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Frequency of Malocclusion of Cleft Lip and/or Palate: A Multicentric Study In Bangladesh

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Abstract:

Objectives: This study aimed to investigate the prevalence of malocclusion based on molar and incisor relationship in a group of Bangladeshi cleft lip and/or palate Patients.

Material and Methods: The study was performed on the dental cast and photos of the dentition of 140 individuals with cleft lip and/or palate aged between 5 and 15 years. Convenient sampling was carried out. These were used to study and compare the transverse and frontal occlusion of cleft lip palate subjects. Malocclusion was classified based on Angle's Molar and British Incisor Classification.

Results: The mean age of the subjects was 10.36±3.11 (SD) years. Angle Class III malocclusion (51.42%) was significantly greater than other types of malocclusion. In frontal relation, the incidence of Class I malocclusion was 23.57%. Some subjects had Class II div 1 malocclusion (20%) and Class II div 2 (2.14%). The open bite was more in the anterior segment (2.87%) than the posterior segment (7.93%). On transverse relation, the prevalence of Class III, Class I, Class II malocclusion, and scissor bite was respectively 50%, 21.42%, 18.51%, and 2.14%.

Conclusion: Class III malocclusion was the most prevalent followed by class I and class II types of malocclusion in cleft lip and/or palate populations. Cleft lip palate (CLP) subjects demonstrated a higher prevalence of dental malocclusion than normal individuals.

Keywords: Cleft lip (CL), Cleft lip and palate (CLP), Malocclusion.

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Introduction:

Clefts of the upper lip (CL), with or without cleft alveolus (CLA) and palate (CLP), or cleft palate only (CP), are among the most common congenital human malformations, showing a mean incidence of 1.7/1000 live births [1]. Every year more than 5000 patients with cleft lip and palate are born in Bangladesh [2].

Cleft of the lip and palate can be associated with other systemic symptoms. The exact etiology of cleft lip and palate is obscure but some factor like familial, genetic, environmental, and nutritional (micronutrient, folic acid) deficiencies seems to play a significant role. Incidences of cleft lip and palate are increasing day by day due to environmental pollution, misuse of drugs by pregnant women, radiation hazards, etc. Clefts arise during the fourth developmental stage. Exactly where they appear is determined by the location at which the fusion of various facial processes failed to occur and this in turn is influenced by the time in embryonic life when some interference with development occurred [3]. Failure of fusion between the maxillary prominences and median and lateral nasal processes results in cleft lip of varying extent, unilaterally or bilaterally. Closure of the secondary palate by elevation of the palatal shelves follows that of the primary palate by nearly 2 weeks which means that an interference with lip closure that still is present can also affect the palate. About 60% of individuals with a cleft lip also have a palate cleft. Cleft lip and palate patients have significantly different patterns of malocclusion than the general population.

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The occurrence of malocclusions in subjects with oral clefts favors the retention of dental plaque on tooth surfaces, predisposing them to different oral diseases such as caries [4]. Malocclusion can cause plaque retention, leading to dental caries which eventually causes loss of functions such as mastication [5]. Severe malocclusion can result in reduced aesthetics, which in turn can decrease the social standing of an individual resulting in low self-esteem [6]. Assessing the prevalence of malocclusions in cleft lip and cleft palate patients can aid in early detection and can help in efficient treatment planning leading to a good prognosis[7].

The treatment for cleft lip and palate patients is predominantly multidisciplinary and according to the American Cleft Lip and Palate and Craniofacial Association, evaluation should be carried out by specialists from different specialties such as pediatric medicine specialists, plastic surgeons, pediatric dentistry surgeons, orthodontists, radiologists, genetic counselor, neurologist, ophthalmologist, oral and maxillofacial surgeon neurosurgeon, nurse, otolaryngologist, psychologist, social workers, speech and language therapist[8].

Objective of the study:

This study aimed to investigate the prevalence of malocclusion based on molar and incisor relationship in a group of Bangladeshi cleft lip and/or palate Patients.

Material and Methods:

The present investigation was a cross-sectional study carried out from June 2014 to August 2015. After obtaining ethical clearance from Dhaka Dental College Ethical Committee this study was conducted. After obtaining consent from cleft patients, photographs and dental casts were made. The study was conducted in the Department of Orthodontics and Dentofacial Orthopaedics, Dhaka Dental College and Hospital. Patients with clefts were retrieved from the Department of Orthodontics & Dentofacial Orthopaedics, Department of Oral and Maxillofacial Surgery of Dhaka Dental College & Hospital, Institute of Burn and Plastic Surgery, Dhaka Medical College and Hospital, and various cleft lip palate surgery camp.

