



Prevalence of cleft lip: A retrospective hospital based study

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ABSTRACT

Amongst the most frequent congenital birth defects are facial malformations, including cleft lips associated with or without cleft palate (CL/P) and cleft palate (CP). Although the incidence of such malformations worldwide is around 1.5 per 1,000 live births, the rate for CL/P ranges six-fold and for CP three-fold. The study aims to determine the prevalence and gender variations of isolated cleft lip among patients who have visited Saveetha Dental College and have undergone primary cleft lip repair procedure. A retrospective study was conducted and data collection was done from dental archives pertaining from June 2019 to April 2020. Data consisted of patients with isolated cleft lip who underwent primary cleft lip repair procedure. Data was imported to IBM SPSS Version 20 for statistical analysis. Results were tabulated. From this study, it has been observed that prevalence of isolated cleft lip is more among males (55.6%) compared to females (44.4%) and belonging to the age group 0 to 6 years. Millard's technique (rotation advancement technique) is the most commonly employed technique for primary cleft lip repair. Male predilection observed (statistically not significant). This study was conducted in a single centre – Saveetha Dental College. Extensive multi centre study with increased sample size is to be done.



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INTRODUCTION

Amongst the most frequent congenital birth defects are facial malformations, including cleft lips associated with or without cleft palate (CL/P) and cleft

palate (CP). Although the incidence of such malformations worldwide is around 1.5 per 1,000 live births, the rate for CL/P ranges six-fold and for CP three-fold, the rate for cleft lip/palate ranges six times and for cleft palate three times (Little *et al.*, 2004; Mossey *et al.*, 2011). Asian population reports put overall rates at between 1.76 and 1.81, reflecting the higher prevalence in this area (Kim *et al.*, 2002; Wang *et al.*, 2009). With an estimated population of 1.1 billion in India alone the Indian subcontinent remains one of the world's most populated regions. India is one of the many areas in the world where population estimates of birth defect prevalence are not obtained regularly (Mossey and Little, 2009). Several studies in India have reported differing findings regarding the prevalence of orofacial clefts. This may be due to geographical variation, the various parameters used in the collection

of data, the case description used and other methodological problems, such as changes in the standard of the design of the study (Christianson *et al.*, 2005).

Many etiological factors may cause clefts of the lip and/or palate. Some are induced by single mutant genes, chromosome aberrations, some by particular environmental agents, and mostly by the interaction of multiple genetic and environmental variations, each having a relatively small impact in a large number of cases (Fraser, 1970). You can separate clefts into syndromic and non-syndromic clefts (Murray, 2002). Affected people have no physical or developmental defects in non-syndromic clefts. Most reports show that about 70% of cleft lip/palate cases and only 50% of cleft palate cases are non-syndromic (Jones, 1988). It is possible to identify syndromic clefts into chromosomal syndromes, teratogens and uncategorized syndromes (Murray, 2002).

Patients with orofacial clefts may have difficulties with chewing, impaired facial growth (Ariga *et al.*, 2018), oral health (Selvan and Ganapathy, 2016; Subasree *et al.*, 2016; Jyothi *et al.*, 2017; Basha *et al.*, 2018), dental defects, hearing disorders, dysphonia, slurred speech, language cognitive impairment, learning disability, and behavioural wellbeing concerns (Spriestersbach *et al.*, 1973; Hall and Golding-Kushner, 1989; Skinner *et al.*, 1997; Reid, 2004; Kaufman, 1991).

These patients' management begins with advanced neonatal nursing and may involve both parents and the patient to undergo psychosocial therapy. Along with odontological diagnosis and treatment of conductive and probable perceptive hearing disorders, complex speech and language rehabilitation, orthodontic services (Ashok *et al.*, 2014), and corrective and restorative dental care (Bernheim *et al.*, 2006; Ashok and Suvitha, 2016; Ganapathy *et al.*, 2016; Ajay *et al.*, 2017), one or more surgical procedures typically follow (Ganapathy *et al.*, 2017; Jain *et al.*, 2017; Duraisamy *et al.*, 2019).

Related syndromes can present more complex clinical image that needs additional clinical and genetic diagnostics, specialized care and recommendations (Shprintzen and Bardach, 1995; Bauer, 1997). The primary objective of the management of the cleft lip and or palate is the best cosmetic and functional result, with a minimum of procedures and maximum cost efficiency. The key variables that decide the final results are the restoration of dento-facial appearance (Gupta *et al.*, 2010; Venugopalan *et al.*, 2014), as well as regular swallowing and chewing, hearing and voice. The procedure, mostly from birth to adulthood, lasts for a long time and poses

significant problems for healthcare systems.

