ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 1, February - 2023, Page No. : 29 - 37

Oral anomalies associated with cleft lip and palate in children – An update.

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Citation of this Article: Dr. Jyoti Shukla, Dr. Deepak Viswanath, Dr. Palini Pradhan, Dr. Nayanlata Saxena, "Oral anomalies associated with cleft lip and palate in children – An update", IJDSIR- February - 2023, Volume – 6, Issue - 1, P. No. 29 – 37.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Cleft Lip and Palate is That Congenital Anomaly of Face Which is a Very Common Birth Condition. There is a Lot of Factors Behind This Condition Like Environment Factor, Genetical Factor and Many More. This can Occur Alone or as a Combination of Both Cleft Lip and Palate. For Main taining Functional and Esthetical Well Being Right Time Treatment Is Necessary. Successful Treatment Is Also Depended Upon the Numbers of Different Specialist. To Fix A Problem, We Need To Understand It That's Why This Review Based Upon The Different Conditions Related To Cleft, Examination, And Management Of Cleft Lip And Palate.

Keywords: Cleft Lip, Cleft Palate, Congenital Anomaly, Genetical Factor, Environment Factor

Introduction

The most severe congenital disorder of the oro facial region is cleft lip and palate. Oro facial clefts include a range of con genital deformities most commonly presenting as cleft lip with or without cleft palate (CLP) or isolated cleft palate (CP). CLP is the second most common congenital birth defect[1].

Cleft lip

Failure in fusion of front onasal process with the maxillary process which results in to cleft of different area around the nasal floor, alveolus and the lip. Alveolus or palate involvement may be present together with unilateral or bilateral cleft lips. Affected people could exhibit other congenital defects and might belong to a genetic syndrome[1].

Cleft palate

Clefts of the soft or hard palate result from failure in the fusion of the palatal shelves of the maxillary processes. This usually occurs in prenatal period (early stages of embryonic life), when some involvement with develop Ment takes place, in those locations where the fusion of several facial processes failed to occur.

Cleft can occur alone, in combination with other congenital deformities including congenital heart disease, such as cleft lip with/ without palate, cleft palate alone, or both. The second most frequent congenital deformity in the US is cleft lip and palate. Around 7000 children with CL/P are born in the US each year overall. Beyond this, there is a significant impact of CL/P on socioeconomic and psychological conditions, as well as a reduction in quality of life. Due to social negligence, there is also a chance of suicidal thoughts[1].

Clefts of the lip and palate

Basic knowledge of embryo logical development and pattern of formation of lip and palate helps the clinicians to understand the reason behind the occurrence of clefts. A disruption in migration of neural crest cells/ palatal shelf movement in the embryo can result in a cleft, either it can be caused by an inherited condition or by environ mental condition. Specific genes that are active during early craniofacial development have contributed to the origins of CL/P, including transforming growth factor-alpha retinoic acid receptor; transforming growth factor beta; MSX[2]; and IRF6, the gene[3,4,5]. The risk of CL/P recurrence is also increased for affected individuals and their siblings when they have children. With each additional child born with a cleft, the risk of recurrence rises. Teratogens that have been associated with CL/P include cigarette smoke[6,7]; alcohol; certain drugs (e.g., Dilan tin, Valium, anticonvulsants, and corti costeroids)[8]; lead pollution[9]; viruses, including rubella and even influenza[10]; maternal nutritional deficiencies, including a lack of vitamin B-6[11]; and maternal obesity[12]. Because folic acid is crucial for the foetal and embryonic development of the neural tube, it was once believed that folic acid deficiency was a cause of orofacial clefts.

