

Assessing Angle's malocclusion among cleft lip and/or palate patients in Jammu

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Abstract

Objective: The study was conducted to examine the patients with abnormalities of cleft lip and/or palate and its association with different types of malocclusion. **Materials and Methods:** This descriptive study was done among 168 patients with abnormalities of cleft lip and/or palate. Angle's classification of malocclusion was applied for assessment of occlusion as Class I, Class II, and Class III. The types of oral clefts classification such as cleft lip unilateral and cleft lip bilateral, cleft palate (CP), unilateral cleft lip with palate (UCLP) and bilateral cleft lip with palate (BCLP) was considered. Chi-square test was applied to analyze the data at $P < 0.05$. **Results:** The study showed different categories of clefts patients as cleft lip (81), CP (31), and both cleft lip and palate (53). The occurrence of unilateral cleft lip (44) was maximum among the sample followed by UCLP (39), and bilateral cleft lip (31). Maximum subjects with Class II (10.7%) and Class III (4.9%) malocclusion were seen with unilateral cleft lip deformities. None of the patients with UCLP had Class III malocclusion. **Conclusion:** Cleft lip was the most commonly observed deformity and high frequency of Class II and III malocclusion was evident. Therefore, patients with such abnormalities should be screened timely.

Key words: Cleft lip, cleft palate, malocclusion

INTRODUCTION

Patients with deformities may be physically, socially, or mentally challenged and comprise more marked oral health-related problems, either because of their authentic disability or because of associated medical conditions.^[1] The incorporation of individuals with oral cleft problems into civilization needs an interdisciplinary approach.^[2]

The occurrence of cleft lip and/or palate (CLP) is most frequent congenital defect, next to osteomuscular and nervous system anomalies.^[3] Its incidence has been mentioned as 0.18 per 1000 live births around the world.^[4] The World Health Organization (WHO, 1997) reported that CLP is a major dental health issue as it affects psychologically, esthetically, and functionally.

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Infect, in India alone, a child is born with a cleft after every 2 min.^[5]

Children with CLP face clinical problems which include delayed eruption of teeth, attrition, occlusal interference, intrusion with tongue leading to obscurity in mastication, temporomandibular joint dysfunction, periodontal problems and increased susceptibility to dental caries. In spite of this, these patients and their parents give more significance only to the surgical correction of clefts abnormalities and ignore the other oral health problems including functional disorder such as malocclusion.^[6,7]

Malocclusion is irregularity which leads to disfigurement hampering the function of teeth, and this disfigurement or imperfection is likely to be an impediment to the patient's physical or emotional comfort.^[8] Malocclusion compromises the health of oral cavity and also can lead to social problems to affected patients.^[9] It is the second commonest dental disease in patients after caries.^[10]

Orthodontic problems have been correlated with psychosocial distress, deprived periodontal conditions, and weak masticatory functions.^[11] There is also evidence that certain features such as overbite, unprotected incisors, and impacted teeth may negatively affect the prolonged existence of dentition.^[12]

Malocclusions and cleft abnormalities have been described in many books.^[3,8] However, there are few studies that have associated malocclusions with oral clefts.^[13,14] Sakamoto *et al.*, in 2008 rated 8.6% crossbites in CLP cases and Vallino *et al.* observed prevalence of malocclusions in 62% children with oral clefts.^[14] Baek *et al.* reported occurrence of malocclusion in 76.3% and 42.1% patients with a trans-foramen incisor cleft and preforamen incisor cleft, respectively.^[15] Therefore, it is expected that these patients having different types of oral clefts present differences in the malocclusions. Thus, this present study aimed to evaluate the type of malocclusions in patients with CLP.

MATERIALS AND METHODS

The present cross-sectional investigation was carried out during April 2014 to September 2015 at a Dental Institute in Jammu, India. The sample was collected from different hospitals in the city using multistage random sampling. A total of around 200 patients with abnormalities of cleft lip and/or palate were observed and out of which 168 finalized according to the study criteria. The subjects who have been treated and undergoing management of cleft lip and/or palate with

complete permanent dentition only were included in this study and the patients undergoing orthodontic treatment were excluded from the study.

Official permission to conduct the survey was obtained from the Institute and an informed consent was taken from the participants.

