

PREVALENCE OF CLASS I, II, III MALOCCLUSION IN PATIENTS WITH BILATERAL CLEFT LIP AND PALATE

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ABSTRACT:

The aim of this study was to assess the prevalence of class I, II, III malocclusions in patients with bilateral cleft lip and palate. Cleft lip and palate are the most common congenital defects. Cleft lip and cleft palate can be divided into bilateral cleft lip and palate and unilateral cleft lip and palate. In patients with cleft lip and palate the prevalence of other dental anomalies is very common. Cleft lip and palate patients require a multidisciplinary treatment approach, to correct the cleft and other associated defects. This study was done in a university based setting on the bilateral cleft lip and palate patients who reported to our hospital. The data was obtained by reviewing case sheets from June 2019 to March 2020 of Saveetha dental college and hospitals. The data was collected and tabulated in the excel sheets and exported to the SPSS software for statistical analysis. The prevalence of Class I was 52%, class III was 28% and Class II had 20% prevalence in bilateral cleft lip and palate patients. There was a difference between the incidence of different types of malocclusions among different genders, with more male predilection, however it was statistically insignificant. The prevalence of Class I malocclusion was more in our Bilateral cleft lip and palate population.

KEYWORDS:

Angle's Classification; Cleft Lip And Palate; Malocclusion.

1. INTRODUCTION:

Cleft lip and cleft palate is one of the commonly occurring dentofacial congenital defects. In India, 1 in 1000 live births presents with cleft lip and palate deformities. (Yilmaz *et al.*, 2019). Incidence of cleft lip and palate varies with different races and geographical locations. (Chowdhury *et al.*, 2017) The frequency of cleft lip and palate is higher in the Asian population when compared to the other population and places. (Sharma, 2020). 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, plastic surgery, pediatric dentistry, orthodontists, audiology, radiology, genetic counsellor, neurology, ophthalmology, orals and maxillofacial surgery neurosurgery, nursing, otolaryngology, psychology, social workers, speech and language specialists. (Kehrer, 1981). Cleft lip and palate patients normally have a higher incidence of dental anomalies than in patients without cleft lip and palate. (Tan and Yow, 2020). Associated dental anomalies include congenitally missing teeth, supernumerary teeth, malformed teeth, malaligned teeth, delayed

eruption of deciduous dentition, TMJ dysfunction which invariably leads to difficulty in mastication, poor aesthetics and poor phonetics. (Premkumar and Mohan, 2015).

Orthodontic treatment remains as a major treatment in cleft patients. (Nakajo et al., 2012). Malocclusion can cause plaque retention, leading to dental caries which eventually cause loss of functions such as mastication. (Nagappan, Nagappan and John, 2015) Severe malocclusion can result in reduced aesthetics, which in turn can decrease the social standing of an individual resulting in low self esteem. (Dixon et al., 2011) Cleft patients require treatment from the dentist from a very young age, and they might require different types of orthodontic interventions in different ages. (Vargervik, Oberoi and Hoffman, 2009) . The orthodontist has a critical role in the care and treatment of patients with cleft lip and palate as they are involved in the patients care from birth to adulthood as they provide treatments such as pre surgical orthopaedics, orthodontic preparation of the alveolar bone grafts, early phase of orthodontic treatment post alveolar bone grafts, followed by comprehensive orthodontic treatment with or without orthographic surgery. (Shetye, 2016)