Types and classification of clefts

Various Types of Cleft Palate As Follows:

- Incomplete Cleft Palate
- Complete Cleft Palate
- Unilateral Complete Cleft Lip and Palate
- Bilateral Complete Cleft Lip and Palate

The striped Y for cleft classification developed by Kernahan. Primary and secondary palates are represented by the Y's upper arm and base, respectively. The lip is represented by the most anterior segment, the alveolus is represented by the middle segment, and the region between the alveolus and the incisive foramen is represented by the posterior segment. Additionally divided into sections to represent the areas of the velum and hard palate is the secondary palate (hard and soft palate). A visual representation of the type and extent of the cleft can be created by darkening the diagram segments that are affected by the cleft. The affected segments are marked with crosshatches if there is a submucous cleft.

Table 1: Oral anomalies

Facial structures		
Nose		
Nasal Abnormalities	Asymmetry Of the Nose and Reduced Projection of The Nasal Tip Affect Breathing and Resonance Function Overgrowth Of the Maxilla[13,14]. Choanal Stenosis Choanal Atresia	Medication Surgical Intervention
Maxilla		

Maxillary Retrusion	Small Upper Jaw Anterior Crossbite Class III Malocclusion Nasal Cavity to Be Relatively Small	Surgical Repair[15]
Oral cavity		
Lips		
Short Upper Lip	Deficient In Tissue Because Of The Basic Dysmorphology from The Cleft Lip Premaxilla Is Protrusive Asymmetry Of the Lip, And A Flattening of Cupid's Bow	Cleft Lip Repair
Mouth		
Macro stomia	Excessively Largemouth Opening Common With Hemifacial Microsomia Small Mouth Opening Can Be Congenital but Can Also Be Acquired Because Of Injuries Or Burns	
Tongue		
Macroglossia	Tongue Is Abnormally Large Open-Mouth Posture Excessive Drooling Anterior Open Bite	
Lobulated Tongue	Appear To Have Multiple Lobes, With Fissures Between Each Lobe Common In Oral–Facial–Digital (OFD) Syndrome	
Ankyloglossia	Referred To as Tongue-Tie Abnormal Restriction of Tongue-Tip Movement Usually, Congenital Also Occur After Radical Oral Surgery. The Person Cannot Elevate the Tongue Tip to The Alveolar Ridge with The Mouth Open The Person Cannot Protrude the Tongue Tip Past the Mandibular Incisors Protrusion Of Tongue Where the Tip of The Tongue Is Heart Shaped Associated with Midline Indentation	
Palate		
Palatal Arch Anomalies	Abnormalities In the Height, Width, And Configuration Crowding Of the Teeth	
Palatal Fistula	An Opening Between the Oral Surface of The Palate or Velum and The Nasal	

	Cavity Maxillary Advancement A Common Site for A Fistula Is at The Junction of The Hard and Soft Palate	
Nasolabial Fistula	An Opening in The Alveolus Sometimes Called an Intentional Fistula Slight Regurgitation of Food	Later Closed by An Alveolar Bone Graft When Permanent Teeth Begin to Erupt

Dental anomalies

It's normal for the incisors to overjet and overbite to a certain extent. However, when the amount exceeds the norms, it can affect both speech and aesthetics.

- Abnormal Incisors Relationships
- Overjet
- Overbite
- Under Jet
- Diastema
- Missing, Malposition Ed and Malformed Teeth
- Open Bite
- Cross Bite
- Protruding Premaxilla
- Skeletal Malocclusion

Feeding problems caused by clefts

Due to their inability to form an anterior lip seal, infants with cleft lips and palates typically struggle greatly with all aspects of feeding, inability due to the open palate, to compress the nipple, and failure to generate negative pressure suction[16]. Aside from the open nasopharynx significant liquid reflux through the nose and throat is also present. Breastfeeding is typically not an option for babies in this group. Only infants with cleft palates can successfully eat when assisted feeding techniques are used.

