Journal of Contemporary Issues in Business and Government Vol. 27, No. 2, 2021
https://cibg.org.au/

P-ISSN: 2204-1990; E-ISSN: 1323-6903
DOI: 10.47750/cibg.2021.27.02.394

Assessment of Prevalence and Gender Distribution of Congenitally Missing Maxillary Lateral Incisors

APARNA.M[1], NIVETHIGAA B[2*], RAKSHAGAN V[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science, Saveetha University,Chennai, India.
[2]Senior Lecturer,Department of Orthodontics,Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science,Saveetha University,Chennai, India.
[3]Senior Lecturer,Department of Prosthodontics,Saveetha Dental College and Hospitals,Saveetha Institute of Medical and Technical Science,Saveetha University,Chennai, India.
*Corresponding author,
Email : 151501019.sdc@saveetha.com[1], nivethigaab.sdc@saveetha.com[2], rakshagan.sdc@saveetha.com[3]

Abstract: Tooth agenesis refers to the developmental failure of a tooth and could be classified into anodontia or partial anodontia. It is more frequently observed on the permanent dentition with more frequency for the upper arch than in lower arch. Many studies had evaluated the prevalence of congenitally missing lateral incisors among various populations previously. The main aim of the study is to assess the prevalence and gender distribution of congenitally missing maxillary lateral incisors among a sample of 10000 patients in an institutional set-up. Dental records and radiographs were retrospectively examined for the presence of missing maxillary lateral incisors. Data was retrieved from the dental case records of Saveetha Dental College, Chennai. Details like age, gender, absence of missing lateral incisors may be unilateral (or) bilateral were retrieved from the source and analysed. Lesser prevalence rate of missing maxillary lateral incisors among the examined population (n=10,000) was found.

Keywords: Maxillary lateral incisors, Prevalence, Permanent teeth, Tooth agenesis.

INTRODUCTION

The congenital absence of one or more teeth is a dental anomaly that frequently occurs in the world's population with a wide variability of distribution as compared to various other developmental abnormalities. Tooth agenesis refers to the developmental failure of a tooth which could be further classified into anodontia or partial anodontia(Affan and Serour, 2014).

Anodontia is the total absence of the tooth development in primary or permanent or both dentition. Partial Andontia is known as the lack of development and absence of one or more teeth.It may be further divided into two types which is known as oligodontia and hypodontia. Oligodontia is termed as a rare developmental dental anomaly in humans characterised by the absence of six or more teeth, whereas hypodontia is defined as the developmental absence of one or more teeth excluding the third molars. It is one of the most common dental anomalies and has a negative impact on both esthetics and function (Acev and Gjorgova, 2014).

Various causes of tooth agenesis may be due to genetic diseases like cleft lip / palate, down's syndrome etc; or due to non-syndromic agenesis like gene mutations especially genes such as (MSX1 and PAX9), Diseases such as syphilis, birth injuries pregnancy illness and traumatic injuries are also considered to be various other contributing factors for tooth agenesis (Bailleul-Forestier et al., 2008).

Absence of lateral incisors may cause a variety of esthetic and functional problems like midline diastema, spacing between permanent incisor and canine, mesial migration of canine, midline shift in case of unilateral missing tooth (Chung, Han and Kim, 2008, p. 4). The definitive diagnosis is required which can be achieved by radiographic examination and reviewing dental records in order to confirm the assumed diagnosis.

Many studies had evaluated the prevalence of congenitally missing lateral incisors among various populations previously (Cozzani, Lombardo and Gracco, 2011). Moreover, treatment protocols for missing lateral incisors is complicated and a challenging process, which demands interaction with several dental specialities. The aim of this study was to estimate the prevalence and gender distribution of congenitally missing maxillary lateral incisors in an institutional setup.Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J et al., 2018; Menon et al., 2018; Prabakar et al., 2018; Rajeshkumar et al., 2018, 2019; Vishnu Prasad et al., 2018; Wahab et al., 2018; Dua et al., 2019; Duraisamy et al., 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran et

al., 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma et al., 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi et al., 2020; Samuel, Acharya and Rao, 2020)

MATERIALS AND METHODS

This study was planned in a university set up among the patients under the age group of 18 to 30 years who visited Saveetha Dental College for dental check up. Before scheduling the retrospective study the official permission was acquired from the Institutional ethical committee (ethical approval number - SDC/SIHEC/2020/DIASDATA/0619-0320) .

