

PalArch's Journal of Archaeology of Egypt / Egyptology

PREVALENCE OF CLEFT LIP AND CLEFT PALATE AMONG PATIENTS VISITING A DENTAL INSTITUTION

Nurul Afiqah Amani Binti Zaaba¹, Manjari Chaudhary², K. K. Shantha Sundari³

¹Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences,
Saveetha University, Chennai-77, India

²Senior Lecturer, Department of Oral Medicine and Radiology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, 162, PH Road, Chennai 600077, Tamil Nadu, India

³Professor, Department of Orthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-77, India
¹151501093.sdc@saveetha.com, ²manjaric.sdc@saveetha.com, ³shantasundari@saveetha.com

Nurul Afiqah Amani Binti Zaaba, Manjari Chaudhary, K. K. Shantha Sundari. PREVALENCE OF CLEFT LIP AND CLEFT PALATE AMONG PATIENTS VISITING A DENTAL INSTITUTION-- PalArch's Journal Of Archaeology Of Egypt/Egyptology 17(7), 563-573. ISSN 1567-214x

Keywords: Cleft lip, Cleft palate, Epidemiology study, Management of orofacial clefts

ABSTRACT:

Orofacial clefts are formed when the right and left side of lip or palate do not fuse together completely during foetal growth, that results in formation of a gap in between them. It also can be categorised into syndromic orofacial cleft and non syndromic orofacial cleft. The aetiology of cleft lip and palate are seen to be multifactorial in association with parental ethnicity, geographical origin, and socio-economic status. This abnormality may cause aesthetic, structural and functional defects to babies. To determine the prevalence of cleft lip and palate among the Chennai population. The present retrospective cross-sectional study was conducted among patients that visited our institute in Chennai, India. The sampling for the study was done from June 2019 till February 2020, by simple random sampling method. About 74 cases were reviewed, which consisted of 34 female patients and 40 male. Data collection was done by reviewing patients dental records. Then, the collected data was recorded in MS excel sheet and tabulated. Cleft palate (40.5%) was more common than cleft lip (21.6%) and cleft lip and cleft palate (37.8%). Gender predilection shown than cleft lip and cleft palate affecting males (54.1%) more compared to females (45.9%). There were no significant findings in association of cleft lip and cleft palate with consanguineous marriage

of parents based on their family history (Chi square test, $P=0.370$). Based on the results obtained, negative correlation was seen with gender (chi square test, $p=0.717$). On top of that, positive statistical significant correlation was seen between cleft lip and cleft palate with cleft lip repair (chi square test, $p < 0.000$) as well as cleft palate repair (chi square test, $p < 0.000$). Cleft palate is more prevalent compared to cleft lip and cleft lip and cleft palate. Male was commonly affected with a cleft lip and cleft palate. There was no significant association of cleft lip and cleft palate with consanguineous marriage of parents. Majority of the patients underwent primary repair of cleft lip and cleft palate.

INTRODUCTION

Congenital anomalies are usually known as malformations that occur to the foetus during pregnancy. Most of them can be detected during the early or third trimester of pregnancy. Early diagnosis is quite challenging and requires multiple investigations to detect the malformation¹. If it is detected in early pregnancy, it could be serious and life threatening², and lead to child abortions in worse scenarios. It may be associated with severe physical and mental disability during the course of the treatment prompting interventions³ to treat the orofacial clefts. However, although cleft lip with or without cleft palate (CL±P) and cleft palate (CP) are considered as orofacial clefts (OC), they are not life threatening for the baby as it can be surgically treated after birth. Among the group of malformations, orofacial cleft is known to be the second leading cause of congenital anomalies in live births⁴.

Clefting of the lip with or without palate also is the most common congenital craniofacial anomaly with prevalence approximately at 1 in 700 live births⁵. In general, orofacial clefts are formed when the right and left side of lip or palate do not fuse together completely during foetal growth, that results in formation of a gap in between them⁶. It also can be categorised into syndromic orofacial cleft and non syndromic orofacial cleft. Syndromic cleft usually occurs outside of the affected area and is associated with a syndrome, whereas non-syndromic cleft is an isolated condition that is unassociated with any recognisable anomalies⁷.

In addition to this, orofacial clefts also could be described by using the acronym "LAHSHAL," which was introduced by Kriens. This pandromic classification categorised the clefts based on bilateral anatomy of the lip (L), alveolus (A), hard (H), and soft (S) palates from right to left. This LAHSHAL code indicates complete cleft with a capital letter and an incomplete cleft with a small letter⁷. Thus, it can be generally used and understood by all physicians easily.

