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.2021.27.02.395

Retrospective Study on School Children with Deleterious Oral Habits

APARNA.M[1], MAHESH RAMAKRISHNAN[2]*, RAKSHAGAN V[3]

[1]Saveetha dental college and hospitals,Saveetha Institute of Medical and technical Science,Saveetha University, Chennai , India .
[2]Reader,Department of Pedodontics,Saveetha dental college , Saveetha Institute of Medical and technical Science,Saveetha University,162,Poonamallee High Road ,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], mahesh@saveetha.com[2], rakshagan.sdc@saveetha.com[3]

Abstract: Oral habits are repetitive behaviour in the oral cavity that results in malalignment of the dentofacial structure and they include digit sucking ,lip sucking, lip biting, nail-biting , bruxism, self- injurious habits, mouth breathing and tongue thrusting. This study was taken to assess the prevalence of deleterious oral habits among school children.A Sample size of 6200 patients under 3 to 15 years of age were taken into study. Their case records were reviewed and retrieved from patients reported to a private Dental Hospital, India. Details regarding their demographic information and presence or absence of oral habits were collected. Statistical analysis was done using SPSS (version 26.0) .Prevalence rate among school children with deleterious oral habits was evaluated. Overall 27 % of the school going children had deleterious oral habits.Nail biting (28.52 %) habit was most commonly seen followed by thumb sucking habit (19.39 %) , Mouth breathing habit (19.01 %), Tongue Thrusting habit (17.87 %) and Lip biting habit (15.21 %).Higher prevalence of these oral habits among children were seen in this study population.This highlighted the need for preventive orthodontic treatment at an early age of life, so that future occurrence of malocclusion can be avoided.

Keywords :Malocclusion,Oral habits, Prevalence rate , Preventive treatment,School children.

INTRODUCTION

Habits are acquired automatisms,represented by an altered pattern of muscle contraction with complex characteristics, which proceed unconsciously and on a regular basis (Ravikumar, Jeevanandan and Subramanian, 2017). Deleterious oral habits are the common problem of paediatricians which affects the quality of life (Dutta and Verma, 2018).

Whereas ,oral habits are repetitive behaviour in the oral cavity that result in the loss of tooth structure and they include digit sucking ,lip sucking, lip biting, nail-biting , bruxism, self- injurious habits, mouth breathing and tongue thrusting(Nowak and Warren, 2000),(Barbosa and Gavião, 2008). Their effect is dependent on the nature,onset and duration of habits (Jeevanandan, 2017),(Govindaraju, Jeevanandan and Subramanian, 2017b).The development of habits is considered as part of the normal sequence of maturation process in children but can have the potential to become a harmful one, under the circumstances of physical , mental and socio-economic stress (Govindaraju, Jeevanandan and Subramanian, 2017a),(Veerale Panchal, Jeevanandan and Subramanian, 2019). An oral habit in infancy and early childhood is normal , and it is considered to be abnormal over 3 years of age.

The persistence of these deleterious oral habits may alter the inter - arch relationship ,interfere with the normal growth of jaws and the function of the oro-facial musculature (Christabel and Linda Christabel, 2015),(Packiri, Gurunathan and Selvarasu, 2017).Moreover,it is observed that there has been ascending bend in the prevalence of deleterious oral habits in children , in recent times probably influenced by change in the family and social environment (Gurunathan and Shanmugaavel, 2016). Habits like non- nutritive sucking behaviours such as (thumb sucking, lip sucking) which prolongs beyond 3 and half years can affect the stomatognathic system , by damaging the structure of the mouth. Both thumb sucking and nail biting habits may allow the spread of infectious disease.Tongue thrusting, may create abnormal swallowing patterns (Subramanyam et al., 2018).