Data collection

A total of 10000 patients were selected with a simple random sampling technique. Case reports of the patients were retrieved and reviewed from the archives of Saveetha Dental College. Incomplete case records were excluded from the study, a retrospective study was done based upon the available dental records from june 2019 to March 2020. Details like age, gender, absence of missing lateral incisors may be unilateral (or) bilateral were retrieved from the source and analysed.

Inclusion and exclusion criteria

The Inclusion criteria included high quality radiograph of patients that were between the age group of 18 to 30 years as by this time all the permanent teeth would have erupted exclusion criteria which includes poor quality IOPA / OPG incomplete dental records, previous history of extraction. The data was tabulated in excel sheets and were copied to IBM SPSS (version 26.0). Data was analysed using chi-square test was done to find the association of missing maxillary lateral incisor among the different age and gender.

RESULTS AND DISCUSSION

Various studies assessed the prevalence rate of congenitally missing teeth and missing lateral incisors among different study populations. There are several studies in which researchers have attempted various clinical trials for advanced orthodontic diagnosis, treatment planning [(Sivamurthy and Sundari, 2016)],[(Samantha et al., 2017)],[(Krishnan, Pandian and Kumar S, 2015)],[(Vikram et al., 2017)],[(Kamisetty, 2015)],[(Viswanath et al., 2015)] and in vitro studies were done and assessed based on various recent advances in orthodontic management [(Felicita, 2017)],[(Jain, 2014)],[(Krishnan, Pandian and Kumar, 2018)],[(Ramesh Kumar et al., 2011)],[(Felicita and Sumathi Felicita, 2017)],[(Felicita, Chandrasekar and Shanthasundari, 2013)].This study evaluates the prevalence rate of missing maxillary lateral incisors in chennai population.

Among the total of 10000 patients , 67 patients had missing total incisors under the age group of 18 to 30 years. Figure 1 represents the frequency of distribution of patients with missing maxillary lateral incisors, which shows that 52 patients (77.61%) had unilaterally missing maxillary lateral incisors whereas, 15 patients (22.39%) had bilaterally missing maxillary lateral incisors.Whereas, figure 2 infers that the association between patients with missing upper lateral incisors and gender distribution. Among males, 41 patients (61.19%) unilateral missing maxillary lateral incisors and 7 patients (10.45%) had bilateral missing maxillary lateral incisors. Among females, 11 patients (16.42%) unilateral missing maxillary lateral incisors and 8 patients (11.94%) had bilateral missing maxillary lateral incisors .

Therefore, the overall prevalence for congenitally missing maxillary lateral incisors in all the cases was 0.7% which falls within the range 0.71 % to 2.6 % reported by other studies. Association of patients with missing maxillary lateral incisors with gender was statistically significant ($P < 0.05$) among the institutional set up. Similarly, Mani et al reported that 1.7% of their study population among Malaysians had missing lateral incisors. Pinho et al reported that 1.3% patients were found to have missing upper lateral incisors. Naji Ziad Arandi et al reported that the study population conducted in Palestinis had upper missing lateral incisors [(Pinho and Lemos, 2012)],[(Mani, Mohsin and John, 2014)],[(Arandi and Mustafa, 2018)].

Prevalence of congenitally missing maxillary lateral incisors among males was higher than females in our study. Whereas, Batool and Ahmed et al , Maniet et al did not report the gender distribution and association with missing lateral incisors . Yet, Nazi et at and Pinho et at had reported that females were more frequently affected which was a contradictory literature compared to this study [(Shimizu and Maeda, 2009)],[(Muller et al., 1970)].