Next, the aetiology of cleft lip and palate are seen to be multifactorial depending upon the genetic and environmental factors, which involved early tissue changes⁸. It is mainly caused by shifting of the primary and secondary palates toward a threshold of abnormality⁹. It may also be associated with parental ethnicity, geographical origin, and the socio-economic status. This abnormality may cause aesthetic, structural and functional defects to babies including difficulty in feeding, delayed growth, disturbed speech and hearing development, irregularity and displacement of teeth⁶. In addition, it also can

exert a number of adverse effects on the teeth and adjoining structures¹⁰. The defects may remain permanent if they are not treated in early age.

Based on previous study done in Punjab, India, cleft lip with palate was seen more common than cleft lip¹¹. They are also seen more in consanguineous marriage¹². Depending upon gender predilection, male are commonly affected with orofacial clefts in comparison to females¹³. Correlating the history, clinical findings supported by radiographic appearance, diagnosis of orofacial cleft was made¹⁴. Based on the clinical condition of the individual, the adverse effects associated with the conditions¹⁵ also will be differ. Therefore, the prevalence, distribution and comparison regarding gender, and the side of occurrences of orofacial cleft also should be evaluated¹⁶. Thus, this study is required to assess the prevalence of cleft lip and palate at early age in order to provide a better treatment.

Hence, the aim of this study is to determine the prevalence of cleft lip and palate among patients visiting a dental institution.

MATERIALS AND METHODS

The present retrospective cross-sectional study was conducted among patients that visited our institute under university settings. The advantages of this study were large data availability and similar ethnicity involvement of Indian population. However, the disadvantage of this study was to be regional data collection, as it focused only on the Chennai population. The Institutional Ethics Committee of our institute gave approval for the study with the following ethical approval number SDC/SIHES/2020/DIASDATA/0619-0320. The consents of all patients for conducting this study was taken.

The sampling for the study was done from June 2019 till February 2020, by simple random sampling method. About 86000 cases were reviewed and 64 cases were extracted, which consisted of 34 female patients and 40 male. Non probability sampling method was used as a sampling method for this study. Each patient's dental records, treatment reports and photographs were reviewed and cross verification of samples were done by two examiners. In order to minimise sampling bias, simple random sampling was done. The inclusion criteria of this study were involvement of patients below 18 years old and diagnosed with cleft lip and or cleft palate. The internal validity for this study was all samples diagnosed with associated conditions are involved. Whereas, the external validity was epidemiological perspective.

Data collection was done by reviewing patients dental records. Then, the collected data was recorded in MS excel sheet and tabulated. The variable definition for this study was association of cleft lip and cleft palate with primary and secondary repairs. Then, IBM SPSS version 23 was used for importing data. The descriptive statistic test and inferential statistic was done. Pearson's Chi square test was used to check the prevalence of cleft lip and cleft palate. Then, variables definition processes were done by using table and graphical illustrations. Any incomplete or missing data in this study, will be eliminated.

RESULTS AND DISCUSSION

In this present study, out of 74 patients visited outpatient departments of our institute, 34 patients were female and 40 patients were male. The range of age groups of the patients were from till 21 years old, with an average age of 4.3. In Figure 1, distributions of cleft lip and cleft palate was shown. Cleft palate showed (40.5%) the highest number followed by both cleft lip and palate (37.8%) involvement and cleft lip (21.6%).

In this present study, cleft palate was most prevalent compared to other types. This findings was in line with study reported by Hlongwa P et al, but in contrast with study reported by Reddy, S. G et al where cleft lip was more common than cleft palate^{13,17}. However, in studies reported by Kesande et al and Yimalz et al cleft lip and palate was commonly seen than cleft palate and cleft lip^{18,19}. Differences in the results may be due to smaller sample size used in this study compared to previous studies. According to regions also the prevalence of cleft lip and cleft palate may differ.

In Figure 2 distributions of cleft lip and cleft palate based on family history was revealed. Based on the results, the majority of patients does not show any association with consanguineous marriage (86.5%). About 10 patients reported a history of consanguineous marriage (13.5%) of their respective parents. The prevalence of consanguineous marriage was seen commonly in patients with cleft palate (8.1%) than both cleft lip and palate (4.1%) and also cleft lip (1.4%). No statistical correlation was seen between cleft lip and palate with family history (Chi square test, $P=0.370$).