Both mouth breathing and thank sucking habit is associated with anterior open bite, abnormal speech and anterior protrusion of the maxillary incisors. Therefore, habits require a multidisciplinary approach to provide integral care to children (‘Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children - Review’,

2018),(Gildasya et al., 2006).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; Rajendran et al., 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma et al., 2019; Varghese, Ramesh and Veeraiyan, 2019; V. Panchal, Jeevanandan and Subramanian, 2019; Gomathi et al., 2020; Samuel, Acharya and Rao, 2020)
The main objective of this study was to determine the various deleterious oral habits present among school children.

MATERIALS AND METHODS

This study was planned among school going children aged 3 to 15 years visited Saveetha Dental College Hospital during the time frame of June 2019 and March 2020. Before scheduling the retrospective study,the official permission was obtained from the Institutional ethical committee (ethical approval number - SDC/SIHEC/2020/DIASDATA/0619-0320). A total of six thousand two hundred children were selected with simple random sampling techniques. Case records of the children were retrieved from the patient management software.Incomplete case records were excluded from the study.

Data collection

A Retrospective study was done based on the available records from June 2019 to March 2020, details like age, gender, residence,presence / absence of the habit, type of habits were retrieved and analysed. Nail biting , mouth breathing, thumb sucking, tongue thrusting and lip biting were especially evaluated.

Statistical analysis

Prevalence of different oral habits among children were assessed from the data obtained . Data collected were tabulated in microsoft excel sheets and imported into SPSS (26.0 version) , retrieved data were used to obtain the frequency of distribution of various deleterious oral habits.

RESULTS AND DISCUSSION

Oral deleterious habits are often called harmful or parafunctional ,which includes thumb sucking, bottle feeding, tongue thrusting, nail biting, lip biting and mouth breathing(Al-Haifi et al., 2013; Mahesh, Waseem and Siva kumar, 2014). These habits have direct influence on the quality of life and can affect the stomatognathic system of the body (AlSadhan and Al-Jobair, 2017),(Langford, 1939).
Development of these habits in school going children are considered to be the sign of distress and emotional instability(Eslami et al., 2017). Children in particular practice of these anomalous habits use them as the way to attract attention possibly because they find themselves in a violent family environment , lack of parental attention, lack of emotional maturity or constant changes in the family (Lakshmanan et al., 2020) .
There are several studies in which researchers have attempted various clinical trials for advanced pedodontic diagnosis, treatment planning and in vitro studies were done and assessed based on various recent advances in pedodontic management (Jeevanandan and Govindaraju, 2018),(Govindaraju, 2017),(Govindaraju and Gurunathan, 2017). Whereas ,this study had assessed frequency of distribution of various deleterious oral habits among school children.
Out of 6200 children, 263 (4.2%) children had various deleterious oral habits. Correlation between age and gender distribution among children with thumb sucking status was done (Graph -1) . Among males 6 % of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 14% , 10 to 12 years it was about 20% and 8% among 13 to 15 years .Among females 6 % of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 24% , 10 to 12 years it was about 16% and 6% among 13 to 15 years .
Correlation between age and gender distribution among children with tongue thrusting habit was done (Graph -2) . Among males 4.26% of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 14.89% , 10 to 12 years it was about 14.89% and 17.02% among 13 to 15 years .Among females 2.13% of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 14.89% , 10 to 12 years it was about 23.40% and 8.51% among 13 to 15 years .
Correlation between age and gender distribution among children with nail biting status was done (Graph -3) . Among males ,2.67 % of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 22.67% , 10 to 12 years it was about 12% and 17.02% among 13 to 15 years .Among females, none of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 18.67% , 10 to 12 years it was about 17.33% and 4% among 13 to 15 years .

Correlation between age and gender distribution among children with lip biting status was done (Graph - 4) . Among males , none of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 25% , 10 to 12 years it was about 12.50% and 7.50% among 13 to 15 years .Among females, none of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 25% , 10 to 12 years it was about 17.50% and 12.50% among 13 to 15 years .

Correlation between age and gender distribution among children with mouth breathing status was done (Graph - 5) . Among males , none of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 28% , 10 to 12 years it was about 16% and 20% among 13 to 15 years .Among females, none of them under the age group of 3 to 6 years had thumb sucking habit , under 7 to 9 years it was about 12% , 10 to 12 years it was about 16% and 8% among 13 to 15 years .