Various kinds of mini implants can be used as anchorage devices, in orthodontic treatments. (Sivamurthy and Sundari, 2016) The positioning of the mini implants influences the type of clinical outcomes obtained. (Sivamurthy and Sundari, 2016; Felicita, 2017b) Hence during orthodontic treatment in cleft patients, the mini implants if used, should be positioned to optimise good prognosis. The most common method of bonding orthodontic brackets to the teeth surfaces is by etching of the enamel surfaces, and bonding the brackets to the teeth surfaces using resin cements. (Kamisetty et al., 2015) It is imperative that the brackets are to be bonded properly especially in cleft patients so that the treatment duration is not prolonged due to frequent debonding of the brackets. (Samantha, 2017) The clinical efficiency of a bonding material depends upon various parameters such as the bond strength, depth of resin penetration within the enamel, and its debonding properties. (Ramesh Kumar et al., 2011). In cases of cleft patients undergoing orthodontic treatment and are being medicated with bisphosphonates the chances of prologination of the duration of the orthodontic treatment is increased. (Krishnan, Pandian and Kumar S, 2015). Cleft patients with class III malocclusion can present also with maxillary retrognathism or mandibular prognathism sometimes with both along with the other dental anomalies. (Krishnan, Pandian and Kumar S, 2015; Vikram et al., 2017). Like the incidence and occurrence of obstructive sleep apnea can be linked to genetics, cleft lip and palate can also be linked to genetics. (Viswanath et al., 2015). Lower gonial angle can be used as an indicator of growth to assess the amount of growth left in cleft patients undergoing orthodontic treatment. (Rubika, Felicita and Sivambiga, 2015). This can aid the orthodontist in planning an efficient treatment plan for growing versus non growing patients. Intrusion of proclined maxillary incisors can pose as a hassle in any orthodontic treatments, mini implants can produce true intrusion when compared to utility arches and j hook head gears. (Jain, Kumar and Manjula, 2014; Rubika, Felicita and Sivambiga, 2015). In normal individuals, presence of dimensional balance can be found between the maxilla and mandible in relation to both the dentoalveolar and skeletal level at a ratio of 1:1. (Felicita, Chandrasekar and Shanthasundari, 2012).

Assessing the prevalence of malocclusions in cleft lip and cleft palate patients can aid in the early detection and can help in efficient treatment planning leading to a good prognosis. Previously our team has conducted multiple original studies over the past 8 years. (Sivamurthy G et al, 2016), (Felicita, Chandrasekar and Shanthasundari, 2012), (Krishnan, Pandian and Kumar, 2018), (Felicita, 2017a), (Felicita and Sumathi Felicita, 2018), (Dinesh and Saravana Dinesh, 2013), (Pandian, Krishnan and Kumar, 2018). Now we are focusing on cross sectional studies. The idea for this type of cross sectional study arose due to the piqued interest in our community about the type of incidence of different types of malocclusions and molar relations in cleft lip and palate patients. The aim of this study is to assess the prevalence of Class I, II,III type of malocclusions or molar relations occurring in patients with bilateral cleft lip and palate patients.

MATERIALS AND METHODS:

Study Setting:

This was a university-based study, cross-sectional, uni-centred study. The ethical board clearance was obtained from the institutional ethics committee of Saveetha Dental College and hospitals, Chennai. IEC approval number: SDC/SIHEC/2020/DIASDATA/0619-0320. The data was obtained by reviewing 86,000 case sheets of patients who reported to Saveetha Dental College and hospitals. Informed consents were obtained from the patients.

Sampling:

All the data samples used in this study were obtained by reviewing the case sheets of patients belonging to Saveetha dental college and hospital. The data samples were collected from June 2019 to March 2020. All the case sheets of patients with cleft lip and palate with all four permanent first molars were taken into account in order to prevent sampling bias. The molar relation and malocclusions were cross verified using the intra oral photographs of bilateral cleft lip and palate patients. Patients with unilateral cleft lip and palate or syndromic cleft patients and patients without clefts were excluded from this study. No sorting of data was done.

Data Collection:

The data collected included, gender, orthodontic diagnosis and molar relations based on Angle's classification. (Angle, 1899) Patient case sheets with incomplete data were excluded if the data required could not be obtained from the intra oral photographs. The data samples obtained were collected and tabulated in excel sheets and were exported for statistical analysis.

Statistical Analysis:

The values and variables were tabulated and analysed using the SPSS software by IBM version 25.00 for windows OS. Chi-square tests were done to assess the correlation and association. Any p value of less than 0.05 was considered as statistically significant. The independent variables were gender, bilateral cleft lip and palate. While the dependent variable was the type of malocclusion or molar relation of the patients.