There is ample evidence that the consistency of the outcomes is connected to unique surgical procedures and the abilities of the team members employed in high-volume multidisciplinary centres (Bearn *et al.*, 2001; Vijayalakshmi and Ganapathy, 2016). Rotation Advancement or Millard's method, named after the person who designed it is the most widely used technique for primary cleft lip repair (Millard and Millard, 1978). Other interventions include the adapted Millard technique (Fork Flap) procedure (Adeyemo *et al.*, 2013) and other conservative approaches to care.

This study was done for epidemiological significance to check the current trends in prevalence of isolated cleft lip among patients who visited Saveetha Dental College and have undergone primary cleft lip repair procedure for the same. The study aimed to determine the prevalence pattern of isolated cleft lip among different age groups and gender. To find the most commonly employed technique for primary cleft lip repair procedure. To check if gender and age have any statistically significant association with the prevalence of isolated cleft lip.

MATERIALS AND METHODS

Study setting

A retrospective study was conducted in Saveetha Dental College by obtaining data from dental archives (single centre study). Ethical approval was obtained from the institutional ethics committee.

Sampling, data collection and tabulation

Non-probability convenience sampling method was employed. The data included records of patients who presented with isolated cleft lip and underwent primary cleft repair procedure. The technique used for primary cleft lip repair procedure was also obtained. Data entries from June 2019 to April 2020 were obtained for the same and were tabulated. All the available data were included (without any sorting process) to reduce sampling bias. Data was analysed and censored data was excluded. The data was then verified by one external reviewer. A data of 27 patients (males – 55.6%; females – 44.4%) belonging to the age group 0 to 6 years was obtained. The technique used for primary cleft lip closure was also obtained.

Data analysis

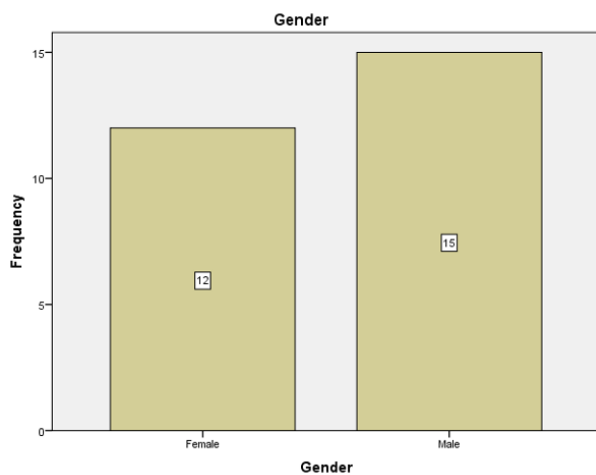
The tabulated data were statistically analysed by IBM SPSS Version 20 to check prevalence of isolated cleft lip among different age groups, gender,

the technique used for primary cleft lip procedures. Also, this study was done to check for any statistically significant correlation between gender, age and technique used. Data was imported to IBM SPSS Version 20 and variables were analysed. Pearson's Chi-square test was used. Results were tabulated and bar charts were plotted.