Graph 6 depicts the frequency of distribution of deleterious oral habits among children shows that out of 263 children who had deleterious oral habits; 75 children (28.52%) had Nail biting habit which was considered to be more prevalent, among the frequency of distribution. 51 children (19.39%) had thumb sucking habits, 47 children (17.87%)had tongue thrusting habits, 40 children (15.21%) had lip biting habits and 50 children (19.01%) had mouth breathing habits (Graph - 1).

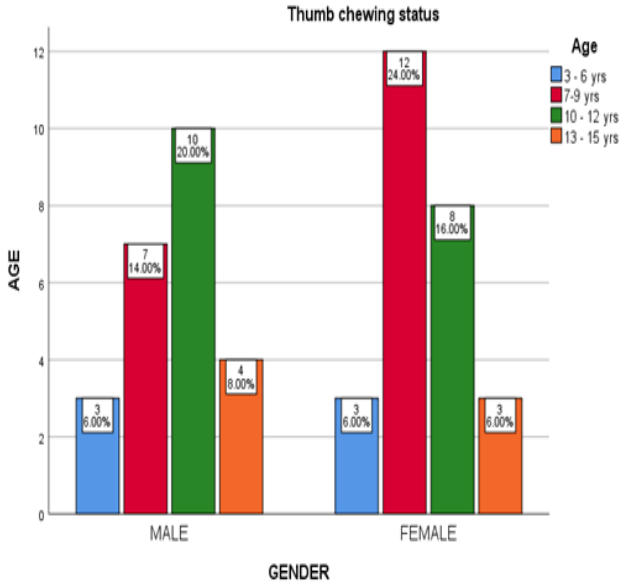
Owing to higher prevalence of oral habits observed the age group of 3 to 15 years , in this literature this age group was selected in the present study.Many authors in most of the studies mentioned that oral habits if persisted beyond preschool age, play a significant role in the development of dental anomalies and malocclusion as they produce a disequilibrium between the intra- and extra oral muscular activities (Somasundaram et al., 2015).

The overall prevalence of oral habits in this study was found to be (27%) which in accordance with the studies reported by kanika s Dhill et al (36 %) and Rajchanovaska and zafirova . Ivanoska (35 %) and Abuaffan (30%.). Contrary to this Oryeaso and sote reported a low prevalence of oral habits (13.14%) among Nigerian preschool children (Rajchanovska and Zafirova-Ivanovska, 2012),(Omer et al., 2015).

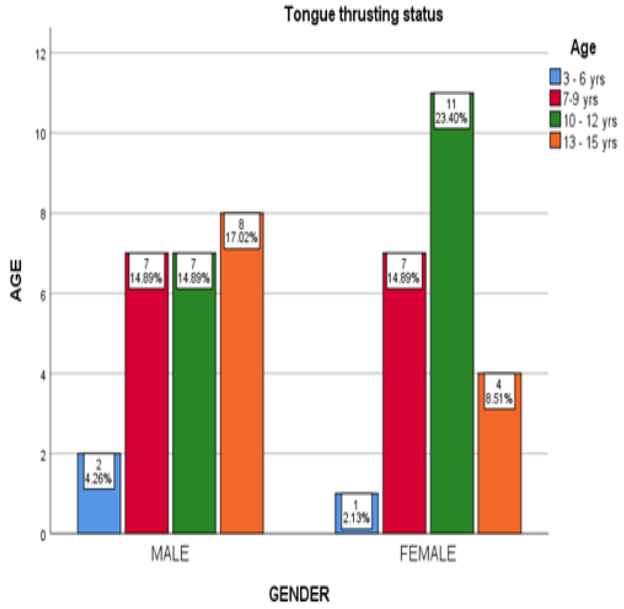
This wide range of prevalence of oral habits may be partially accounted to the fact that be partially accounted to the different oral habits were assessed at different age groups and different methodologies were used. Nevertheless, the role of environmental and cultural factors on the occurrence of oral habits cannot be ignored .The higher frequency of deleterious oral habits was biting (28.5 %) in this study. Whereas Garde JB et al stated that Nail biting was (5. 8%) of the children who were evaluated. Therefore, it is lesser than the prevalence rate assessed in our study (Garde et al., 2014).