The demographic details of the subjects including age, sex, type of the cleft lip and/or palate were recorded. The age of patients ranged from 13 to 18 years. The total number of male participants was 77 and females were 91. Clinical examination was done by an expert examiner of from the Orthodontic Department according to the classification of malocclusion given by Angle and the relationship between the first permanent maxillary and mandibular molar was considered as Class I, Class II (division 1 and 2), and Class III.^[16] The intra-examiner as well as inter-examiner reliability of the examiners was done. To assess the occlusion level, impressions were taken with alginate (Manufacturer Exporters, Gurgaon) and each study subject was asked to bite a wax (Shiva Products, Vasai) to set up occlusion and plaster casts were fabricated.^[15] These casts were examined in the clinic to acquire malocclusion measurements.

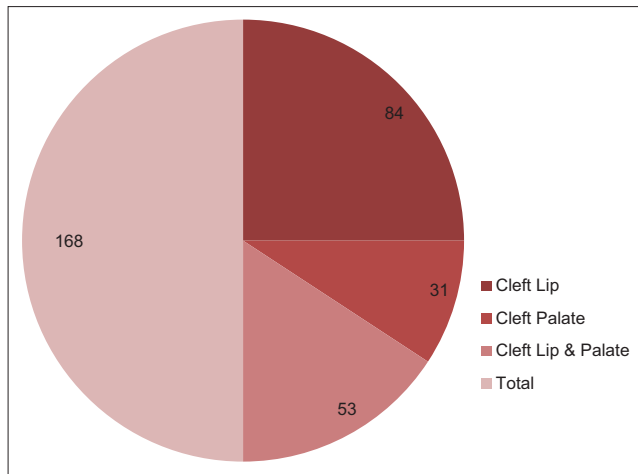
Information was obtained regarding the types of oral clefts from the patient's records or by examination. Different types of clefts were noticed such as cleft lip unilateral and Cleft lip bilateral, cleft palate (CP), unilateral cleft lip with palate (UCLP) and bilateral cleft lip with palate (BCLP).

Data analysis

The data was collected and analyzed by SPSS 16.0 software (SPSS, Chicago, IL, USA). Chi-square test was applied to analyze the statistics. The level of significance in this analysis was set at $P < 0.05$.

RESULTS

The total number of subjects with cleft lip and/or palate was 168, which was further assorted into different types as cleft lip (84), CP (31) and cleft lip and palate (53) patients as mentioned in Graph 1. The occurrence of unilateral cleft lip (44) was maximum among the sample followed by UCLP (39), and bilateral cleft lip (31). However, the prevalence of bilateral CP was minimum (15), as referred in Graph 2. Further, the graph elaborates the relationship of the type of cleft with gender, wherein boys were observed having higher frequency of unilateral cleft lip (25), bilateral CP (8),



Graph 1: Different types of clefts

and unilateral CLP (22) and girls showed higher values in rest of the cleft lip and/or palate aberrations.

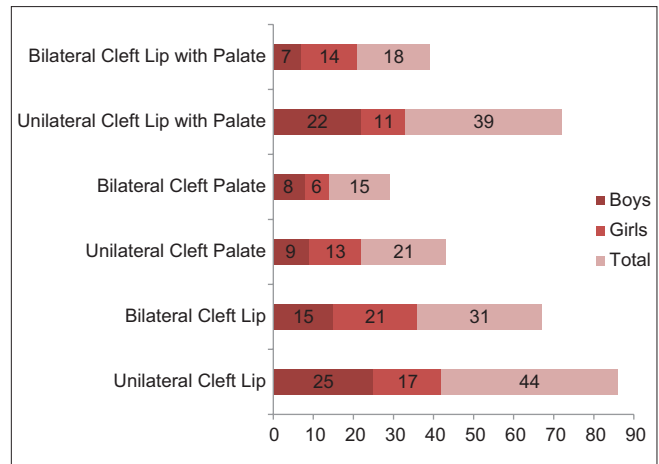
The data revealed Angle's Class I malocclusion among 65.4% of the subjects followed by Class II (25.0%) and Class III (9.6%) as shown in Table 1. The type of malocclusion was also correlated with gender and mostly girls were found with more number of malocclusions of Angle's classification as mentioned in Table 2.