Orofacial examination

Tools for an intraoral examination: -

- Gloves: For the patient's and examiner's protection.
- Flashlight: Used for oral cavity illumination.
- Tongue Blades: Used to observe the velum and uvula by pressing the back of the tongue downward as necessary. Used to check the dentition and occlusion by separating the lips and cheeks from the teeth. (Children should consider flavoured tongue blades)
- Dental Mirror: When necessary, used as a tongue blade to press the back of the tongue down and inspect the velum and uvula. Additionally used for looking up into the pharynx or evaluating the palate for fistulas.
- Alcohol swabs or towelettes: Utilized to clean contaminated surfaces or instruments.
- Sanitizing Gel: used to sanitize hands, especially in the absence of soap and water.

Examination of the oral cavity

Important information on speech sound production can be discovered by a physical examination of the mor phology and function of the oral cavity. Instead of a cursory glance inside the mouth, the investigator should carefully examine every structure and see some of these structures in action. When performing an intraoral examination, the majority of healthcare providers urge the patient to open their mouth and say "Father". This vowel is useful for assessing the anterior oral structures, including the hard palate, because it causes the mandible to drop and, as a result, the anterior part of the tongue. The back of the tongue is raised and retracted during the production of this vowel, obstructing the view of the posterior portion of the oral cavity and pharynx. The posterior portion of the oral cavity, which includes the

velum, uvula's tip, tonsils, and pharynx, cannot actually be seen by the examiner due to the production of this vowel.

Surgical management

Cleft Lip Repair

Cheilorraphy technique is used for cleft lip repair, depending on unilateral or bilateral cleft.

Pre surgical Management Is Sometimes Necessary to Align the Lip and Maxillary Segments Prior To The Formal Lip Repair. Currently, There Are Two Primary Methods for Repairing the Unilateral Cleft Lip- The millard technique[17,18] and the Tennison Randall technique (or a modification thereof)[19,20,21,22].

The lip is repaired in three layers from the inside out with both techniques: mucosa, muscle, and skin. Due to the severity of the lip and nasal deformities, bilateral cleft lip repair is more difficult than unilateral cleft lip repair. The major methods of bilateral cleft lip repair include the modified Broadbent Manchester repair, the millard repair, and the mulliken repair[23,24]. The bilateral cleft surgery includes repairing the mucosa and muscle before applying the skin, much like with the unilateral cleft. Before the child was sent home once, the cleft lip repair was once performed shortly after birth. The majority of centres recommend delaying the lip repair until between 10 and 12 weeks of age, despite the fact that a few cleft palate centres are reintroducing the idea of repair during the first week of life.

Cleft Palate Repair

The goals of palate repair are to establish a normal velopharyngeal mechanism, minimize the occurrence of fistulas, and optimize facial growth[25]. There are several techniques for cleft palate repair. Mostly used techniques are-

- Von Langen beck
- War dill–Kilner V–Y Pushback
- Intravelar Veloplasty (IVVP)
- Furlow Z-Palatoplasty

Over the years, there has been debate on the ideal timing of cleft palate repair. While some surgeons have argued in favour of early palate repair during the first year, others have argued in favour of delaying the repair until the child is five years old. Unless there are serious airway problems caused by mandibular micrognathia as shown in the Pierre Robin sequence, the majority of centres now perform the palate repair between 9 and 12 months of age.

Prosthetic Management

If surgical correction is not possible or the patient does not want it, prosthetic management can be done either permanently or temporarily before the surgery. These gadgets enhance aesthetics while helping the patient with specific tasks like feeding and velopharyngeal closure.

Dental Appliances

Teeth replacement procedures come in a variety of forms. Dental segments are typically replaced with a fixed bridge, while complete dentures are used when every tooth in an arch need to be replaced. Overlay dentures are frequently used if some teeth must be retained but are not useful.

Facial Prostheses

A facial prosthesis is a very good option whenever there is a severe facial defect, especially one that cannot be significantly improved through surgery.

Feeding Obturators

The infant's unrepaired cleft palate is partially covered by the obturator. As a result, it prevents the tongue from resting inside the cleft and offers a solid surface to allow the tongue to compress the nipple and express the milk. Additionally, it aids in reducing liquid regurgitation into

the nose. The device does not obstruct the soft palate but occludes the hard palate.