In our study (19.37%) thumb sucking habit and mouth breathing (19. 1%) habits were the next more prevalent oral habit, Whereas Bhayya Dp et al found tongue thrusting and mouth breathing as the most prevalent oral habits . This study shows tongue thrusting habits (17. 8%) whereas Munshi et al found that tongue thrusting (3.02 %) was comparatively low prevalent among children in Mangalore (Shetty and Munshi, 1998).

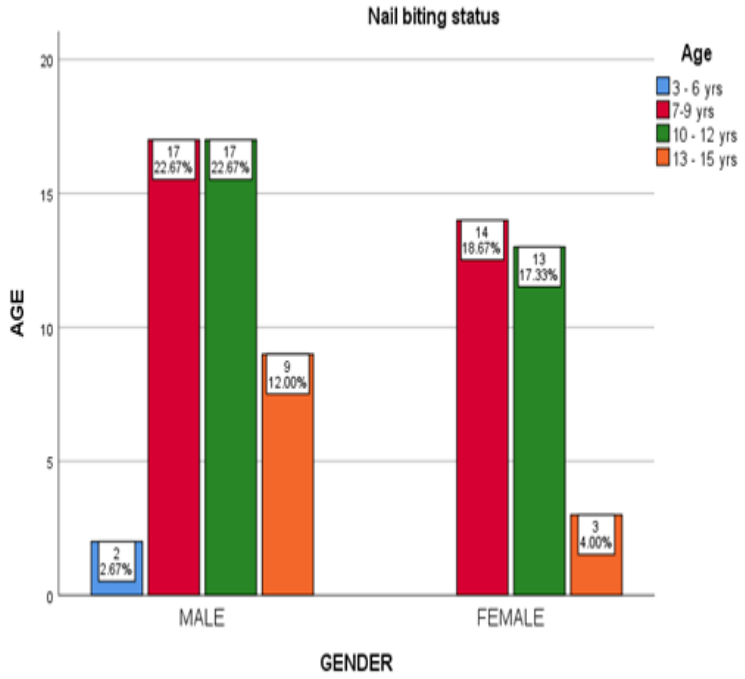
In the present study lip biting habit among children (15.2%), whereas there was no case of lip biting seen in Garda JB et al study. These differences in the prevalence may be because of complicated diagnosis, different methods of data collection and also different samples from different ethnic group.The reason behind Nail biting being the most prevalent oral habit among school children (3 to 15 years) in our study could be due to behavioural problems which is commonly accompanied with oral aggression .It is more common because the act of biting or chewing on nails reportedly relieves stress tension and anxiety. It is habitual in children who feel nervous, bored , lonely, and even when they become hungry. It may also occur due to obsessive compulsive and related disorders (Reding, Rubright and Zimmerman, 1966).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; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; Chandrasekar et al., 2020; Mathew et al., 2020; R et al., 2020; Samuel, 2021)