When category of cleft lip and/or palate abnormalities were related to Angle's classification of malocclusion, maximum cases of Class II (10.7%) and Class III (4.9%) malocclusion were seen with unilateral cleft lip conditions. Bilateral cleft lip and unilateral CLP showed 7.1% and 3.0% patients of Class II malocclusion, respectively. Least subjects with Angle's Class I (3.6%) and Class II (0.6%) malocclusion were observed in bilateral CLP deformity, and none of the patient with unilateral CLP had Class III malocclusion cases illustrated in Table 3.

DISCUSSION

Clefts are frequent birth defects and are mainly accompanied by a variety of malformations, such as disturbances in facial appearance along with skeletal disorders that includes malocclusions.^[17] Oral clefts mainly comprise lips, alveolar arches, and hard and soft palate.

In this study, the ratio of cleft lip: CP: Cleft lip palate was observed as 84:31:53. However Fogh-Andersen reported it as 1:1:2.^[18] and Jensen *et al.*, as 34:39:27.^[19] A wide variation has also been reported among Koreans.^[20,21]



Graph 2: Cleft lip and/or palate deformities according to gender

Table 1: Prevalence of Angle's malocclusion classification according to age

Age (years)	Angle's malocclusion classification (%)			Total	Significant
	Class I	Class II	Class III		
13-14	35 (20.8)	9 (5.4)	8 (4.8)	52 (31.0)	0.05*
15-16	28 (16.7)	18 (10.7)	8 (4.8)	54 (32.1)	
17-18	47 (28.0)	15 (8.9)	0 (0)	62 (36.9)	
Total	110 (65.4)	42 (25.0)	16 (9.6)	168 (100.0)	

*Significant

Table 2: Prevalence of Angle's malocclusion classification according to gender

Sex	Angle's malocclusion classification (%)			Total	Significant
	Class I	Class II	Class III		
Boys	54 (32.1)	19 (11.3)	4 (0.4)	77 (45.8)	0.050*
Girls	56 (33.4)	23 (13.7)	12 (7.1)	91 (54.2)	
Total	110 (65.5)	42 (25.0)	16 (9.5)	100.0	

*Significant

Table 3: Association of cleft lip and/or palate deformities with types of malocclusion

Types of cleft lip and/or palate	Angle's malocclusion classification (%)		
	Class I	Class II	Class III
Unilateral cleft lip	42 (25.0)	18 (10.7)	8 (4.9)
Bilateral cleft lip	20 (11.9)	12 (7.1)	2 (1.2)
Unilateral cleft palate	18 (10.7)	4 (2.4)	4 (2.4)
Bilateral cleft palate	7 (4.2)	2 (1.2)	1 (0.6)
Unilateral cleft lip with palate	17 (10.1)	5 (3.0)	0 (0.0)
Bilateral cleft lip with palate	6 (3.6)	1 (0.6)	1 (0.6)
Total	110 (65.5)	42 (25.0)	16 (9.7)

In our study, unilateral clefts occurred significantly more often than bilateral clefts (approximately 3:1), which was in agreement

with previous studies.^[19,22] Jurkiewicz and Bryant recommended that the (unilateral) left-side preponderance of cleft development was due to the right side of the embryo's head which obtains somewhat greater supply of blood due to the elevated blood pressure from right internal carotid artery.^[23]

The data also observed overall ratio of boys and girls in relation to clefts, which was almost 1:1. However, Jensen *et al.*^[19] observed the ratio of male to female as 3:1. Similarly most of the previous studies were in contrast to the present data, showing higher incidence of cleft defects in male counterparts.^[24,25] Cooper *et al.* stated the proportion of males to females as 1:1.3 in CP and 1.6:1 for cleft lip.^[26] But Meskin *et al.*^[27] hypothesized that CP was additionally frequent among females as the secondary palate of female fuses later as compared to males, therefore, females were more commonly affected. Furthermore, Burdi and Silvey confirmed this assumption experimentally with histologically sectioned human embryos.^[28]

The present study also observed that maximum cases of Angle's Class II (10.7%) and Class III (4.9%) malocclusion were associated with unilateral cleft lip patients and minimum subjects with Class I (3.6%) and Class II (0.6%) malocclusion were observed in bilateral CLP patients as the prevalence of these patients was fewer comparatively. Back *et al.* found a similarity between types of malocclusion and diverse classification of oral clefts.^[15] On the other hand, some practical issues, counting differences according to malocclusion criteria, age range of participants, and surgical procedures of oral cleft, limit the comparisons between studies.