Speech Appliances

Three types of speech appliances can be used to assist with speech production: a palatal obturator, a palatal lift, and a speech bulb obturator.

Speech Therapy

Speech therapy is effective in correcting misarticulations that lead to nasal emission or hypernasality. The following basic steps for correction are suggested:

- Determine the phonemes to target first
- In a session, get as many accurate sound productions as you can.
- Select anterior sounds before posterior sounds.
- Select continuant cognates before movement sounds.
- Prioritize nasal cognate placement for voiced plosives.
- Choose the voiceless sound in isolation before the voiced cognate (requires a vowel) for fricatives.
- Make sure the child is able to distinguish between the right and wrong sounds.
- Establish Placement of Production First.
- First, practise voiceless phonemes and continuants in isolation.
- Work on voiced plosives in syllables.
- Work on the sound in consonant-vowel (CV) syllables once placement has been attained.
- To change from the consonant to the vowel, use /H/.
- Begin with the sound in the initial word position
- Next, decide which position is easier: the medial or final position.
- For the medial position, break up the word into syllables.
- A medial sound's production can change based on its phonemic context.
- Break up the word when working on the final position.
- Combine the final word position with a word that starts with a vowel when working on it.
- work on novel sentences' sound.
- Change one feature at a time when changing to the next sound in a category.
- For consonant blends, divide the clusters into individual components
- A voiceless consonant that is usually present becomes voiced when /S/ is present.
- Work on carrier phrases' sound
- In a session, get as many accurate sound productions as you can.
- Focus on carryover while speaking unstructured Ly.
- Include the parents and other carers in the process, including babysitters.

The team approach

There are many qualified professionals who can care for patients with craniofacial anomalies both in the United States and around the world. However, patients with chronic needs, such as those with clefts or craniofacial conditions, do not benefit from independent care provided by a variety of professionals without inter disciplinary communication. This is because the treatment of one professional can have an effect on the treatment of the other professionals. In addition, the sequence of treatment from each discipline must be carefully planned for a variety of reasons. Finally, there is evidence to suggest that patients who do not receive team care are less likely to receive all the services they need[26]. Therefore, for maximum benefit, services to patients with clefts and craniofacial anomalies must be provided in a coordinated and integrated manner over a period of years[27,28].

Table 2: Advantages of Team Approach

Advantages of the Team Approach to Management of Care
Numerous specialists are available to patients who may do interdisciplinary exams and provide ongoing follow-up services.
Multiple professionals can evaluate the child in one visit, typically at a lower cost than individual evaluations, making care more efficient and cost-effective.
The whole child is cared for, not just one specific abnormality or functional disability.
The patient's overall medical, developmental, and psychological needs are taken into consideration when care is delivered in a coordinated and consistent manner.
The team members share in decision-making since they cooperate well and are aware of each other's specialties. Decisions are therefore based on more information than one professional could have independently gathered.
Better evaluation and treatment sequencing, better continuity of care, and better long-term treatment planning from infancy through adulthood are all present.
The team coordinator can help with follow-up appointments and function as the primary point of contact for the entire professional team.
Parent groups, specialised camps, pamphlets, and other educational materials are frequently provided by teams.
The team approach improves interprofessional communication, increasing each professional's knowledge.
Maintaining accurate serial records and gathering data for quality assurance, collaboration in research, and publication are all made possible by the team approach.
Every professional involved in the patient's care communicates frequently and regularly. By speeding up the collaboration process, this saves time for the providers.

Adapted from

Ann W. Kummer. Cleft Palate and Craniofacial **Conditions**

A Comprehensive Guide to Clinical Management. Fourth edition; 2020

Conclusion

Children with clefts or other craniofacial anomalies are more likely to have dental and occlusal problems. Inter disciplinary communication and coordination will aid in determining the best course of treatment to achieve the best results in aesthetics, mastication, and speech.

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