In addition to this, this presence study showed no correlation of consanguineous marriage with cleft lip and cleft palate. This findings was in opposition to a study reported by Dvivedi, J et al²⁰. In his study, consanguineous marriage showed high prevalence in causing cleft lip and cleft palate. In general, when abnormality occur the in developing foetus, the genetic of the foetus may be influenced by by 1% of teratogens, 5.5% by maternal factors, 18% by chromosomal abnormalities, 22% by single gene anomaly, and 60 % of multifactorial effects²⁰. This proves that cleft lip and palate occurrence not only can occur due to consanguineous marriage of parents but also genetic and environmental factors.

Figure 3 demonstrated distributions of cleft lip and palate based on gender. Cleft lip and cleft palate were highly prevalent in male (54.1%) compared to females (45.9%). In male, cleft palate (20.3%) and both cleft lip and palate (20.3%) were more common than cleft lip (13.5%). Whereas in females, cleft palate (20.3%) was the most common followed by both cleft lip and palate (17.6%) and cleft lip (8.1%).

Based upon the association of cleft lip and palate with gender, gender prevalence was seen more in male compared to females. The findings were supported by Josiane Souza et al, Uppal SK et al, and Yimalz et al^{4,11,19}. Thus, it was in accordance with our study. However, this findings was contradictory with Hlongwa P et al, where he stated that females were commonly affected. This can be explained by the timing of embryonic closure of the secondary

palate, where it occurs earlier in male when compared to females⁴. Sex hormones⁷ also may increased or decreased the occurrence of cleft. Thus, gender differences in cleft lip and palate could be seen. No statistical correlation was seen between cleft lip and palate with gender (Chi square test, $P=0.719$)

Figure 4 showed distribution of cleft lip repair. In both cleft lip and palate, most of the patients underwent primary repair (21.6%) only, followed by both primary and secondary repairs (4.1%) and secondary repair (2.7%). In cleft lip, the highest number of patients was seen undergone primary repair only (17.6%), in comparison to secondary repair (2.7%) and both surgeries (1.4%). There was no prevalence seen in cleft palate. Majority of the patients underwent primary repair only. Based on the results obtained, there was significant correlation between the cleft lip and cleft palate with cleft lip repair (Chi square test, $P<0.000$). In addition, distributions of cleft palate repair were demonstrated in Figure 5. In cleft palate, the greatest number of patients underwent primary repair (35.1%) only, followed by secondary repair (5.4%). Whereas in cleft lip and palate, most of the patients do not undergo any treatment (24.3%). Only a few patients underwent primary repair (12.2%) and secondary repair (1.4%). According to the findings, there was significant correlation between the cleft lip and cleft palate with cleft palate repair (Chi square test, $P<0.000$).

Children with cleft lip and cleft palate will require long years of continuous medical care and treatment. Therefore, the treatment should be started at the earliest age in order to have a better prognosis. In this study, majority of the patients underwent primary repair of cleft lip and cleft palate, with only few patients followed up with secondary repair. There were no studies reported on the prevalence of cleft lip and palate repair. This may be due to no universally accepted surgical treatment regimen for cleft lip and cleft palate⁶. However, the surgical treatments are necessary and important for the patients for functional restorations mainly, and aesthetic appearance. Management of cleft lip and palate also will help to ensure optimum facial growth and development to prevent deformity developing in association with impaired growth⁹.

The limitations of this study can cause variations in results obtained when compared to previous studies. The shortcoming was associated with sample size that was limited and no distinction was made for the left and right sides²¹, with unilateral or bilateral involvement. Other etiological factors like socio-economic status and demographic data also should be considered in further study. Prevention, risk reduction and treatment strategies need to be further improved for an accurate judgement on the risk, prognosis, treatment selection and outcome for patients^{22,23} with orofacial clefts. Advanced training curriculum also should be given to dental practitioners for better diagnosis²⁴.

In future, more study also should be done on prevalence of cleft lip and cleft palate based on Indian population. Studies in the Indian population are needed to understand specific genetic variations in association with orofacial clefts²⁵. On top of that, oral health education and promotive programs also need to be conducted to improve oral hygiene practices and oral health^{26,27} of

the child. Different management approaches also should be introduced for management of the orofacial cleft.

