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Research Article

Incisal abnormalities in children with Unilateral cleft lip and palate

Dr. Amarshree Shetty[1*], Prof. Dr Kavitha Rai[2], Prof. Dr Amitha M Hegde[3]
[1]Reader & PhD Scholar, Department of Pedodontics & Preventive Dentistry, A.B Shetty Memorial Institute of Dental Sciences, Mangalore-575018.
[2]PhD guide, Nitte University, Mangalore-575018
[3]H.O.D, Department of Pedodontics & Preventive Dentistry, A.B Shetty Memorial Institute of Dental Sciences, Mangalore-575018

Corresponding author
Dr. Amarshree Shetty
E-mail: dramarshreeshetty@gmail.com

Abstract: Cleft genes produce disturbances in many body tissues and therefore also affect the dental lamina leading to Dental anomalies, a complication for the treatment planning of cleft patients which has been proposed to occur more frequently than in healthy patients..A high incidence of dental anomalies in the anterior maxillary region has been noted by various investigators, mainly at the level of lateral incisor both in deciduous and the permanent dentition. The purpose of this study was to evaluate the incidence of incisal abnormalities in cleft lip and palate patients. This study was carried out on 113 untreated unilateral cleft lip and palate patients of which 62 were males and 51 females. The included samples consisted of 113 dental casts of unilateral cleft lip and palate subjects ranging in age from 7 to 12 years. The examination of the diagnostic casts showed incisal abnormalities in the maxillary arch like Missing lateral incisors (12 & 22),Rotated lateral incisors (12 & 22),Rotated central incisors (11 & 21) and Combination of the above.The result of this study revealed higher percentage of absence of left lateral incisors (48.7%) ,rotated right lateral inciosrs(22.1%), missing right lateral incisors (21.2%) and rotated right central incisors (18.6%).Hence The study group consisting children with unilateral cleft lip and palate showed predominance of clefts on left side with laterals incisors being the tooth most affected..
Keywords: dental lamina , Cleft genes, lateral incisors, unilateral cleft lip

INTRODUCTION

Cleft genes produce disturbances in many body tissues and therefore also affect the dental lamina [1] leading to Dental anomalies, a complication for the treatment planning of cleft patients which has been proposed to occur more frequently than in healthy patients [2,3,4].These patients tend to demonstrate different types of abnormal dental conditions such as developmentally missing teeth, ectopic eruption, supernumerary teeth, fused teeth and taurodontism[5,6,7].A high incidence of dental anomalies in the anterior maxillary region has been noted by various investigators, mainly at the level of lateral incisor both in deciduous and the permanent dentition.[8]. It has been proposed that the reason behind this is the severe impairment of the embryonic structures during the early phase of dental development in cases of cleft lip and/or palate. The purpose of this study was to evaluate the incidence of incisal abnormalities in cleft lip and palate patients.

MATERIAL AND METHODS

This study was carried out on 113 untreated unilateral cleft lip and palate patients of which 62 were males and 51 females, who reported to the department of Pedodontics and preventive dentistry of A.B. Shetty Memorial institute of dental sciences and the Nitte Meenakshi Cranio-maxillofacial centre, both constituents of Nitte University, for surgical correction and dental treatment. The included samples consisted of 113 dental casts of unilateral cleft lip and palate subjects ranging in age from 7 to 12 years. Diagnostic casts were prepared by taking impressions of these patients. The impressions were made by placing a layer of gauze or wax sheet over the alginate loaded tray, in order to prevent the alginate flowing into the cleft defect [9].

On the examination of the diagnostic casts the following incisal abnormalities in the maxillary arch were noted.

- Missing lateral incisors (12 & 22)
- Rotated lateral incisors (12 & 22)
- Rotated central incisors (11 & 21)
- Combination of the above

The data gathered was subjected to statistical analysis using chi- square test.

RESULTS

The study was completed on 113 subjects of unilateral cleft lip and palate of which 62 were males and 51 females, to study the prevalence of incisal abnormalities. Based on the evidence, unilateral cleft lip and palate, predominance was found to be more on the left side of the arch (64%) than that of the right side (49%), with the maxillary left lateral incisor being the

tooth to be affected the most. On examination of diagnostic casts combination of clinical absence and rotation of incisors were observed and tabulated in Table 1.