Numerous studies evaluated the prevalence of hypodontia in orthodontic patients whereas, in this study the prevalence of lateral incisor agenesis in both non-orthodontic and orthodontic patients were analysed [(Endo et al., 2006)].

Higher prevalence rates have been reported in other studies. But, in our study there was a lesser prevalence rate of missing maxillary lateral incisors because other studies are restricted and taken up only for orthodontic patients [(Bäckman and Wahlin, 2001)].

Therefore, this study provides useful information and statistics regarding upper lateral incisor agenesis among chennai population and helps dental professionals to learn more about the prevalence of maxillary lateral incisor

agenesis and emphasizes the importance of early diagnosis and referral to reduce or prevent a number of complications that may affect the function and esthetics [(Baccetti, 1998)].
Still this study has limitations as it is a retrospective study, and only representatives of the patient pool at one institution in chennai. Wider population groups should be studied in chennai in order to draw more accurate results like several other studies which had taken and assessed larger study samples in their research [(Dinesh and Saravana Dinesh, 2013)],[(Felicita, 2018)],[(Rubika, Sumathi Felicita and Sivambiga, 2015)].Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; Mathew et al., 2020)

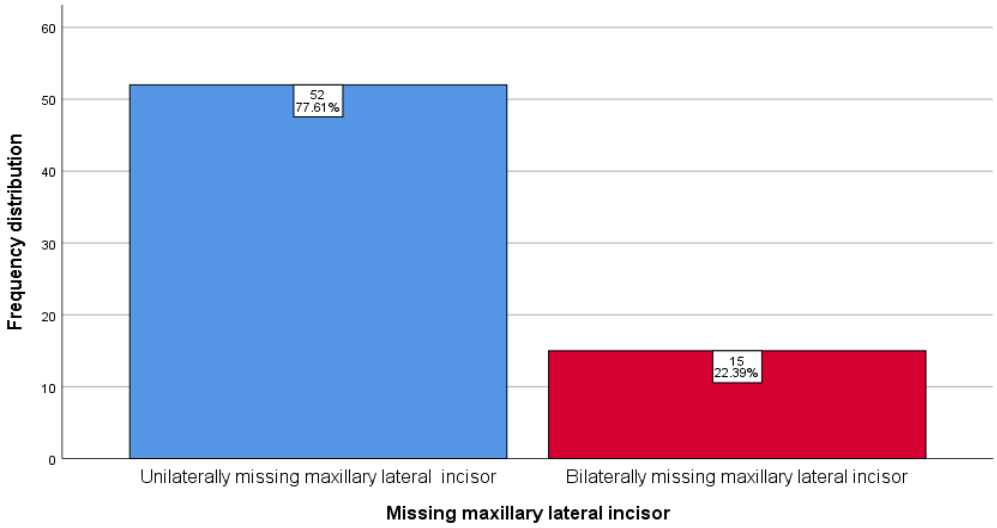

Fig.1: Bar graph represents frequency of distribution of patients with unilateral and bilateral missing of maxillary lateral incisors. X axis represents missing maxillary lateral incisor (unilateral or bilateral). Y axis represents the frequency distribution of patients with congenitally missing lateral incisors. Frequency distribution of unilaterally missing maxillary lateral incisors (blue) was higher as compared to bilateral (red).