The Cleft lip and/or palate patients were in the age group of 5 to 15 years old of Bangladeshi origin. The materials & tools for examination include- Dental casts and Photographs of the dentition. Malocclusion was classified based on Angle's Molars and British Incisor Classification. All data was analyzed through standard statistical methods using Statistical Package for Social Sciences Software (SPSS) version 19.

Result:

Dental malocclusion in Bangladeshi cleft subjects varied from type of cleft. Incidence of bilateral cleft lip and palate (BCLP-40.71%) was significantly greater than other type of cleft. Isolated Cleft lip (1.24%.) had the lowest frequency.

The frequency of female cleft subjects was significantly greater than male subjects. Statistically age range was 9.5 years, mean age was 10.36±3.11 (SD) years. Incidence of bilateral cleft lip and palate (40.71%) was significantly greater than other type of cleft.

The frequency of anterior crossbite (51.42%) was also high in cleft subjects. The incidence of Class I malocclusion was 23.57%. Some subjects had class II div1 malocclusion (20%) and Class II div 2 (2.14%). The open bite was more in the anterior segment (7.85%) than the posterior segment (2.85%). On transverse or posterior relation, the prevalence of Class III, Class I, and Class II malocclusion and scissor bite were respectively 50%, 21.42%, 18.51%, and 2.14%.

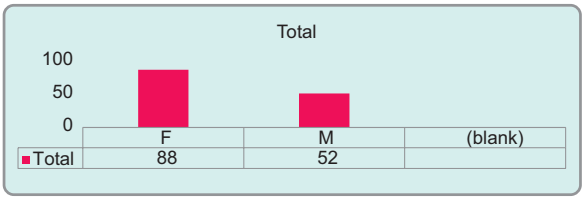

Figure 1: *Distribution of cleft subjects by sex*

Figure 1 Shows the total number of subjects was 140 among them females 88 and males 52

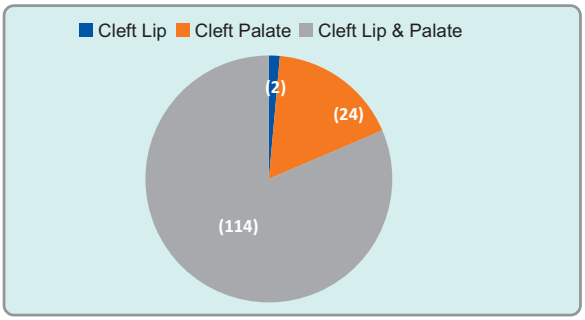

Figure 2: *Different Types of Clefts*

Figure 2 shows that the total number of subjects was further assorted into different types as CL (2), CP (24), and CLP (114)

Table-I

Descriptive study of age of cleft lip and palate subjects (n=140)

Range	max	mini	Mean±SD
Age (years) 9.5	15	5.5	10.36±3.11

n: Total number of subjects, Max: Maximum, Mini: Minimum, SD: Standard deviation

Table 1 Shows, That the current study sample, is between 5 to 15 years old

Table-II

Count and percentage of different cleft types of cleft lip and palate subjects (n=140)

Type of cleft	Count of cleft (n)	%
BCLP	57	40.71
BCLP with CFD	3	2.14
CL	2	1.42
CP	24	17.14
UCLP(Left)	38	27.14
UCLP(Right)	16	11.42

n: Count of cleft, %: Percentage of cleft lip palate, BCLP: Bilateral cleft lip palate,

CFD: Craniofacial defect, CL: Cleft lip, CP: Cleft palate, ULCP: Unilateral cleft lip palate.

Table 2 shows that the incidence of bilateral cleft lip and palate (40.71%) was significantly greater

than other types of cleft. Cleft lip had the lowest incidence(1.42%).Left-sided Upper cleft lip and palate are more prominent (27.14%) than left-sided cleft(11.42).

Table-III

Prevalence of malocclusion based on incisor relation of cleft lip palate subjects

Incisor relation	n (%)
Class I	33 (23.57%)
Class II div 1	28 (20%)
Class II div 2	3 (2.14%)
Class III	72 (51.42%)
Open bite	11 (2.87%)

n: Number of subjects
%: Percentage of subjects

Table III shows, that Class III malocclusion (51.42%) was significantly greater than other types of malocclusion. The prevalence of normal class I occlusion is 23.7% and Class II div 1 is 20%.cleft patients showed a similar incidence of open bite and Class II div2 malocclusion.