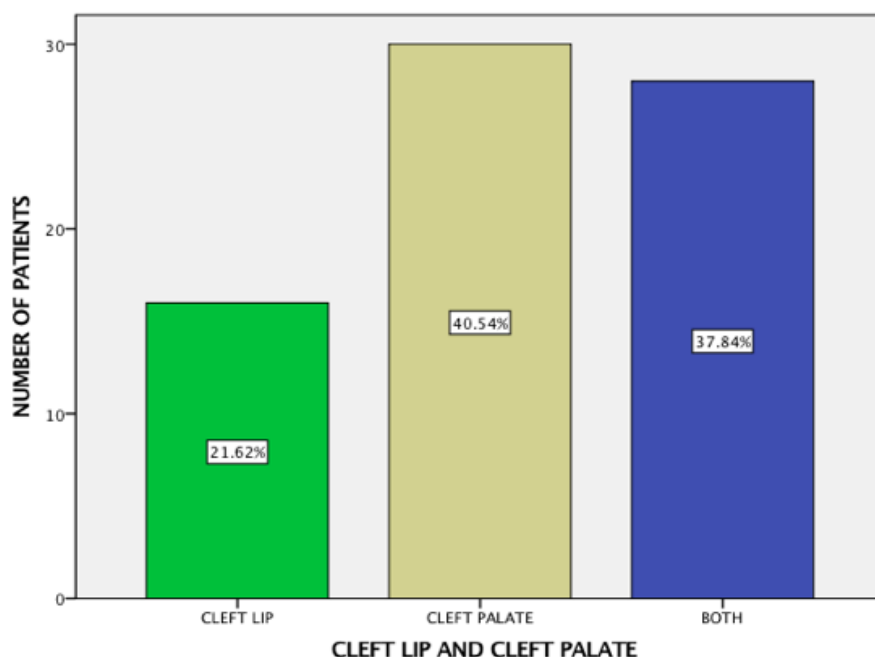


Figure 1: Bar chart depicting frequency distributions of cleft lip and cleft palate. X axis shows distributions of cleft lip and cleft palate. Y axis shows the number of patients in each cleft. Cleft palate showed (n=30, 40.5%) the highest prevalence followed by both cleft lip and palate (n=28, 37.8%) involvement and cleft lip (n=16, 21.6%).

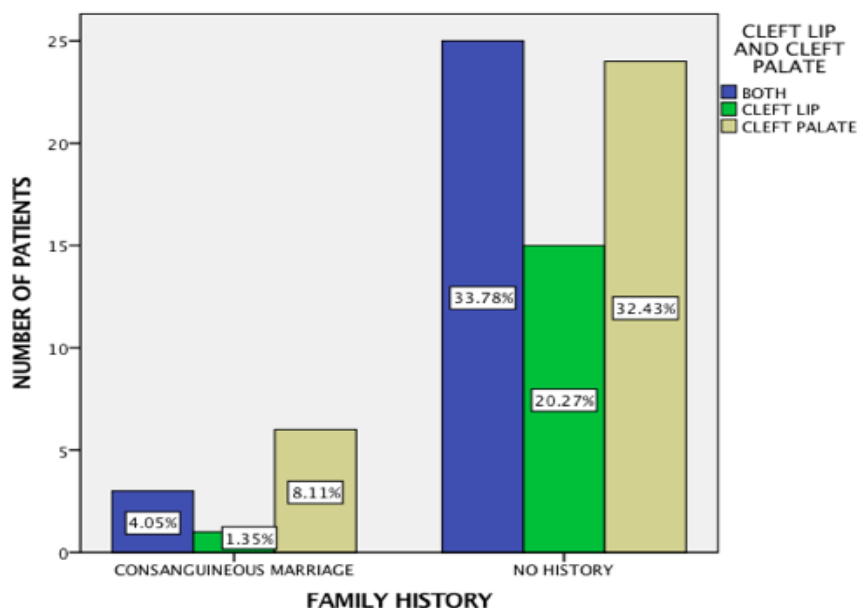


Figure 2: Bar chart depicting association of cleft lip and cleft palate and family history. X axis shows distributions of family history. Y axis shows the

number of patients. Chi-square test was done and association was found to be statistically not significant. Pearson’s Chi Square value: 1.990, DF2:2, p value: 0.370 (>0.05). Hence, statistically not significant. Consanguineous marriage was more prevalent in patients with cleft palate (beige) than both cleft lip and palate (blue) and also cleft lip (green).