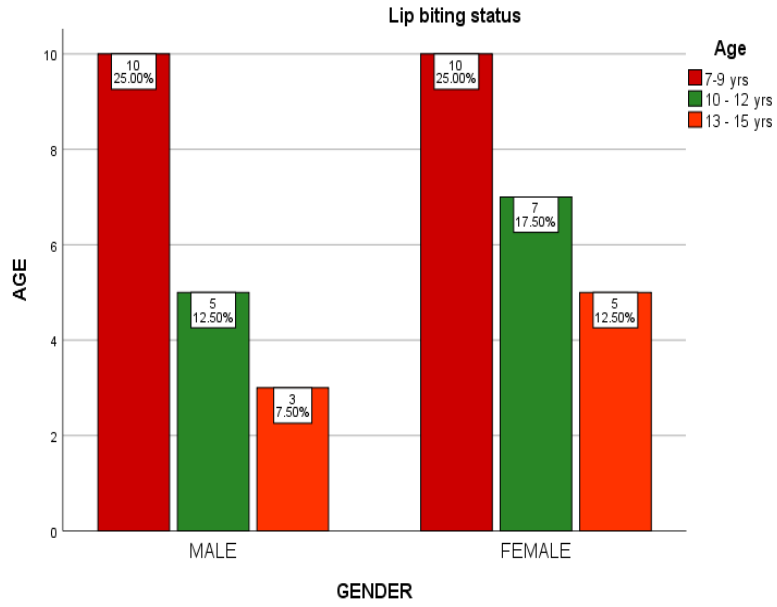
Graph 1: Bar graph showing the correlation between age [3 -5 yrs (blue) , 7-9yrs (red) , 10-12 yrs (green) , 13-15 yrs (orange)] and gender distribution among children with thumb sucking habits. X axis represents the gender distribution of children .Y axis represents the age distribution of children.The frequency of thumbsucking habit among females in the age group 7 to 9 years was higher as compared to other age groups and gender and this difference was not statistically significant when assessed using Chi square test [chi square value - 1.603 ; P value = 0.657].



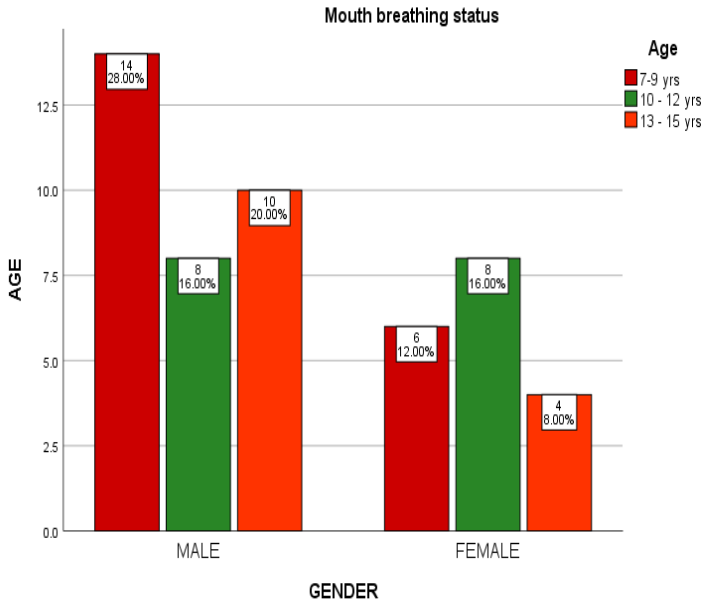
Graph 2: Bar graph showing the correlation between age [3 -5 yrs (blue) , 7-9yrs (red) , 10-12 yrs (green) , 13-15 yrs (orange)] and gender distribution among children with tongue thrusting habits. X axis represents the gender distribution of children .Y axis represents the age distribution of children.The frequency of tongue thrusting habit among females in the age group 10 - 12 years was higher as compared to other age groups and gender and this difference was not statistically significant when assessed using Chi square test [chi square value - 2.535; P value = 0.469].