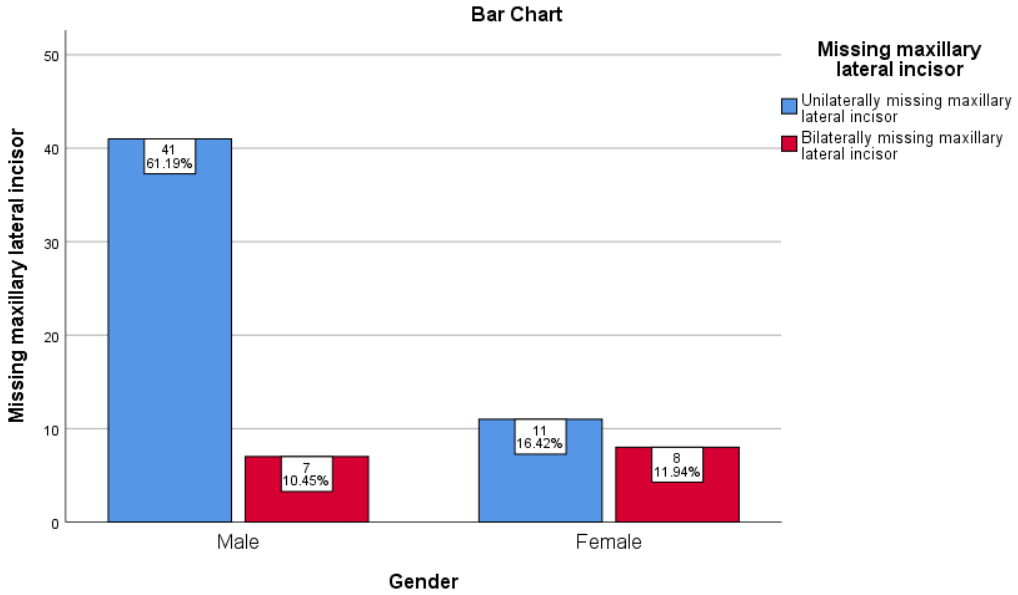

Fig.2: Bar graph represents the association between gender distribution among the patients with congenitally missing maxillary lateral incisors. X axis represents gender distribution. Y axis represents the number of patients with missing lateral incisors. Unilaterally missing maxillary lateral incisors (blue) were more among both males and females as compared to bilaterally missing maxillary lateral incisors (red). Chi square value: 5.934; p-value= 0.015 which was considered to be statistically significant.

CONCLUSION

Overall prevalence of congenitally missing maxillary lateral incisors was less. Association of congenitally missing maxillary lateral incisors with gender reveals males had higher prevalence of missing lateral incisors than females. The frequency of distribution of unilaterally missing maxillary lateral incisor was prevalently higher than bilaterally missing maxillary lateral incisor among the selected population.

ACKNOWLEDGEMENT

The authors would like to thank the study participants for their participation and Saveetha Dental College for providing a platform to express our knowledge.