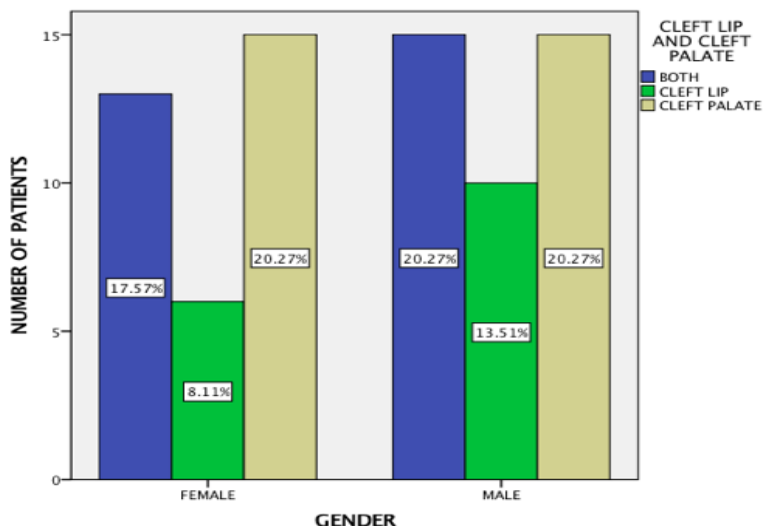


Figure 3: Bar chart depicting associations of cleft lip and cleft palate and gender. X axis shows different genders. Y axis shows the number of patients in each gender. Chi-square test was done and association was found to be statistically not significant. Pearson’s Chi Square value: 0.661, DF2:2, p value: 0.719 (>0.05). Hence, statistically not significant. In females, cleft palate (beige) was the most common followed by both cleft lip and palate (blue) and cleft lip (green). Whereas in males, cleft palate (beige) and both cleft lip and palate (blue) were more common than cleft lip (green).

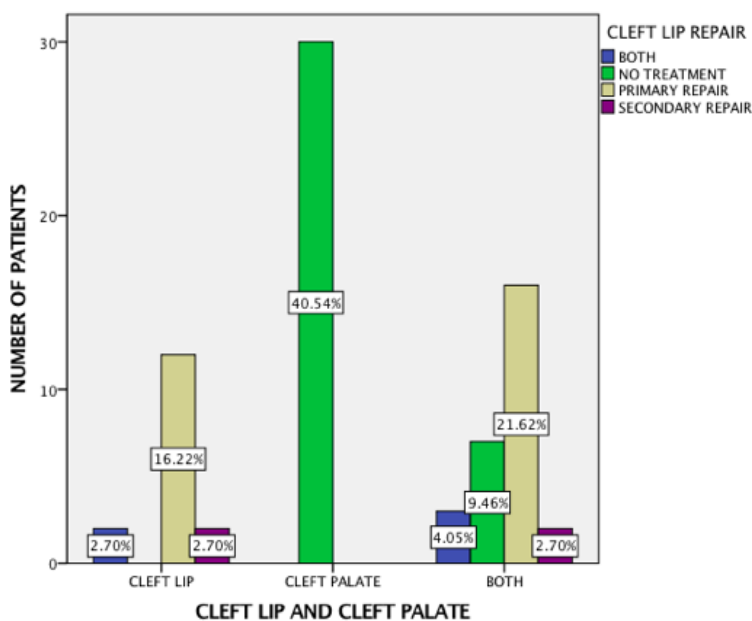


Figure 4: Bar chart depicting association of cleft lip and palate with cleft lip repair. X axis shows different types of cleft. Y axis shows the number of patients for cleft lip repair. Chi-square test was done and association was found to be statistically significant. Pearson's Chi Square value: 49.327, DF2:2, p value: 0.000 (<0.05). Hence, statistically significant, proving the majority of the patients underwent primary repair (beige) than both primary and secondary repairs (blue) and secondary repair (purple). In cleft lip, primary repair (beige), was commonly done in comparison to secondary repair (purple) and both surgeries (blue).