Hongal *et al.*, in their study, mentioned that patients with cleft lip and/or palate abnormality (8.92%) scored a Dental Anxiety Index of 31–35 (severe malocclusion).^[29] Shrestha *et al.* found that overjet had a significant difference in cases of BCLP while major difference was observed with overbite in UCLP condition.^[7]

Chopra *et al.* also stated that the occurrence of malocclusion were higher in patients with oral cleft deformities. This anomaly could be possibly related to the unusual tongue movement or a poor swallow reflex.^[30] Additionally, it was observed that the frequency of developmental defects of enamel were more among these patients than those without clefts.^[31]

The decay percentage of teeth and premature loss of deciduous teeth that is more commonly found in cleft

patients, affects to relocation of teeth, and deteriorates occlusion.^[17] Furthermore, investigations on fetuses as well as dental casts in a group of postnatal sample have concluded that the features that led to cleft deformities are also responsible for the tooth defects.^[32] The present study has limited sample size and few knowledge regarding the lack of information relating to the time of surgical restore and therefore more research is required on large sample of oral clefts and to follow them regularly at primary, mixed, and permanent stages of dentition.

CONCLUSION

The study evidenced increased dominance of Class II and III malocclusion in patients having cleft lip and/or palate deformities and orthodontic treatment needs vary among them. Henceforth, such patients should be screened in early phases of life to avert such complications.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Vellappally S, Gardens SJ, Al Kheraif AA, Krishna M, Babu S, Hashem M, *et al.* The prevalence of malocclusion and its association with dental caries among 12-18-year-old disabled adolescents. *BMC Oral Health* 2014;14:123.
2. Banerjee M, Dhakar AS. Epidemiology-clinical profile of cleft lip and palate among children in India and its surgical consideration. *CJS* 2013;2:45-51.
3. Pinto CO, Nascimento LF. Prevalence study of birth defects University of Paraiba Valley, Sao Paulo, Brazil. *Rev Paul Pediatr* 2007;25:233-9.
4. Kianifar H, Hasanzadeh N, Jahanbin A, Ezzati A, Kianifar H. Cleft lip and palate: A 30-year epidemiologic study in North-East of Iran. *Iran J Otorhinolaryngol* 2015;27:35-41.
5. Nambiar S, Singhal P, Menon A, Unnikrishnan B. Clinico-epidemiological profile of orofacial clefts among children of coastal district of Southern India: A 5 year hospital based study. *J Cleft Lip Palate Craniofacial Anomalies* 2014;1:34-7.
6. Deolia SG, Chhabra C, Chhabra KG, Kalghatgi S, Khandelwal N. Dental anomalies of the deciduous dentition among Indian children: A survey from Jodhpur, Rajasthan, India. *J Indian Soc Pedod Prev Dent* 2015;33:111-5.
7. Shrestha A, Marla V, Shrestha S. Developmental anomalies affecting the morphology of teeth – A review. *RSBO* 2015;12:68-78.
8. Iecha K, MaharjanIbrahim HA, Abuaffan AH. Prevalence of malocclusion and orthodontic treatment needs among Down