RESULTS AND DISCUSSION:

Out of a total 71 patients, 50 (70.4%) had bilateral cleft lip and palate, and 21 (29.6%) had unilateral cleft lip and palate (Graph 1). Among the bilateral cleft lip and palate, Male patients 29 (58%) were more commonly affected than female patients 21 (42%) (Graph 2). Based on the type of malocclusion, Class I malocclusion - 26 (52%) was most prevalent, followed by Class III malocclusion -14 (28%) and the least prevalent type of malocclusion was Class II - 10 (20%) (Graph 3). In both genders, Class I malocclusion was most prevalent. In females, equal prevalence of class III and II malocclusion was seen 6 (12%). In males, class III malocclusion 8(16%) was more prevalent than Class II malocclusion II 4(8%). (Graph 4). Chi-square test showed a difference between the incidence of different types of malocclusions among different genders, however it was statistically insignificant. According to our study, class I malocclusion was the most prevalent type of malocclusion in patients with bilateral cleft lip and palate, followed by class III and the least prevalent was class II in bilateral cleft lip and palate patients. Male patients were slightly more affected than female patients.

In a previous study by Anna Paradowsika-Stolaraz et al, done in the danish population class III malocclusion was the most prevalent (70%) followed by class I malocclusion with only 30% incidence.(Paradowska-Stolarz and Kawala, 2014) In the study by Seung Ha Baek et al, 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 unilateral cleft lip and palate patients was more than bilateral cleft lip and palate patients. (Baek, 2002) Another study by Seo et al in the South Korean population found that among UCLP patients class III malocclusion was more prevalent. (Seo *et al.*, 2011). The results from the above two studies showed significantly higher prevalence of Class III malocclusion in Cleft patients, which might be due to the higher prevalence of Class II malocclusion in the South Korean general population without cleft lip and palate. (Piao *et al.*, 2016). In the another study by Mario Vianna Vettore, done on Brazilian population, they found that the prevalence of Class III was higher and Class I malocclusion had been least prevalent, which is contrary to our study findings. (Vettore and Sousa Campos, 2011) The study done by Okoye et al, South Africa population with cleft, showed more prevalence of Class III and least prevalence for Class I malocclusion in bilateral cleft lip and palate patients, but their sample size was very less and hence the results have to be viewed cautiously. (Okoye *et al.*, 2020). In a study done by Akshay Gupta et al, in Jammu on Indian population, they found similar results to our study with class I malocclusion being most prevalent (58.8%), (Gupta *et al.*, 2016). From the results from the above study and the results from our study, we can come to a conclusion that Class I malocclusion is most prevalent in Indian population.

The sample size was limited as the study population belonged to a single university in a single region. This was only a single centred study. In the future, further studies can be done among multiple universities within the country with more sample size, as a multi centred pan India study.

CONCLUSION:

Within the limits of this study, it can be concluded that the class I malocclusion was the most prevalent followed by class III and class II type of malocclusion in Bilateral cleft lip and palate patients.

AUTHOR CONTRIBUTIONS :

Author 1 (P. Deeksheetha), carried out the study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Dr. Arvind.S) aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. Author 3 (Dr. Nashra) has participated in the study design and has coordinated in developing the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

CONFLICT OF INTEREST:

