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Review Article

Oral clefts - dental development anomaly

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ABSTRACT

Cleft lip and palate are dental development anomalies. They are common and they should be studied by the clinicians.
To study about cleft lip and palate and know about their details in patients so as to treat them well. It is known that clefts occur as dental development anomalies. These need to be diagnosed, examined, treated successfully. When clinicians take this issue as serious, only then the patients will be benefitted.
This anomaly is well known to all. Awareness and knowledge both in patients and clinicians is needed. This is a team approach. Also it requires skills on part of the clinician. Investigations, if done timely, can do miracles for this problem.

1. Introduction

Various anomalies prevail in head and neck region. Some are specifically important for dental branch. These are of significance for society and the doctors. Some dental development anomalies need special attention, oral clefts is one of these. Cleft lip and palate are common and these should be studied by the clinicians. Cleft lip- is 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).[1] It results from abnormal development of the median nasal and maxillary process.[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.[3] It results from a failure of fusion of the two palatine processes.[2] Clefts arise during the 4^{th} developmental stage and is known by locations at which fusion of various facial processes failed to occur, this is affected by the time in embryologic life when some interference with development occurred.[4]

Both are the severest congenital anomalies affecting the mouth and related structures. Also cleft lip and palate are the appropriate terms than a cleft.[3,5,6] Cleft lip and palate are also associated features in over 300 recognised syndromes.[7] Some beliefs unsupported by science (eg. Superstitious beliefs) do exist about these anomalies and among these the scientific casual beliefs are the commonest ones endorsed.[8] For eg. It results from past sins, witchcraft, God's will and casual power when pregnant woman sees a facially deformed child.

2. Discussion

Cleft types are distributed[7] as cleft lip alone 15%, cleft lip and 45%, isolated cleft palate 40%. Treatment of these is complex with interdisciplinary and multidisciplinary approach.[9] Also it has to be done at right time and at right age for functions and esthetics. Different branches of dental-oral maxillofacial surgery, orthodontics, prosthodontics, otolaryngology, genetics/dysmorphology, speech/language

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pathology, and others successfully reconstruct this issue by multiple phase of surgical intervention.[10,11] Cleft lip and palate occurs more frequent and more severe in boys than in girls. Cleft palate is seen more frequently in females than in males. Overall incidence of orofacial clefting is around 1.5 per 1000 live birth (about 220,000 new cases per year) with variations based on geographic areas, ethnic group and nature of cleft itself.[12] Also its incidence is high among Asians (0.82-4.04 per live births).[13]

In the critical period of embryonic confront, cleft lip and palate occurs in embryology. Cleft lip is due to the failed mix between 4^{th} and 6^{th} months of pregnancy, whereas cleft palate occurs between the 6^{th} and 12^{th} months of pregnancy.[14]

2.1. Causes

Non genetic(cleft not with a cause or malformation for the disorders).[15] Genetic (syndromic- van der woude, pierre robin syndrome).

Van der woude syndrome VWS is a rare autosomal dominant developmental disorder, usually associated with lower lip pit(s) and cleft lip and palate.[16] Pierre Robin syndrome (PRS)also called as Pierre Robin sequence,[17] is congenital condition with cleft palate, retrognathia and glossoptosis.Non genetic factors- some environmental factors included[18] are: smoking, alcohol use, others-included are maternal diseases, stress during pregnancy chemical exposure, less blood supply in nasomaxillary region, more maternal, paternal age for cleft lip and more parental age for cleft palate only, also any fetal exposure to retinoid drugs causes severe craniofacial anomalies.[15,16,19,20] Monozygomatic twins (60%) are more genetically seen in cleft lip and palate cases. It is seen that syndromic form of cleft lip and palate, follows classic Mendelian inheritance pattern. Also in non-syndromic form, many genes have been identifies for clefting.[15,21,22]

2.2. Types

1. Cleft lip- central, lateral, complete/incomplete, simple or compound.[2]
2. Cleft palate- complete, incomplete.[2]

2.3. Clinical features

Some physical, dental and behavioral/emotional needs of a child with an oral cleft are[23,24]

2.4. Functional effect

1. Cleft lip: Some difficulty in bottle feeding and in speech (disarticulation).[2,25]
2. Cleft palate: It interferes with swallowing, unable to pronounce the consonant sounds as B,D,K,P,T. In teeth, upper lateral incisors may be small/absent. The maxilla is smaller and crowded teeth are present. In nose, oral organisms contaminate the upper respiratory mucous membrane through cleft palate. In ear, even with repair, acute and chronic otitis media and hearing problems occur.[2,26]

This cleft lip and palate shows variation across geographic regions and ethnic groups and has significant medical, psychological, social and economic ramifications.[27]

Birth defects cause problems and for this, there are some strategies:

1. Family planning, genetic counseling, prenatal diagnosis
2. Education for couples to reduce maternal exposure to risk factors as tobacco, alcohol and teratogenic medications
3. Intake of folic acid
4. Medical and surgical care for the infants. Also some commitment and national leadership for birth defects and infant mortality.[28,29]

2.5. Dental problems in cleft lip and palate

Natal, neonatal teeth, microdontia, taurodontism, ectopic eruption and enamel hypoplasia.[30–32] Delayed tooth maturation occurs, modifies odontogenesis and cause abnormalities of the dental lamina.[33]

2.6. Treatment of cleft lip and palate

The team is of the dental specialities (orthodontics, oral surgery, pediatric dentistry, and prosthodontics), the medical specialities (genetics, otolaryngology, pediatrics, plastic surgery and psychiatry), and allied healthcare fields (audiology, nursing, psychology, social work and speech pathology).[34] In cleft palate babies, feeding advice is given[2] as babies are not able to suck mother's milk. For this, baby's head is elevated by 45° and swallowed air is released during feeding frequently by burping.[2] Rule of 10 is followed which is-. HB>10 g%, age 10 weeks, weight>10 lb(4.5kg), TC <10,000/mm3.

2.7. Types of cleft lip repair[35–39]

1. Unilateral: Cleft lip repair by Millard rotation advancement flap and Tennison flap.
2. Bilateral: In stage (single or multiple) at 3-6 months interval.
3. Palate repair: Mucoperiosteal flaps, v-y pushback palatoplasty.

2.8. Surgery treatment[4]

A team approach has decreased deformities that affect quality of speech. Surgeons are doing intravelar veloplasty vs a 2 flap palatoplasty with double opposing 2- plasty

to get levator muscular repositioning. For severe maxillary retrusion, in cleft lip and palate patients, maxillary distraction is used. The team approach of plastic surgeon, speech therapist, orthodontist, pediatric, ENT and dental is required for patients with cleft lip and palate. NAM 36 nasoalveolar molding benefits cleft lip and palate children as skeletal facial growth is unaltered. Also it leads to improved surgical outcomes, less load of care on the caregivers, less need for revision surgery and overall less cost of care both to the society and the patient. Recently robotic cleft surgery is advantageous to surgeons and patients but economic challenges and high costs have to be reduced.[39]

3. Conclusion

Education of parents is must and the morale, mental, psychological status of cleft lip and palate patients is to be maintained. By team approach, it is possible. Cleft lip and palate is treatable if done at right time by right clinician.

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5. Conflict of Interest

None.

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