REFERENCES

1. Acev, D. P. and Gjorgova, J. (2014) 'Prevalence of Hypodontia in the Permanent Dentition of Macedonian Population', Balkan Journal of Dental Medicine, pp. 93–98. doi: 10.1515/bjdm-2015-0015.
2. Affan, A. A. and Serour, A. (2014) 'Prevalence of Hypodontia in Permanent Dentition in a Sample of Sudanese University Students', International Arab Journal of Dentistry, pp. 59–64. doi: 10.12816/0028750.
3. Arandi, N. Z. and Mustafa, S. (2018) 'Maxillary lateral incisor agenesis; a retrospective cross-sectional study', The Saudi Dental Journal, pp. 155–160. doi: 10.1016/j.sdentj.2017.12.006.
4. Baccetti, T. (1998) 'A controlled study of associated dental anomalies', The Angle orthodontist, 68(3), pp. 267–274.
5. Bäckman, B. and Wahlin, Y. B. (2001) 'Variations in number and morphology of permanent teeth in 7-year-old Swedish children', International Journal of Paediatric Dentistry, pp. 11–17. doi: 10.1046/j.1365-263x.2001.00205.x.
6. Bailleul-Forestier, I. et al. (2008) 'The genetic basis of inherited anomalies of the teeth. Part 1: clinical and molecular aspects of non-syndromic dental disorders', European journal of medical genetics, 51(4), pp. 273–291.
7. Chung, C. J., Han, J.-H. and Kim, K.-H. (2008) 'The pattern and prevalence of hypodontia in Koreans', Oral Diseases, pp. 620–625. doi: 10.1111/j.1601-0825.2007.01434.x.
8. Cozzani, M., Lombardo, L. and Gracco, A. (2011) 'Class III malocclusion with missing maxillary lateral incisors', American Journal of Orthodontics and Dentofacial Orthopedics, pp. 388–396. doi: 10.1016/j.ajodo.2009.09.022.
9. Deogade, S., Gupta, P. and Ariga, P. (2018) 'Effect of monopoly-coating agent on the surface roughness of a tissue conditioner subjected to cleansing and disinfection: A Contact Profilometric In vitro study', Contemporary Clinical Dentistry, p. 122. doi: 10.4103/ccd.ccd_112_18.
10. Dinesh, S. P. S. and Saravana Dinesh, S. P. (2013) 'An Indigenously Designed Apparatus for Measuring Orthodontic Force', JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. doi: 10.7860/jcdr/2013/7143.3631.
11. Dua, K. et al. (2019) 'The potential of siRNA based drug delivery in respiratory disorders: Recent advances and progress', Drug development research, 80(6), pp. 714–730.
12. Duraisamy, R. et al. (2019) 'Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments', Implant dentistry, 28(3), pp. 289–295.
13. Endo, T. et al. (2006) 'A survey of hypodontia in Japanese orthodontic patients', American Journal of Orthodontics and Dentofacial Orthopedics, pp. 29–35. doi: 10.1016/j.ajodo.2004.09.024.
14. Ezhilarasan, D. (2018) 'Oxidative stress is bane in chronic liver diseases: Clinical and experimental perspective', Arab journal of gastroenterology: the official publication of the Pan-Arab Association of Gastroenterology, 19(2), pp. 56–64.
15. Ezhilarasan, D., Apoorva, V. S. and Ashok Vardhan, N. (2019) 'Syzygium cumini extract induced reactive oxygen species-mediated apoptosis in human oral squamous carcinoma cells', Journal of oral pathology & medicine: official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology, 48(2), pp. 115–121.
16. Ezhilarasan, D., Sokal, E. and Najimi, M. (2018) 'Hepatic fibrosis: It is time to go with hepatic stellate cell-specific therapeutic targets', Hepatobiliary & pancreatic diseases international: HBPD INT, 17(3), pp. 192–197.
17. Felicita, A. S. (2017) 'Quantification of intrusive/retraction force and moment generated during en-masse retraction of maxillary anterior teeth using mini-implants: A conceptual approach', Dental press journal of orthodontics, 22(5), pp. 47–55.
18. Felicita, A. S. (2018) 'Orthodontic extrusion of Ellis Class VIII fracture of maxillary lateral incisor - The sling shot method', The Saudi dental journal, 30(3), pp. 265–269.
19. Felicita, A. S., Chandrasekar, S. and Shanthasundari, K. K. (2013) 'Determination of craniofacial relation among the subethnic Indian population: a modified approach (vertical evaluation)', Indian journal of dental

