

A DESCRIPTIVE CROSS-SECTIONAL SURVEY OF INHERENTLY MISSING PERMANENT DENTITION IN PATIENTS HAVING CLEFT LIP & PALATE

Wasim Ijaz¹, Hasan Ali Raza², Syed Suleman Shah², Ghulam Rasool², Nabbiya Noor¹, Asifa Zubair¹

¹Department of Dentistry, Ayub Medical College, Abbottabad.

²Department of Orthodontic, Khyber College of Dentistry, Peshawar

ABSTRACT

Objective: Therefore, the basic aim of this study is to look into the differences in the pattern of congenitally missing teeth on basis of type of teeth involved (upper permanent lateral incisor [MLI] and upper second premolar [MSP]) among males and females in patients with cleft lip and palate [CLP] visiting the Department of Orthodontics at Khyber College of Dentistry, Peshawar.

Materials and Methods: Data from clinical, radiographic & cast analysis of 50 patients with cleft defect (aged 6-15 years) was utilized in this study. Frequencies and percentages of missing MLIs and missing MSPs were calculated. The two teeth in question i.e MLI and MSP were compared via Pearson Chi-Square test on basis of gender. $P < 0.05$ was considered significant. The entire data was interpreted in tabular form.

Results: From the 50 patients having CLP defect, MLIs were found to be missing in 68.0% cases, 46.0% had absent MSPs and 33.30% were found to have both MLIs and MSPs missing. High proportion of males had congenitally absent teeth as compared to females. Boys had a higher ratio of congenitally absent MLIs and MSPs than girls. Outcome of the study showed gender predominance of congenitally absent MLIs & MSPs.

Conclusion: These upshots imply that maxillary lateral incisor is the frequently absent tooth in patients with cleft deformity succeeded by maxillary 2nd premolar and this pattern of congenitally missing teeth might be influenced by the gender.

Keywords: Congenitally absent; Permanent Maxillary lateral incisor; Maxillary second premolar; Cleft Lip and Palate.

INTRODUCTION

Cleft defect in lip & palate is a frequently occurring inherent disorder. Even not life threatening unless accompanied by other grave diseases occurring congenitally, this is considered a significant public health issue worldwide as it is associated with proficient deal of clubbable stigma along with intellectual and functional disability.¹

Different tooth anomalies, specifically agenesis

of teeth i-e hypodontia, has a quite high incidence in certain clusters. Aforementioned abnormalities have been commonly seen in infants who suffer from cleft lip, palate or their combination.²⁻³

To a great extent hypodontia (tooth agenesis) is genetically influenced and passed on by autosomal dominant pattern of inheritance, with deficient penetrance & variation in expression.^{4,5} Howbeit, the etiology of this deformity is also contributed by some of environmental factors.^{6,7} MSX1 (homeobox gene) mutation has been reported as a causative agent of inherited selective agenesis of the 2nd premolar & the 3rd molar.⁸

Correspondence:

Dr. Wasim Ijaz

Assistant Professor Orthodontics Dentistry Department,
Ayub Medical College, Abbottabad.

Email: drwasimijazrahmat@gmail.com

Contact: +923338585006

Absence of teeth might be a sporadic finding or can be a symptom of different syndromes. Almost all clefts are mostly associated with congenitally missing teeth. The frequent most missing teeth in patients suffering from clefts (excluding the wisdom teeth) are the upper permanent lateral incisors inside the cleft vicinity and upper and lower 2nd premolars beyond the cleft vicinity.^{11,15,16} Missing teeth have also been reported in general population. However, the proportion of congenitally absent teeth in patients with CLP is markedly high.¹⁷

A study conducted by Bohn on the cleft area revealed the 45.50% prevalence of tooth absence.⁹ Another study conducted by Shapira showed the incidence of 74.0% for absent upper lateral incisor & 18.0% for 2nd premolar among patients with cleft in lip, palate or their combination.¹⁸

Prevalence of hypodontia as reported by Shapira et al was 77.0% (excluding wisdom teeth) for the cleft sample altogether. Non-cleft population has been reported with much lower incidence of hypodontia both via statistical and clinical analysis than that of cleft population, and significantly high than other studies conducted on children with clefts. The most common teeth missing in the vicinity of cleft were upper permanent lateral incisor succeeded by the upper & lower 2nd premolar irrespective of genders. The teeth most frequently absent on the non-affected region were upper 2nd premolars succeeded by upper lateral incisors & lower 2nd premolars. Absence of aforementioned teeth is seen more frequently on the left side as in the case of cleft defect which is more common on left side too.