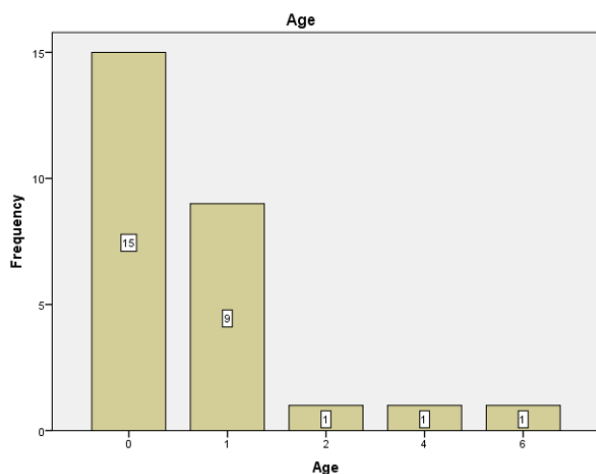
RESULTS

Age and gender

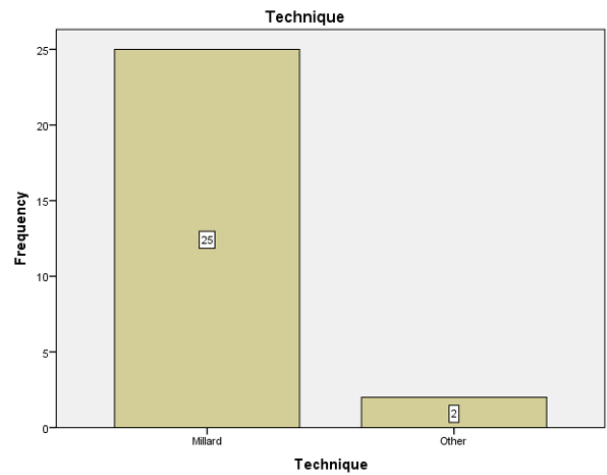
Among the 27 patients, 12 (44.4%) were females and 15 (55.6%) were males (Graph 1). 15 patients (55.6%) were below one year, 9 patients (33.3%) were one year old, three patients (11.1%) each belonging to 2 years, 4 years and 6 years respectively (3.7% in each group) (Graph 2).



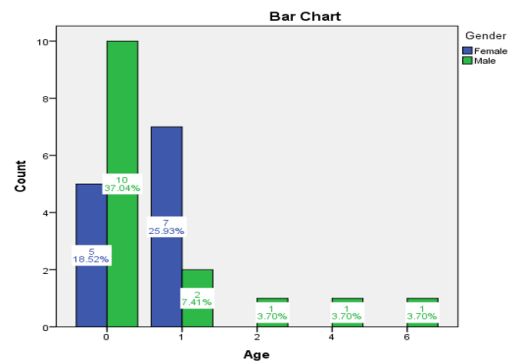
Graph 1: Bar graph depicting the gender variations in the prevalence of cleft lip



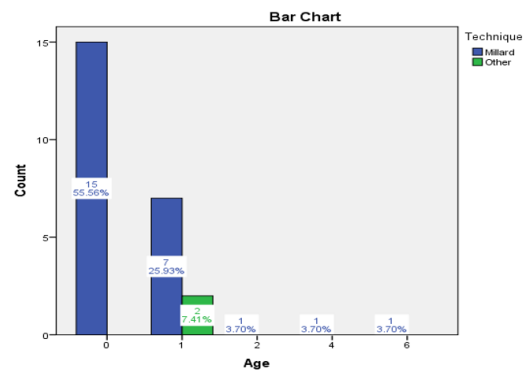
Graph 2: Bar graph depicting prevalence of cleft lip among different age groups



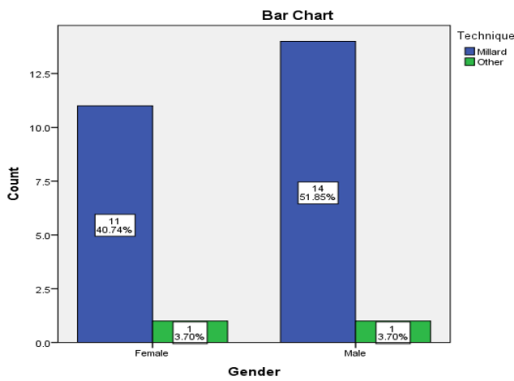
Graph 3: Bar graph depicting the techniques used for primary cleft lip repair



Graph 4: Bar graph depicting the association between age and gender



Graph 5: Bar graph depicting the association between age and technique used



Graph 6: Bar graph depicting association between gender and technique

Technique used

Among 27 patients, the primary cleft repair procedure was done using Millard's technique (rotation advancement technique) in 25 patients (92.6%) and other techniques were used in 2 patients (7.4%) (Graph 3).

Correlations

The correlation between gender and age shows increased Male predilection in all age groups (Graph 4). The correlation between age and technique shows that Millard's technique is the most commonly used technique for primary cleft lip procedure among all age groups (Graph 5). Correlation between gender and technique employed showed Millard's technique to be more prevalent in both the genders. Other techniques were also equally distributed among males and females (Graph 6)

Cleft lip with or without a cleft palate is a multifactorial malformation in which the likelihood of having the anomaly is determined by both genetic and environmental factors. The absence of fusion between the maxillary and medial nasal processes, probably due to mesenchymal mass deficiency, could result in cleft lip, cleft palate, or both and the odontogenic ability of the lateral incisor is likely to come from both of these regions. Several dental problems can result from the prevalence of clefts. Cleft lip with or without cleft palate results in infant sucking problems, which have a significant effect on growth and development (Masarei *et al.*, 2007).