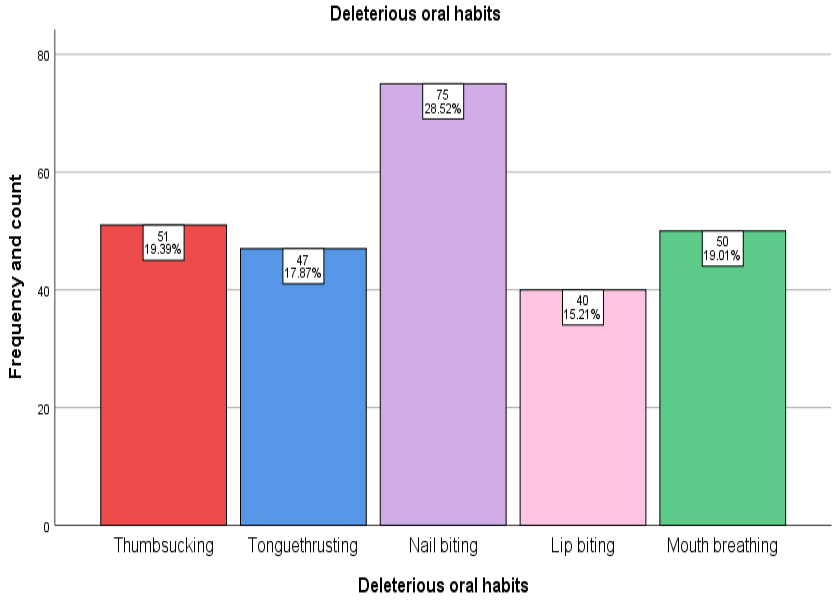
Graph 3: Bar graph showing the correlation between age [3 -5 yrs (blue) , 7-9yrs (red) , 10-12 yrs (green) , 13-15 yrs (orange)] and gender distribution among children with nail biting habits. X axis represents the gender distribution of children .Y axis represents the age distribution of children.The frequency of nail biting habit among males in the age group 7 -12 years was higher as compared to other age groups and gender and this difference was not statistically significant when assessed using Chi square test [chi square value - 2.941; P value = 0.401].



Graph 4: Bar graph showing the correlation between age [3 -5 yrs (blue) , 7-9yrs (red) , 10-12 yrs (green) , 13-15 yrs (orange)] and gender distribution among children with lip biting habits. X axis represents the gender distribution of children .Y axis represents the age distribution of children.The frequency of lip biting habit among males in the age group 7-9 years was higher as compared to other age groups and gender and this difference was not statistically significant when assessed using Chi square test [chi square value - 0.438; P value = 0.803].



Graph 5: Bar graph showing the correlation between age [3 -5 yrs (blue) , 7-9yrs (red) , 10-12 yrs (green) , 13-15 yrs (orange)] and gender distribution among children with mouth breathing habits. X axis represents the gender distribution of children .Y axis represents the age distribution of children.The frequency of mouth breathing habit among males in the age group 7-9 years was higher as compared to other age groups and gender . and this difference was not statistically significant when assessed using Chi square test [chi square value - 2.009; P value = 0.366].



Graph 6: Bar graph showing the frequency distribution of deleterious oral habits [thumb sucking habit (red) , tongue thrusting habit (blue) , nail biting habit (purple) , lip biting habit (pink) and mouth breathing habit (green)] among children. X axis represents the frequency and count of children and Y axis denotes the deleterious oral habits.The frequency of distribution of deleterious oral habits among children shows that nail biting habit is more prevalent as compared to other habits.

CONCLUSION

The results concluded that overall prevalence of deleterious oral habits in the present group was high . Within the limits of the study , the prevalence of nail biting was more common than other habits among school children and females commonly had various deleterious oral habits as compared to males . Children among 7 to 9 years

of age group were more prevalently involved in these oral habits as compared to other age groups. It has the highest frequency than other oral habits.
Therefore, it is important to know the prevalence of oral habits,which as in future it may alter the dentition and verbal communication skills of the child .This Data provides the baseline information for planning preventive strategies to eradicate the oral habits among children.