Table-IV

Prevalence of malocclusion based on molar relation of cleft lip and palate subjects (n=140)

Molar relation	n (%)
Class I	30 (21.42%)
Class II	26 (18.51%)
Class III	70 (50%)
Open bite	11 (7.93%)
Scissor bite	3 (2.14%)

n: Total number of subjects

Table IV shows the frequency of posterior crossbites was high on cleft subjects(50%). Posterior scissor bite (2.14%) had the lowest incidence. Almost 30 out of 140 patients had normal Class I occlusion. The frequency of Class II malocclusion (18.51%) was also prominent.

Discussion:

The prevalence of dental malocclusion has been found to vary among different racial/ethnic groups. In Bangladesh dental malocclusions were significantly greater in cleft lip and palate patients due to multifactorial causes such as delay in surgery, defective reconstructive surgery, alveolar bone deficiency, and delay in consulting with orthodontists. Normally in Bangladesh parents of cleft patients report to the orthodontist when their children's permanent anterior teeth are not erupting or delaying. Usually, cleft patients come through an average of 2 to 3 surgeries such as lip repair, and palate repair. Those reconstructive surgeries formed scars on their lip, and palate area. These scar tissues hamper the normal development of the premaxilla and maxilla. As a result, underdeveloped premaxilla and maxillary constricted arch are frequently seen in cleft lip and palate patients.

In this study, the ratio of CL:CP: CLP was observed as 2:24:114. However, Fogh Andersen [9]reported it as 1:1:2, and Gupta et al. [10], as 84:31:53. and Jensen et al.[11], as 34:39:27. A wide variation has also been reported among Koreans.

The frequency of female cleft subjects was significantly greater than male subjects. The total sample size was 140 among them female subjects were 62.2%, male subjects were 37.1%. Statistically age range of cleft subjects was 9.5 years, mean age was 10.36± 3.1 1(SD). Incidence of bilateral cleft lip and palate (BCLP-40.71%) was significantly greater than another type of cleft. Isolated Cleft lip (1.24%) had the lowest frequency.

The frequency of anterior as well as posterior crossbite was significantly high on cleft subjects. In this study, class III malocclusion (51.42%) in frontal relation and (50%) in molar relation was significantly greater than other malocclusion [12]. The prevalence of an anterior crossbite in the current study was similar to that reported by Sakamoto et al. [13]17]. 51.42% per cent versus 57%. However, a posterior crossbite was lower (2.14% versus 9%). The mean age of the participants and the sample size might explain this discrepancy.

In a previous study by Anna Paradowsika-Stolaraz et al. [14], done in the Danish population class III malocclusion was the most prevalent (70%) followed by class I malocclusion with only 30% incidence. In the study by Seung Ha Baek et al [15], done on the South Korean population, class III was the most prevalent (72%) followed by class I (18.5%) and class II (9%). They also found that the incidence of UCLP patients was more than BCLP patients but in this study, BCLP patients were.

The lowest type of malocclusion was the scissorbite (2.14%). incidence of incisor Class I malocclusion was 23.57%. Some subjects had class II div1 malocclusion (20%) and Class II div 2 (2.14%). The open bite was more in the posterior segment 7.93 than the anterior segment 2.87%. On transverse or posterior relation prevalence of Class III, Class I, and Class II malocclusion and scissor bite were 50%, 21.42%, 18.51%, and 2.14%.

However, this research had a few limitations as it was carried out in 2014 and 2015(not very recent) and samples were collected in Dhaka city although subjects were coming from various parts of Bangladesh. It is recommended to do a further study on the malocclusion of cleft patients.

Conclusion:

The findings from the present study suggest that patients with oral clefts need special oral health care for the treatment of dentofacial anomalies. In addition, it was also found that orthodontic treatment needs differ between patients with different oral clefts. Within the limits of this study, it can be concluded that class Ill malocclusion was the most prevalent followed by class I and class II types of malocclusion. Dental malocclusion in Bangladeshi cleft subjects varied from type of cleft. The frequency of female cleft subjects was significantly greater than male subjects. Incidence of bilateral cleft lip and palate (BCLP-40.71%) was significantly greater than other type of cleft. Isolated cleft lip (1.24%) showed lowest frequency.

Conflict of interest: None

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