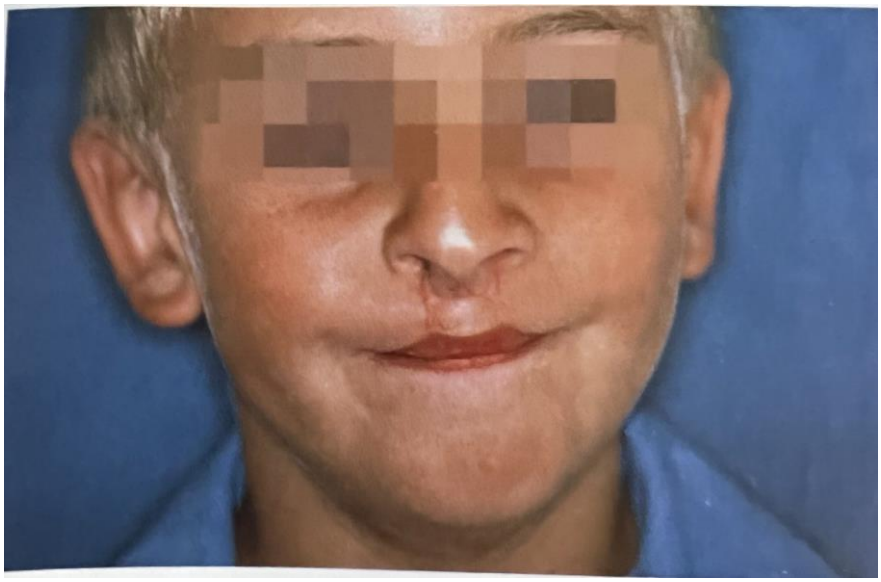

Figure 3: Surgical repair of a bilateral complete cleft lip with columella lengthening. The alar base is symmetrical although there is an accentuation of the cupid's bow and eversion of the vermillion border **(Angus and Richard, 2008).**

17-Complications of surgical treatment

Immediate complications of cleft palate repair are bleeding, respiratory obstruction, infection, and dehiscence. Bleeding and respiratory obstruction happen immediately after surgery, and while rare require re-intubation and may be life-threatening **(Hopper *et al*., 2006).**

Palatal (oronasal) fistulas may also form, ranging from asymptomatic holes to large communications between the oral and nasal cavities that cause speech problems, nasal regurgitation and hygiene difficulties. If symptomatic, fistulas may be surgically corrected with local mucosal flaps **(Katzel *et al*., 2009).**

Factors that affect fistula formation include the anatomy of the cleft (primary palate clefts have higher fistula rates), the type of repair, and the experience level of the surgeon **(Hopper *et al*., 2006).**

Chapter two

Conclusion

1. The perfect thing to do for CLP is certainly to prevent its occurrence in the first place.
2. The primary aim in CLP is to educate parents and future mothers and fathers. Cleft lip and palate are both birth defects that affect different structure and function such as speech difficulty, aesthetic, eating, nutrition etc.
3. Patients with oro-facial cleft deformity needs to be treated at right time and at right age to achieve functional and aesthetic well-being. The mental status of patients with CLP should be considered and supported by psychological rehabilitation and their morale should always be bolstered.
4. Extensive dental treatment may be requires but it should not be made more extensive or complex than is necessary to achieve a reasonable standard of dental perfection.
5. The multidisciplinary approach towards this problem led to a steady improvement in its end results.

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