The prevalence of dental caries was found to be substantially higher in children with cleft lip, alveolus and palate in both primary and permanent dentition, according to numerous studies conducted on dental caries (Bokhout *et al.*, 1996; Besseling and Dubois, 2004; Kirchberg *et al.*, 2004). In a population of unilateral and bilateral cleft lip and palate patients, there are many other dental anomalies in

dental structure, location and eruption pattern (Tortora *et al.*, 2008). In addition to dental abnormalities, isolated cleft lip, cleft lip and or palate can lead to several other systemic problems such as congenital heart diseases, mouth breathing (Geis *et al.*, 1981; Hairfield *et al.*, 1988).

In cleft with or without cleft palate patients, the most often associated dental defects are associated with lateral cleft side incisors accompanied by central incisors (Pegelow *et al.*, 2012). From birth until adult life, patients with oro-facial clefts need multidisciplinary treatment and typically have greater morbidity and mortality than normal populations. Although in many places, multidisciplinary care teams may be effective, cleft lip and or cleft palate inevitably pose global health problems around the globe, particularly for low-income populations. Accurate data on the birth prevalence of cleft lip and/or cleft palate is relevant as this can serve as a guide for better understanding of its aetiology and for managing resources and strategies for public health.

The prevalence of isolated cleft lip is more in males (55.6%) compared to females (44.4%) (Graph 1). This is in accordance with the study conducted by Nagappan (2015). This might be due to the same geographical location used in the study – Chennai population. Studies done by Sah and Powar (2014); Amidei *et al.* (1994) there was an increased prevalence among Males. This shows that irrespective of the geographical location, isolated cleft lip is prevalent more in males compared to females. In a study done by Suleiman *et al.* (2005), the study population had more females. This explains a genetic predisposition to males for isolated cleft lip which is yet to be discovered. In this study, prevalence of cleft lip was seen in children of age 0 to 6 years with majority patients less than one year (Graph 2). This is not in accordance with the study done by Gregg *et al.* (1981) where the prevalence of cleft lip and or palate among the study population did not exceed 5 years of age (Graph 3) In this study, it is observed that Millard's technique is the most commonly employed technique to correct isolated cleft lip procedures (92.6%). The correlation between Gender and age group shows increased Male predilection in all age groups (Graph 4). The correlation between age and technique shows that Millard's technique is the most commonly used technique for primary cleft lip procedure among all age groups (Graph 5). Correlation between gender and technique employed showed Millard's technique to be more prevalent in both the genders. Other techniques were also equally distributed among males and females (Graph 6). All these correlations are sta-

tistically insignificant ($p > 0.05$).

The study is a single entered study and samples were collected from a fixed time frame. Extensive research to be conducted – multi centre approach with a larger time frame to improve the scope of research. Also, to evaluate the impact of geographical variations, race and habits in the prevalence, pattern and type of orofacial cleft. The qualitative problems experienced during descriptive orofacial cleft epidemiological studies are: case identification using documentation sources such as birth and foetal death certificates, and medical documents that often produce ascertainment, selection bias, or both, and the issue of multiple comparisons (Sayetta et al., 1989). The resulting occurrence and prevalence rates are minimal and may be confounding in studies with insufficient designs or inadequate data.

In Graph 1, X-axis represents gender and Y-axis represents the number of patients. Prevalence is more in males 15 (55.6%) compared to females 12 (44.4%). In Graph 2, X-axis represents the Age and Y-axis represents the number of patients. Majority of the patients 15 (55.6%) were less than 1 year. In Graph 3, X-axis represents technique and Y-axis represents number of patients. Millard's technique is the most commonly used procedure for primary cleft repair 25 (92.6%). In Graph 4, X-axis represents age and Y-axis represents number of patients. Blue indicates female and green indicates male. There was Male predilection in all age groups except 2 year olds, but was not statistically significant. Chi-square test: $p = 0.216$ ($p > 0.05$ - statistically insignificant). In Graph 5, X-axis represents age and Y-axis represents number of patients. Blue indicates Millard technique and green indicates other techniques. Millard technique is more frequently used among all the age groups, but was not statistically significant. Chi-square test: $p = 0.364$ ($p > 0.05$ - statistically insignificant). In Graph 6, X-axis represents gender and Y-axis represents number of patients. Blue indicates Millard technique and green indicates other techniques. Millard's technique was found to be more prevalent in both the genders, but was not statistically significant. Other techniques were also equally distributed among males and females. Chi-square test: $p = 0.869$ ($p > 0.05$ - statistically insignificant).

CONCLUSION

From this study, it has been observed that prevalence of isolated cleft lip is more among males compared to females and among the age group 0 to 6 years. Millard's technique (rotation advancement technique) is the most commonly employed tech-

nique for primary cleft lip repair.

Conflict of Interest

The authors declare that there is no conflict of interest for this study.

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