None declared

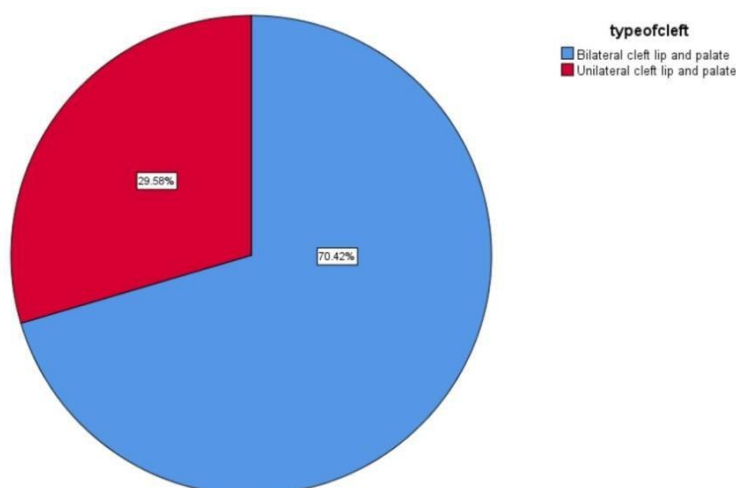
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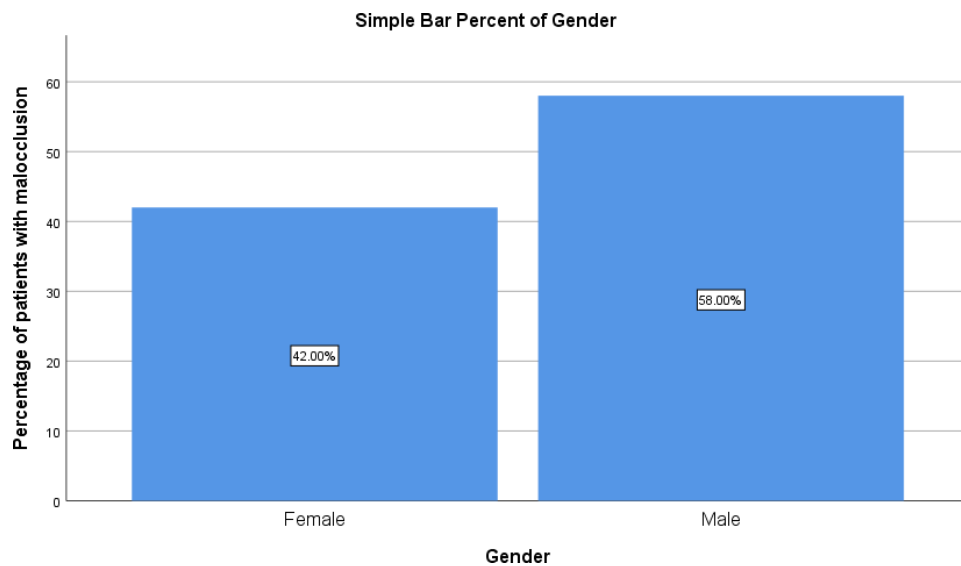
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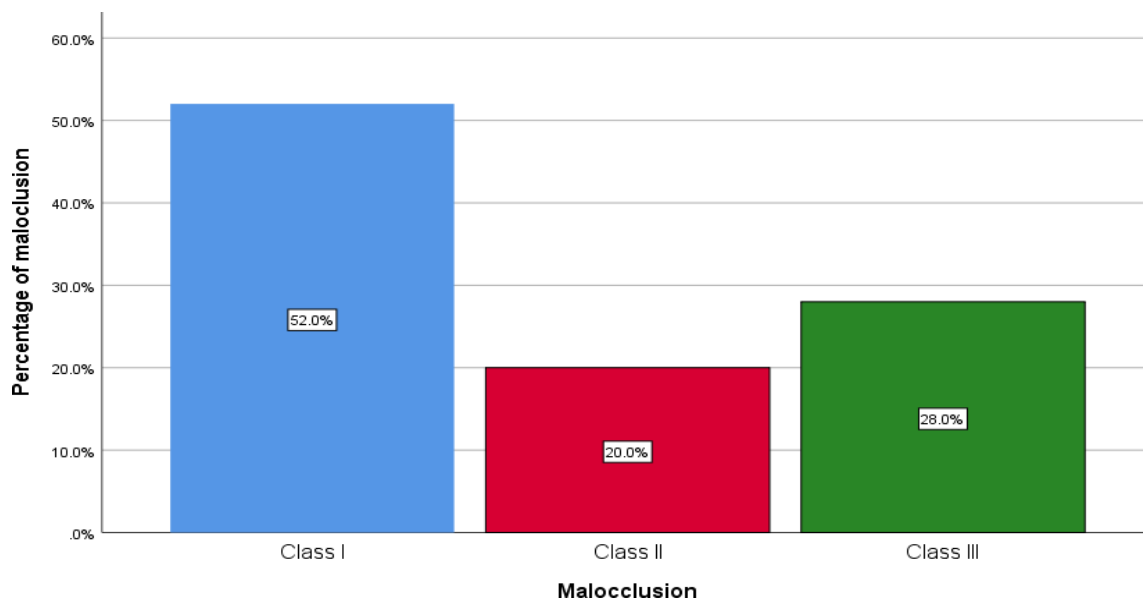
FIGURES:



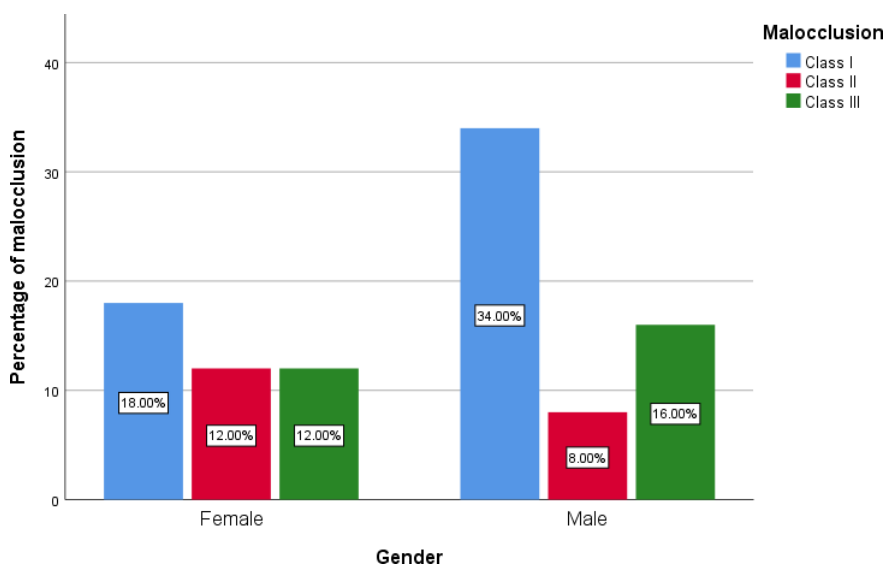
Graph 1: Pie chart shows the distribution of cleft lip and palate; 70.42% patients had bilateral cleft lip and palate, 29.58% patients had unilateral cleft lip and palate. The blue colour indicates patients with bilateral cleft lip and palate, while the red colour indicates patients with unilateral cleft lip and palate.



Graph 2: This bar graph represents the Gender distribution among the bilateral cleft lip and palate patients. Male patients were more commonly affected than female patients. Male patients 58%, female patients 42%.



Graph 3: This bar graph depicts the distribution of malocclusion in patients with Bilateral cleft lip and palate. The highest prevalence observed was for Class I malocclusion (52%) (blue colour), followed by Class III malocclusion (28%) (green colour) and the least observed type of malocclusion was Class II (20%) (red colour). Class I malocclusion was most commonly observed.



Graph 4: This bar graph compares the various types of malocclusions among different genders. The X axis represents the genders of the patients. While the Y axis represents the percentage of the types of malocclusion present. Class I malocclusion (blue colour) more commonly observed than Class III malocclusion (green colour) and Class II malocclusion (red colour), among different genders. Class I malocclusion seen in 18% females and 34% males. Class II malocclusion seen in 12% females and 8% males. Class III malocclusion seen in 12% females and 16% males. Class I was highly prevalent in male and female patients, however it was not statistically significant. (Chi-square test, p value: 0.384 (p>0.05 statistically insignificant)).