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. Al-Haifi, A. R. et al. (2013) 'Relative Contribution of Physical Activity, Sedentary Behaviors, and Dietary Habits to the Prevalence of Obesity among Kuwaiti Adolescents', Food and Nutrition Bulletin, pp. 6–13. doi: 10.1177/156482651303400102.
2. AlSadhan, S. A. and Al-Jobair, A. M. (2017) 'Oral habits, dental trauma, and occlusal characteristics among 4- to 12-year-old institutionalized orphan children in Riyadh, Saudi Arabia', Special Care in Dentistry, pp. 10–18. doi: 10.1111/scd.12187.
3. Barbosa, T. S. and Gavião, M. B. D. (2008) 'Oral health-related quality of life in children: part II. Effects of clinical oral health status. A systematic review', International journal of dental hygiene, 6(2), pp. 100–107.
4. Chandrasekar, R. et al. (2020) 'Development and validation of a formula for objective assessment of cervical vertebral bone age', Progress in orthodontics, 21(1), p. 38.
5. Christabel, S. L. and Linda Christabel, S. (2015) 'Prevalence of Type of Frenal Attachment and Morphology of Frenum in Children, Chennai, Tamil Nadu', World Journal of Dentistry, pp. 203–207. doi: 10.5005/jp-journals-10015-1343.
6. 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.
7. 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.
8. 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.
9. Dutta, B. and Verma, T. (2018) 'Prevalence of Deleterious Oral Habits among 3- to 5-yearold Preschool Children in Bhubaneswar, Odisha, India', International Journal of Clinical Pediatric Dentistry, pp. 210–213. doi: 10.5005/jp-journals-10005-1513.
10. Eslami, O. et al. (2017) 'Dietary habits and obesity indices in patients with gastro-esophageal reflux disease: a comparative cross-sectional study', BMC Gastroenterology. doi: 10.1186/s12876-017-0699-1.
11. 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.
12. 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.
13. 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.
14. 'Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children - Review' (2018) International Journal of Pharmaceutical Research. doi: 10.31838/ijpr/2018.10.04.017.
15. Garde, J. B. et al. (2014) 'An epidemiological study to know the prevalence of deleterious oral habits among 6 to 12 year old children', Journal of international oral health : JIOH, 6(1), pp. 39–43.
16. 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.
17. Gildasya et al. (2006) 'Prevalence of oral habits in homeless children under care of Yayasan Bahtera Bandung', Dental Journal (Majalah Kedokteran Gigi), p. 165. doi: 10.20473/j.djmkg.v39.i4.p165-167.
18. 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.
19. Govindaraju, L. (2017) 'Clinical Evaluation of Quality of Obturation and Instrumentation Time using Two Modified Rotary File Systems with Manual Instrumentation in Primary Teeth', JOURNAL OF CLINICAL