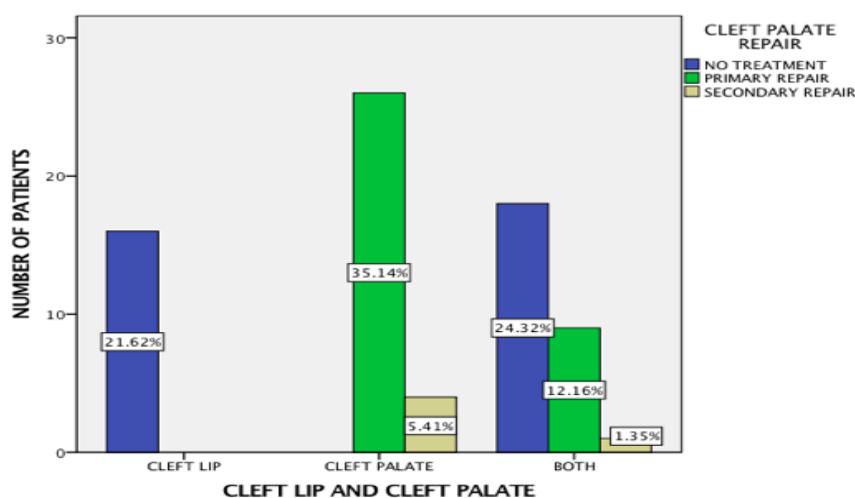


Figure 5: Bar chart depicting association of cleft lip and palate with cleft palate repair. X axis shows different types of cleft. Y axis shows the number of patients for cleft palate repair. Chi-square test was done and association was found to be statistically significant. Pearson's Chi Square value: 48.189, DF2:2, p value: 0.000 (<0.05). Hence, statistically significant, proving in cleft palate, most of the patients underwent primary repair (green) than secondary repair (beige). In cleft lip and palate, primary repair (green) was commonly done than secondary repair (beige).

CONCLUSION

Within the limit of study, cleft palate is more prevalent compared to cleft lip and cleft lip and cleft palate. Male was commonly affected with a cleft lip and cleft palate. There was no significant association of cleft lip and cleft palate with consanguineous marriage of parents. Majority of the patients underwent primary repair of cleft lip and cleft palate.

AUTHORS CONTRIBUTION

All authors have equal contribution in bringing out this research work.

ACKNOWLEDGEMENTS

The authors extend their sincere thanks to Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai for all of the support.

CONFLICT OF INTEREST

There were no conflicts of interests as declared by authors.

REFERENCES

- Misra SR, Shankar YU, Rastogi V, Maragathavalli G. Metastatic hepatocellular carcinoma in the maxilla and mandible, an extremely rare presentation. *Contemp Clin Dent*. 2015 Mar;6(Suppl 1):S117–21.
- Muthukrishnan A, Kumar LB. Actinic cheilosis: early intervention prevents malignant transformation [Internet]. *BMJ Case Reports*. 2017. p. bcr2016218654. Available from: <http://dx.doi.org/10.1136/bcr-2016-218654>
- Chaitanya NC, Muthukrishnan A, Babu DBG, Kumari CS, Lakshmi MA, Palat G, et al. Role of Vitamin E and Vitamin A in Oral Mucositis Induced by Cancer Chemo/Radiotherapy- A Meta-analysis. *J Clin Diagn Res*. 2017 May;11(5):ZE06–9.
- Souza J, Raskin S. Clinical and epidemiological study of orofacial clefts [Internet]. *Jornal de Pediatria*. 2013;89:137–44.
- (who) WHO, Others. Addressing the global challenges of craniofacial anomalies. Geneva: WHO. 2006;
- Supit L, Prasetyono TOH. Cleft lip and palate review: Epidemiology, risk factors, quality of life, and importance of classifications [Internet]. *Medical Journal of Indonesia*. 2008;17:226.
- Burg ML, Chai Y, Yao CA, Magee W, Figueiredo JC. Epidemiology, Etiology, and Treatment of Isolated Cleft Palate [Internet]. *Frontiers in Physiology*. 2016; 7:67
- Venugopal A, Maheswari TNU. Expression of matrix metalloproteinase-9 in oral potentially malignant disorders: A systematic review [Internet]. *Journal of Oral and Maxillofacial Pathology*. 2016;20(3):474.
- Hodgkinson PD, Brown S, Duncan D, Grant C, Mcnaughton Amy, Thomas P, Et Al. Management Of Children With Cleft Lip And Palate: A Review Describing The Application Of Multidisciplinary Team Working In This Condition Based Upon The Experiences Of A Regional Cleft Lip And Palate Centre In The United Kingdom [Internet]. *Fetal and Maternal Medicine Review*. 2005;16:1–27.
- Muthukrishnan A, Warnakulasuriya S. Oral health consequences of smokeless tobacco use. *Indian J Med Res*. 2018 Jul;148(1):35–40.
- Shah S, Uppal S, Mittal R, Garg R, Gupta A. Epidemiology and clinical profile of cleft lip and palate patients, in a tertiary institute in Punjab, India: A preliminary study [Internet]. *Journal of Cleft Lip Palate and Craniofacial Anomalies*. 2016;3:32.
- Venkanna S, Shivani V. Genetic significance of muscle segment homeo box1 gene in South Indian population for cleft lip and palate [Internet]. *Indian Journal of Human Genetics*. 2012;18:332.