research: official publication of Indian Society for Dental Research, 24(4), pp. 456–463.
20. Felicita, A. S. and Sumathi Felicita, A. (2017) 'Orthodontic management of a dilacerated central incisor and partially impacted canine with unilateral extraction – A case report', The Saudi Dental Journal, pp. 185–193. doi: 10.1016/j.sdentj.2017.04.001.
21. Gheena, S. and Ezhilarasan, D. (2019) 'Syringic acid triggers reactive oxygen species-mediated cytotoxicity in HepG2 cells', Human & experimental toxicology, 38(6), pp. 694–702.
22. Gomathi, A. C. et al. (2020) 'Anticancer activity of silver nanoparticles synthesized using aqueous fruit shell extract of Tamarindus indica on MCF-7 human breast cancer cell line', Journal of Drug Delivery Science and Technology, p. 101376. doi: 10.1016/j.jddst.2019.101376.
23. Jain, R. K. (2014) 'Comparison of Intrusion Effects on Maxillary Incisors Among Mini Implant Anchorage, J-Hook Headgear and Utility Arch', JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. doi: 10.7860/jcdr/2014/8339.4554.
24. Jeevanandan, G. and Govindaraju, L. (2018) 'Clinical comparison of Kedo-S paediatric rotary files vs manual instrumentation for root canal preparation in primary molars: a double blinded randomised clinical trial', European Archives of Paediatric Dentistry, pp. 273–278. doi: 10.1007/s40368-018-0356-6.
25. J, P. C. et al. (2018) 'Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study', Clinical implant dentistry and related research, 20(4), pp. 531–534.
26. Kamisetty, S. K. (2015) 'SBS vs Inhouse Recycling Methods-An Invitro Evaluation', JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. doi: 10.7860/jcdr/2015/13865.6432.
27. Krishnan, S., Pandian, K. and Kumar, S. (2018) 'Angular photogrammetric analysis of the soft-tissue facial profile of Indian adults', Indian Journal of Dental Research, p. 137. doi: 10.4103/ijdr.ijdr_496_16.
28. Krishnan, S., Pandian, S. and Kumar S, A. (2015) 'Effect of bisphosphonates on orthodontic tooth movement-an update', Journal of clinical and diagnostic research: JCDR, 9(4), pp. ZE01–5.
29. Malli Sureshbabu, N. et al. (2019) 'Concentrated Growth Factors as an Ingenious Biomaterial in Regeneration of Bony Defects after Periapical Surgery: A Report of Two Cases', Case reports in dentistry, 2019, p. 7046203.
30. Mani, S. A., Mohsin, W. S. Y. and John, J. (2014) 'Prevalence and patterns of tooth agenesis among Malay children', The Southeast Asian journal of tropical medicine and public health, 45(2), pp. 490–498.
31. Mathew, M. G. et al. (2020) 'Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary …', Clinical oral investigations. Available at: https://link.springer.com/article/10.1007/s00784-020-03204-9.
32. Mehta, M. et al. (2019) 'Oligonucleotide therapy: An emerging focus area for drug delivery in chronic inflammatory respiratory diseases', Chemico-biological interactions, 308, pp. 206–215.
33. Menon, S. et al. (2018) 'Selenium nanoparticles: A potent chemotherapeutic agent and an elucidation of its mechanism', Colloids and Surfaces B: Biointerfaces, pp. 280–292. doi: 10.1016/j.colsurfb.2018.06.006.
34. Muller, T. P. et al. (1970) 'A Survey of Congenitally Missing Permanent Teeth', The Journal of the American Dental Association, pp. 101–107. doi: 10.14219/jada.archive.1970.0151.
35. Panchal, V., Jeevanandan, G. and Subramanian, E. M. G. (2019) 'Comparison of post-operative pain after root canal instrumentation with hand K-files, H-files and rotary Kedo-S files in primary teeth: a randomised clinical trial', European archives of paediatric dentistry: official journal of the European Academy of Paediatric Dentistry, 20(5), pp. 467–472.
36. Pc, J., Marimuthu, T. and Devadoss, P. (2018) 'Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study', Clinical implant dentistry and related research. Available at: https://europepmc.org/article/med/29624863.
37. Pinho, T. and Lemos, C. (2012) 'Dental repercussions of maxillary lateral incisor agenesis', European journal of orthodontics, 34(6), pp. 698–703.
38. Prabakar, J. et al. (2018) 'Comparative Evaluation of Retention, Cariostatic Effect and Discoloration of Conventional and Hydrophilic Sealants - A Single Blinded Randomized Split Mouth Clinical Trial', Contemporary clinical dentistry, 9(Suppl 2), pp. S233–S239.
39. Rajendran, R. et al. (2019) 'Comparative Evaluation of Remineralizing Potential of a Paste Containing Bioactive Glass and a Topical Cream Containing Casein Phosphopeptide-Amorphous Calcium Phosphate: An in Vitro Study', Pesquisa Brasileira em Odontopediatria e Clínica Integrada, pp. 1–10. doi: 10.4034/pboci.2019.191.61.
40. Rajeshkumar, S. et al. (2018) 'Biosynthesis of zinc oxide nanoparticles usingMangifera indica leaves and evaluation of their antioxidant and cytotoxic properties in lung cancer (A549) cells', Enzyme and microbial technology, 117, pp. 91–95.
41. Rajeshkumar, S. et al. (2019) 'Antibacterial and antioxidant potential of biosynthesized copper nanoparticles mediated through Cissus arnotiana plant extract', Journal of photochemistry and photobiology. B, Biology, 197, p. 111531.
42. Ramadurai, N. et al. (2019) 'Effectiveness of 2% Articaine as an anesthetic agent in children: randomized