AND DIAGNOSTIC RESEARCH. doi: 10.7860/jcdr/2017/30069.10602.
20. Govindaraju, L. and Gurunathan, D. (2017) 'Effectiveness of Chewable Tooth Brush in Children-A Prospective Clinical Study', Journal of clinical and diagnostic research: JCDR, 11(3), pp. ZC31–ZC34.
21. Govindaraju, L., Jeevanandan, G. and Subramanian, E. M. G. (2017a) 'Comparison of quality of obturation and instrumentation time using hand files and two rotary file systems in primary molars: A single-blinded randomized controlled trial', European journal of dentistry, 11(3), pp. 376–379.
22. Govindaraju, L., Jeevanandan, G. and Subramanian, E. M. G. (2017b) 'Knowledge and practice of rotary instrumentation in primary teeth among indian dentists: A questionnaire survey', Journal of International Oral Health, p. 45. doi: 10.4103/jioh.jioh_4_17.
23. Gurunathan, D. and Shanmugaavel, A. K. (2016) 'Dental neglect among children in Chennai', Journal of the Indian Society of Pedodontics and Preventive Dentistry, 34(4), pp. 364–369.
24. Jeevanandan, G. (2017) 'Kedo-S Paediatric Rotary Files for Root Canal Preparation in Primary Teeth - Case Report', Journal of clinical and diagnostic research: JCDR, 11(3), pp. ZR03–ZR05.
25. 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.
26. 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.
27. Lakshmanan, L. et al. (2020) 'Assessing the quality of obturation and instrumentation time using Kedo-S files, Reciprocating files and Hand K-files', Brazilian Dental Science. doi: 10.14295/bds.2020.v23i1.1822.
28. Langford, W. S. (1939) 'THUMB AND FINGER SUCKING IN CHILDHOOD', Archives of Pediatrics & Adolescent Medicine, p. 1290. doi: 10.1001/archpedi.1939.01990110154015.
29. Mahesh, R., Waseem, H. and Siva kumar, M. (2014) 'Unusual Behavior in Children-Foreign Object in Tooth: A Report of Two Cases', Ethiopian Journal of Health Sciences, p. 369. doi: 10.4314/ejhs.v24i4.14.
30. 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.
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 molars: Randomized controlled trial', Clinical oral investigations, pp. 1–6.
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. Nowak, A. J. and Warren, J. J. (2000) 'INFANT ORAL HEALTH AND ORAL HABITS', Pediatric Clinics of North America, pp. 1043–1066. doi: 10.1016/s0031-3955(05)70257-1.
35. Omer, M. I. et al. (2015) 'Prevalence of Oral Habits and its Effect in Primary Dentition among Sudanese Preschool Children in Khartoum City', Indian Journal of Dental Education, pp. 57–62. doi: 10.21088/ijde.0974.6099.8215.1.
36. Packiri, S., Gurunathan, D. and Selvarasu, K. (2017) 'Management of Paediatric Oral Ranula: A Systematic Review', Journal of clinical and diagnostic research: JCDR, 11(9), pp. ZE06–ZE09.
37. Panchal, V., Jeevanandan, G. and Subramanian, E. (2019) 'Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal treatment of primary teeth: A randomized controlled trial', Journal of the Indian Society of Pedodontics and Preventive Dentistry, 37(1), pp. 75–79.
38. 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.
39. 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.
40. 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.
41. Rajchanovska, D. and Zafirova-Ivanovska, B. (2012) 'Oral habits among pre-elementary children in Bitola', Prilozi / Makedonska akademija na naukite i umetnostite, Oddelenie za bioloski i medicinski nauki = Contributions / Macedonian Academy of Sciences and Arts, Section of Biological and Medical Sciences, 33(1), pp. 157–169.
42. 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.
43. 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.
44. 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.
45. 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.
46. 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.
47. 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.
48. Ravikumar, D., Jeevanandan, G. and Subramanian, E. M. G. (2017) 'Evaluation of knowledge among general dentists in treatment of traumatic injuries in primary teeth: A cross-sectional questionnaire study', European journal of dentistry, 11(2), pp. 232–237.
49. Reding, G. R., Rubright, W. C. and Zimmerman, S. O. (1966) 'Incidence of bruxism', Journal of dental research, 45(4), pp. 1198–1204.
50. R, H. et al. (2020) 'CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene', Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology, pp. 306–312. doi: 10.1016/j.oooo.2020.06.021.
51. Samuel, S. R. (2021) 'Can 5-year-olds sensibly self-report the impact of developmental enamel defects on their quality of life?', International journal of paediatric dentistry / the British Paedodontic Society [and] the International Association of Dentistry for Children, 31(2), pp. 285–286.
52. 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.
53. 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.
54. Shetty, S. R. and Munshi, A. K. (1998) 'Oral habits in children--a prevalence study', Journal of the Indian Society of Pedodontics and Preventive Dentistry, 16(2), pp. 61–66.
55. Somasundaram, S. et al. (2015) 'Fluoride Content of Bottled Drinking Water in Chennai, Tamilnadu', Journal of clinical and diagnostic research: JCDR, 9(10), pp. ZC32–4.
56. 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.
57. Subramanyam, D. et al. (2018) 'Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries', European journal of dentistry, 12(1), pp. 67–70.
58. 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.
59. 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.
60. Vijayashree Priyadharsini, J., Smiline Girija, A. S. and Paramasivam, A. (2018) 'In silico analysis of virulence genes in an emerging dental pathogen A. baumannii and related species', Archives of oral biology, 94, pp. 93–98.
61. 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.
62. 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.