Different ethnic groups and cleft types had different occurrence of congenitally absent permanent teeth (excluding wisdom teeth). Since study on local population of KPK, Pakistan in children with CLP has not been conducted; therefore the sole objective of this research was to evaluate the prevalence and to discriminate the various hypodontia patterns related to permanent teeth in CLP patients with no accompanying syndrome.

MATERIALS AND METHODS

This descriptive cross-sectional study was carried out at the Department of Orthodontics, Khyber College of Dentistry, Peshawar, Pakistan from January 2014-March 2015. A sample of 50 cases

was included in the study by convenient sampling technique. Thorough clinical, radiographic and cast based analysis & examination for absent permanent teeth (excluding wisdom teeth) was carried out. Sampling was done according to the following criteria. Pakistani nationals assessed on the basis of parent's NIC between the ages of 6 to 15 years of both genders having cleft defect of lip and palate were made part of this research.

Participants who fell in the following criteria were excluded from the sample i.e those who had clefts as part of a craniofacial syndrome, those with diagnostic records having low quality, children under 6 years of age and finally who had extractions done due to gross tooth damage or previous orthodontic treatment were exempted from this research.

No known syndromes were found in any of the participant. 10.5 years was considered as mean age (range 6-15 years). The estimated calcification age of tooth buds of MLI & MSP is 10-12 months & 3 years respectively after birth. Complete crown calcification of MLI & MSP is achieved at 4-5 years & 6.2 years respectively postnatally. Since, the most juvenile patient in this survey aged 6 years, therefore it was possible to evaluate the presence or absence of MLI & MSP via radiograph.

SPSS software version 19.0 was used for analyzing data. Frequencies and percentages of missing MLI's and missing MSP's were calculated. Pearson chi square test was implicated for comparison of MLI and MSP between genders. P<0.05 was considered significant. All data was interpreted in form of tables (I-III) & Figures (1 & 2)

RESULTS

Out of total sample (50 CLP patients), MLIs were found to be absent in 68.0% of the participants while 46.0% were found with missing MSPs & 26.0% had combination of missing aforementioned teeth.

DISCUSSION

In children suffering from clefts, the most commonly absent tooth is MLI succeeded by maxillary second premolar & mandibular 2nd premolar.¹⁶ The current survey also showed 68.0%, 46.0% & 26.0% missing MLI, MSP & combination of missing MLI & MSP respectively. In the normal populations, MLI is the most frequently missing tooth when only one

Table: 1 Frequency of Missing Maxillary Lateral Incisor in CLP Patients

	Frequency	Percent
YES	34	68.0
NO	16	32.0
Total	50	100.0

Table: 2 Frequency of Missing Maxillary Second Premolar In CLP Patients

	Frequency	Percent
YES	23	46.0
NO	27	54.0
Total	50	100.0

Table: 3 Frequency of Missing Maxillary Lateral Incisor and Missing Maxillary Second Premolar In CLP Patients

	Frequency	Percent
YES	13	26.0
NO	37	74.0
Total	50	100.0

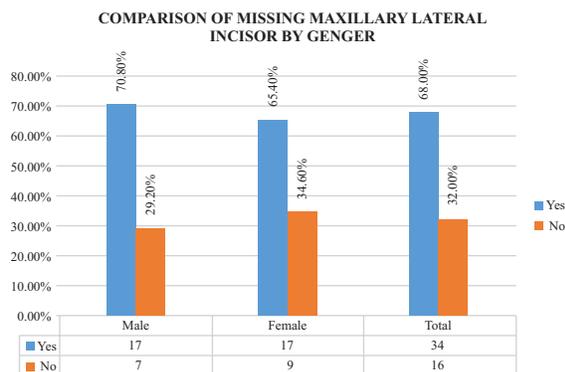


Fig 1:

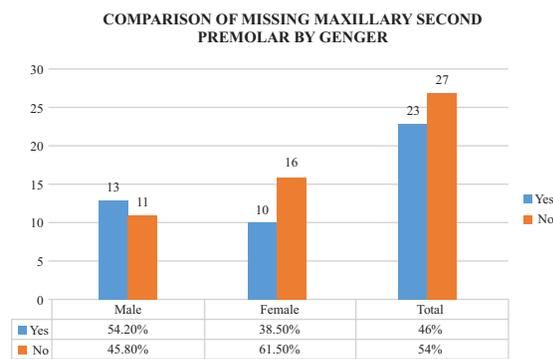


Fig 2:

or two teeth are missing, excluding the third molars whereas when more than two teeth are missing, the MSP becomes the more commonly missing tooth. According to Muller TP et al¹⁹ among white and African American 521 children of age 11-15 years among whom permanent teeth were inherently absent. Combinations of inherently missing teeth were studied on the basis of incidence & frequency. A summative of 3.49% incidence was reported. MLI was the most commonly absent tooth involved in various patterns of inherently absent teeth.

The proportion of inherently absent teeth beyond the vicinity of cleft area, in decreasing order of weightiness, was 7.5%-32.3% for the maxillary second premolar, 3.1%-10.4% for the upper lateral incisor on the non-affected area, and 0.4% -10.8% for the lower 2nd premolar.²⁰ Howbeit compared to the normal population, the proportion of the inherently absence of both type of teeth is significantly altitudinous i-e 2.2% for upper MLI and 3.4% to 6.6% for absent MSP has been narrated.²¹ The high occurrence of missing teeth in patients with cleft defect might be attributed not only to genetic influences (directly influencing missing teeth) but also to the factors resulting in cleft defect itself.²² This implicates that the common etiological reasons might be accounted for causing cleft deformity & teeth missing in the affecting patients.²³ The inherently missing MLIs are closely linked with other tooth changes i-e in size & number of teeth.²⁴ The 2nd premolar exhibits marked holdup in development & eruption when the upper lateral incisor is found in the cleft area along with an abnormality in its size & shape.^{25,26} Divergence from conventional size & form of MLI (peg-shaped/small) on the opposite side & holdup in emergence of the 2nd premolar as conformed by most of the cases, indicating a mild presence of hypodontia.²⁷⁻²⁹ Girls had low proportion of inherently missing MLIs & MSPs than boys. Kim and Baek³⁰ reported similar findings. The objective of their survey was to investigate the number of inherently missing deformed MLIs, the disparity in the presence of cleft sidedness & occurrence of supplemental teeth in patients from Korea with UCLA (unilateral cleft lip & alveolus) & those with UCLP (unilateral cleft lip & palate. By using charts, radiographs, casts & intra oral photographs, 75 patients with UCLA & 129 patients with UCLP aged 6-13 years were studied. A male predominant propensity was seen in both UCLP (P<0.001) &

UCLA ($P < 0.05$) patients. The prevalence of cleft in UCLP patients is 1.3 times greater on the left side & 2.2 times more inherently absent MLI than did the UCLP patients. The study conducted by Ranta showed that inherently absent MLI was less common in males than females but these results were not statistically significant.²⁰ However, in the present survey, the gender- predominant patterns of the inherently missing MLIs & MSPs were not statistically significant.

CONCLUSION

The upshots of this study reveal that upper permanent lateral incisors are the most commonly absent teeth in the cleft vicinity succeeded closely by the upper & lower 2nd premolars and gender may have a role in the pattern of congenital absence on basis of kind of tooth involved.

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