- Reddy S, Reddy R, Bronkhorst E, Prasad R, Ettema A, Sailer H, et al. Incidence of cleft Lip and palate in the state of Andhra Pradesh, South India [Internet]. *Indian Journal of Plastic Surgery*. 2010;43:184.
- Choudhury P. Vanishing Roots: First Case Report of Idiopathic Multiple Cervico–Apical External Root Resorption [Internet]. *Journal Of Clinical And Diagnostic Research*. 2015;9(3):ZD17.
- Chaitanya NC, Muthukrishnan A, Krishnaprasad CMS, Sanjuprasanna G, Pillay P, Mounika B. An Insight and Update on the Analgesic Properties of Vitamin C. *J Pharm Bioallied Sci*. 2018 Jul;10(3):119–25.
- Patil SR, Maragathavalli G, Araki K, Al-Zoubi IA, Sghaireen MG, Gudipani RK, et al. Three-Rooted Mandibular First Molars in a Saudi Arabian Population: A CBCT Study [Internet]. *Pesquisa Brasileira em Odontopediatria e Clínica Integrada*. 2018;18(1):e4133.
- Hlongwa P, Levin J, Rispel LC. Epidemiology and clinical profile of individuals with cleft lip and palate utilising specialised academic treatment centres in South Africa. *PLoS One*. 2019 May 9;14(5):e0215931.
- Kesande T, Muwazi LM, Bataringaya A, Rwenyonyi CM. Prevalence, pattern and perceptions of cleft lip and cleft palate among children born in two hospitals in Kisoro District, Uganda [Internet]. *BMC Oral Health*. 2014:14
- Yilmaz HN, Department of Orthodontics, Marmara University School of Dentistry, Istanbul, Turkey, Ozbilen EO, et al. The Prevalence of Cleft Lip and Palate Patients: A Single-Center Experience for 17 Years [Internet]. Vol. 32, *Turkish Journal of Orthodontics*. 2019;32(3): 139–44.
- Dvivedi J, Dvivedi S. A clinical and demographic profile of the cleft lip and palate in Sub-Himalayan India: A hospital-based study [Internet]. *Indian Journal of Plastic Surgery*. 2012;45(1):115–20.
- Rohini S, Jayanth Kumar V. Incidence of dental caries and pericoronitis associated with impacted mandibular third molar-A radiographic study [Internet]. *Research Journal of Pharmacy and Technology*. 2017;10:1081.
- Muthukrishnan A, Kumar LB, Ramalingam G. Medication-related osteonecrosis of the jaw: a dentist’s nightmare [Internet]. *BMJ Case Reports*. 2016:20164626.
- Subha M, Arvind M. Role of Magnetic Resonance Imaging in Evaluation of Trigeminal Neuralgia with its Anatomical Correlation [Internet]. *Biomedical and Pharmacology Journal*. 2019;12(1):289–96.
- Steele JC, Clark HJ, Hong CHL, Jurge S, Muthukrishnan A, Ross Kerr A, et al. World Workshop on Oral Medicine VI: an international validation study of clinical competencies for advanced training in oral medicine [Internet]. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*. 2015;120(2):143–51.e7.
- Maheswari TNU, Venugopal A, Sureshbabu N, Ramani P. Salivary micro RNA as a potential biomarker in oral potentially malignant disorders: A systematic review [Internet]. *Tzu Chi Medical Journal*. 2018;30(2):55.

- Subashri A, Uma Maheshwari TN. Knowledge and attitude of oral hygiene practice among dental students [Internet]. Research Journal of Pharmacy and Technology. 2016;9(1): 1840.
- Dharman S, Muthukrishnan A. Oral mucous membrane pemphigoid – Two case reports with varied clinical presentation [Internet]. Journal of Indian Society of Periodontology. 2016;20(6):630.