- syndrome Sudanese individuals. *Braz Dent Sci* 2015;18:1-5.
9. Kumar D, Rana M, Dahiya A, Sharma R. Orthodontic camouflage management of a class II malocclusion with impacted canine – A case report. *Int J Adv Case Rep* 2015;2:1442-4.
 10. Masih S, Singh N, Chacko RA, Umar SS. Interception of a developing class III malocclusion with chin cup therapy. *Indian J Dent Sci* 2014;1:108-12.
 11. Abdul Majid ZA, Abidia RF. Effects of malocclusion on oral health related quality of life (Ohrqol): A critical review. *Eur Sci J* 2015;11:386-400.
 12. Ngom PI, Diagne F, Aidara-Tamba AW, Sene A. Relationship between orthodontic anomalies and masticatory function in adults. *Am J Orthod Dentofacial Orthop* 2007;131:216-22.
 13. Potnis A, Panchasara C, Shetty A, Krishna Nayak US. Unveiling the impacted incisor. *Indian J Multidiscip Dent* 2015;5:27-30.
 14. Celikoglu M, Buyuk SK, Ekizer A, Sekerci AE. Evaluation of mandibular transverse widths in patients affected by unilateral and bilateral cleft lip and palate using cone beam computed tomography. *Angle Orthod* 2015;85:611-5.
 15. Baek SH, Moon HS, Yang WS. Cleft type and Angle's classification of malocclusion in Korean cleft patients. *Eur J Orthod* 2002;24:647-53.
 16. Fattahi HR, Pakshir HR, Hedayati Z. Comparison of tooth size discrepancies among different malocclusion groups. *Eur J Orthod* 2006;28:491-5.
 17. Paradowska-Stolarz A, Kawala B. Occlusal disorders among patients with total clefts of lip, alveolar bone, and palate. *Biomed Res Int* 2014;2014:583416.
 18. Fogh-Andersen P. Incidence of cleft lip and palate: Constant or increasing? *Acta Chir Scand* 1961;122:106-11.
 19. Jensen BL, Kreiborg S, Dahl E, Fogh-Andersen P. Cleft lip and palate in Denmark, 1976-1981: Epidemiology, variability, and early somatic development. *Cleft Palate J* 1988;25:258-69.
 20. Kim BJ, Yoon JH. The statistical study on the incidence and related factors of cleft lip and palate. *J Korean Assoc Oral Maxillofac Surg* 1987;13:165-74.
 21. Yang SK, Hong IP, Shim YK, Lee SI. The clinical analysis of 1008 cases of cleft lip and palate patients. *J Korean Soc Plast Reconstr Surg* 1990;17:842-63.
 22. Lee JH, Min BI. Clinical and statistical study of the cleft lip and/or palate patients. *J Korean Assoc Oral Maxillofac Surg* 1987;13:149-58.
 23. Jurkiewicz MJ, Bryant DL. Cleft lip and palate in dogs: A progress report. *Cleft Palate J* 1968;5:30-6.
 24. Lee YK, Yun WT, Ko SO, Shin HK. A familial survey of degree and etiology in cleft lip and/or palate patients. *J Korean Assoc Oral Maxillofac Surg* 1966;22:366-74.
 25. Tang EL, So LL. Prevalence and severity of malocclusion in children with cleft lip and/or palate in Hong Kong. *Cleft Palate Craniofac J* 1992;29:287-91.
 26. Cooper HK, Harding RL, Krogman WH. *Cleft Palate and Cleft Lip: A Team Approach to Clinical Management and Rehabilitation of the Patient*. Philadelphia: WB Saunders Co.; 1979.
 27. Meskin LH, Pruzansky S, Gullen WH. An epidemiologic investigation of factors related to the extent of facial clefts. I. Sex of patient. *Cleft Palate J* 1968;5:23-9.
 28. Burdi AR, Silvey RG. Sexual differences in closure of the human palatal shelves. *Cleft Palate J* 1969;6:1-7.
 29. Hongal SG, Ankola A, Nagesh L. Malocclusion and treatment needs of cleft lip and/or palate subjects aged between 12 and 18 years visiting KLE's Hospital, Belgaum, India. *Oral Health Prev Dent* 2010;8:237-42.
 30. Chopra A, Lakhanpal M, Rao NC, Gupta N, Vashisth S. Oral health in 4-6 years children with cleft lip/palate: A case control study. *N Am J Med Sci* 2014;6:266-9.
 31. Saldias-Vargas VP, Tovani-Palone MR, Moura-Martins AP, da Silva-Dalben G, Ribeiro-Gomide M. Enamel defects in permanent first molars and incisors in individuals with cleft lip and/or palate. *Rev Fac Med* 2014;62:515-9.
 32. Del Prete S, D'urso A, Meshkova DT, Coppotelli E. Cleft lip and palate: A review of the literature. *Webmed Central Orthodontics* 2014;5:1-7.