Table 1: Diagnostic Casts Combination of Clinical Absence And Rotation Of Incisors

CLEFT SIDE				
Incisal abnormalities	Left		Right	
	Frequency	Percentage %	Frequency	Percentage %
Missing 22	55	48.7		
Rotated 22	9	7.9		
Missing 21	-	-		
Rotated 21	10	8.8		
Missing 12	-	-	24	21.2
Rotated 12	-	-	25	22.1
Missing 11	-	-	-	-
Rotated 11	-	-	21	18.6

The result of this study revealed higher percentage of absence of left lateral incisors (48.7%), rotated right lateral incisors (22.1%), missing right lateral incisors (21.2%) and rotated right central incisors (18.6%). Clefting present on the right and left side showed absence of lateral incisors associated with rotated central incisors, but is not statistically significant given in table 2.

Table 2: Clefting present on the right and left side showed absence of lateral incisors associated with rotated central incisors

	Frequency	Percent%
Missing 12& Rotated 11	5	4.4
Missing 22& Rotated 11	6	5.3
Missing 22&Rotated 21	7	6.2
Rotated 12 & Rotated 11	10	8.8
Rotated 22& Rotated 21	3	2.7

On examination it was noted that missing lateral incisors was associated with rotation of contralateral central incisor (5.3%), a significant clinical finding seen in patients with unilateral clefts on the left side. A combination of rotated centrals and laterals was found to be much more predominant on the right side (8.8%) than that of the left side being minimal (2.7%).

DISCUSSION

Clinically, dental anomalies are common findings in children with clefts of the lip and palate. The formation of the tooth germs and the occurrence of cleft lip and /or palate defects have a close relationship in terms of timing and anatomical position. The odontogenic epithelium over the premaxillary area is identified in the fifth embryonic week, while the cleft lip and/or palate anomalies are assumed to occur during the fourth to seventh week period. The fusion of the frontonasal and the maxillary process is complete by the 38^{th} week during which specific odontogenic growth centers for primary central incisors and their permanent successors become evident [10].

High prevalence of tooth agenesis in the region of the cleft signifies its role; the maxillary lateral incisor being affected the most [6, 11-16].The absence of fusion between the maxillary and medial nasal processes, possibly due to the deficiency of mesenchymal mass, could result in the cleft lip, cleft palate, or both, and it is probable that the lateral incisor odontogenic potential comes from both these regions [17]. The results of our current study have confirmed that the permanent maxillary lateral incisor is the tooth most frequently missing in the cleft area.

Dewinter *et al.* (2003)[16] has previously stated that for patients with a UCLP, the left side is more affected than the right side (ratio 2:1) which is in agreement with the findings of the current study. It has been stated that during the early stages of development the right side of the embryo's head receives a greater supply of blood from the right internal carotid artery in comparison to the left side leading to predominance of clefts in the left side [18].The central incisors adjacent to the cleft may be missing, rotated or hypoplastic[2,19-20].They may be severely deviated from the perceived normal inclination[21]. In the present study, right and left sided

clefts showed absence of lateral incisors associated with rotated central incisors. The rotation of the central incisors (11 & 21) was seen in 18.6% & 8.8% of the selected cases. On further examination it was also noted that missing lateral incisors was associated with rotation of central incisors of the same side and the contralateral side (5.3%), a significant clinical finding seen in patients with left sided clefts, which was not seen in cases of clefts involving the right side. The rotation of the central incisors is said to be due to the lack of space at the end of the alveolar segment, with other factors representing the sequence of malformation [22].

The current study has also highlighted the combination of rotated centrals and laterals seen more predominant on the right side (8.8%) than that of the left side being minimal (2.7%). Previous clinical studies have a highlighted the presence missing teeth on the opposite side of the unilateral clefts, proposing of unsuccessful bilateral clefts to be the possible cause for the same[23]. However the present study noted the presence of rotated rather than missing teeth on the opposide side of the clefts.

Seung-Hak Baek in 2000[24] compared the frequency of congenital missing teeth between male and female cleft patients and concluded that the prevalence of missing lateral incisor was high in the male population suggesting a dominant male tendency.. But the present study has failed to show any statistically significant differences between boys and girls. This finding correlates with the findings of Dermijian (1973) [25] who stated that the cleft plays an important etiological role with the occurrence of dental anomalies and that the mechanisms controlling the dental development are independent of sexual maturity.

CONCLUSION

The study group consisting children with unilateral cleft lip and palate showed predominance of clefts on left side with laterals incisors being the tooth most affected. The clinical absence observed of lateral incisors along with rotated central incisors in the left sided clefts is suggestive of the impact of clefts in lateral incisor region is understandable; however predominance of rotation that was noted in right sided clefts requires further investigations.

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