controlled trial', Clinical oral investigations, 23(9), pp. 3543–3550.
43. Ramakrishnan, M., Dhanalakshmi, R. and Subramanian, E. M. G. (2019) 'Survival rate of different fixed posterior space maintainers used in Paediatric Dentistry - A systematic review', The Saudi dental journal, 31(2), pp. 165–172.
44. Ramesh, A. et al. (2018) 'Comparative estimation of sulfiredoxin levels between chronic periodontitis and healthy patients - A case-control study', Journal of periodontology, 89(10), pp. 1241–1248.
45. Ramesh Kumar, K. R. et al. (2011) 'Depth of resin penetration into enamel with 3 types of enamel conditioning methods: a confocal microscopic study', American journal of orthodontics and dentofacial orthopedics: official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics, 140(4), pp. 479–485.
46. Rubika, J., Sumathi Felicita, A. and Sivambiga, V. (2015) 'Gonial Angle as an Indicator for the Prediction of Growth Pattern', World Journal of Dentistry, pp. 161–163. doi: 10.5005/jp-journals-10015-1334.
47. Samantha, C. et al. (2017) 'Comparative Evaluation of Two Bis-GMA Based Orthodontic Bonding Adhesives - A Randomized Clinical Trial', Journal of clinical and diagnostic research: JCDR, 11(4), pp. ZC40–ZC44.
48. Samuel, S. R., Acharya, S. and Rao, J. C. (2020) 'School Interventions-based Prevention of Early-Childhood Caries among 3-5-year-old children from very low socioeconomic status: Two-year randomized trial', Journal of public health dentistry, 80(1), pp. 51–60.
49. Sharma, P. et al. (2019) 'Emerging trends in the novel drug delivery approaches for the treatment of lung cancer', Chemico-biological interactions, 309, p. 108720.
50. Shimizu, T. and Maeda, T. (2009) 'Prevalence and genetic basis of tooth agenesis', Japanese Dental Science Review, pp. 52–58. doi: 10.1016/j.jdsr.2008.12.001.
51. Sivamurthy, G. and Sundari, S. (2016) 'Stress distribution patterns at mini-implant site during retraction and intrusion—a three-dimensional finite element study', Progress in Orthodontics. doi: 10.1186/s40510-016-0117-1.
52. Sridharan, G. et al. (2019) 'Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma', Journal of oral pathology & medicine: official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology, 48(4), pp. 299–306.
53. Varghese, S. S., Ramesh, A. and Veeraiyan, D. N. (2019) 'Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students', Journal of dental education, 83(4), pp. 445–450.
54. Vijayashree Priyadharsini, J. (2019) 'In silico validation of the non-antibiotic drugs acetaminophen and ibuprofen as antibacterial agents against red complex pathogens', Journal of periodontology, 90(12), pp. 1441–1448.
55. Vikram, N. R. et al. (2017) 'Ball Headed Mini Implant', Journal of clinical and diagnostic research: JCDR, 11(1), pp. ZL02–ZL03.
56. Vishnu Prasad, S. et al. (2018) 'Report on oral health status and treatment needs of 5-15 years old children with sensory deficits in Chennai, India', Special care in dentistry: official publication of the American Association of Hospital Dentists, the Academy of Dentistry for the Handicapped, and the American Society for Geriatric Dentistry, 38(1), pp. 58–59.
57. Viswanath, A. et al. (2015) 'Obstructive sleep apnea: awakening the hidden truth', Nigerian journal of clinical practice, 18(1), pp. 1–7.
58. Wahab, P. U. A. et al. (2018) 'Scalpel Versus Diathermy in Wound Healing After Mucosal Incisions: A Split-Mouth Study', Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 76(6), pp. 1160–1164.