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ASSOCIATION BETWEEN NON NUTRITIVE ORAL BEHAVIOUR WITH SEVERITY OF MALOCCLUSION IN PATIENTS ATTENDING A DENTAL HOSPITAL IN CHENNAI

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ABSTRACT

Malocclusion is defined as any deviation from the ideal occlusion and it has a multifactorial etiology. Non physiologic oral habits like non nutritive sucking, mouth breathing, nail biting and lip biting can alter the development of somatogenic system and malocclusion. The aim of the study is to determine the association between non nutritive oral behaviour and malocclusion among patients attending a private dental college in Chennai. Dental aesthetic index was used to measure the malocclusion. This study included all DAI index patient records from 15-30 years old who visited the dental college from August 2019- March 2020 and a total of 65 records were reviewed. Descriptive statistics, chi square tests and Pearson correlation tests were used for statistical analysis. In the present study with a sample size of 65, 67.69% were males and 32.31% were females. Results showed, 73.3% had minor

malocclusion ,13.8% with definite malocclusion , 9.2% with severe malocclusion and 4.6% showed handicapping malocclusion . It was found that 75.3% had mouth breathing and lip biting , 12.3% had thumb sucking; 4.6% had mouth breathing , lip biting and tongue thrusting; 4.6% had thumb sucking , mouth breathing and lip biting and 3.08% had mouth breathing, lip biting and nail biting. In the present study, positive correlation was found between malocclusion and non - nutritive oral behaviour

INTRODUCTION

Angle has defined malocclusion as any deviation from the ideal occlusion. Malocclusion has multifactorial etiology (Tomita et al., 2000) and has a large physical, social and psychological impact on individuals and society (Liu, McGrath and Hägg, 2009). Non physiologic habits include non nutritive sucking, mouth breathing, nail biting and lip biting (Lorente *et al.*, 2019). They can alter the normal development of somatogenic systems, producing an imbalance between internal and external muscular forces. Such habits modify the severity of malocclusion.(Klocke et al., 2002; Mistry *et al.*, 2010) If these detrimental habits are not diagnosed in the initial stages, then it can be a complex procedure to correct the problem in an advanced stage(Basra *et al.*, 2016) . Sometimes in severe cases, it may require orthognathic surgeries to correct the jaw position along with the change in the habit(Ferreira *et al.*, 2015)

In a study done by Chopra *et al.*, 2015, it is found that mothers did not intervene in their children's abnormal habits due to their lack of knowledge and unawareness (Chopra *et al.*, 2015) .Few studies have proved the knowledge and attitude of people with respect to dental caries.(Prabakar et al., 2016; Pratha et al., 2019; Samuel et al., 2020).

Dental caries and malocclusion are heavily related and may be directly proportional to each other. Malocclusion can stock more oral microflora than that of normal occlusion.(Pavithra et al ., 2019; Mathew *et al.*, 2020) Studies have proven use of fluorides to prevent dental caries and use of antimicrobial agents.(Kumar and Preethi, 2017; Kumar et al., 2017; Prabakar et al., 2018; Prabakar et al., 2018a, Prabakar et al., 2018b; Khatri *et al.*, 2019; Mohapatra *et al.*, 2019). some studies prove that lack of nutrition and anxiety can also be a causative factor for oral diseases (Neralla *et al.*, 2019)

As dental students have wide knowledge with respect to other subjects in prevention and intervention methods (Kannan *et al.*, 2017; Harini and Leelavathi, 2019),it is necessary to have a proper knowledge about the prevention and intervention of malocclusion and to identify the highly susceptible individuals based on their habits and lifestyle.

The present study was designed to restore the gaps in the research area with respect to malocclusion and non nutritive habits. The aim of the study is to determine the association between non nutritive oral behaviour and malocclusion among patients attending a private dental college in chennai.

MATERIALS AND METHODS

The present retrospective study was institution based and data for the study was taken from the patient records. Ethical approval was obtained by the Institutional ethical board at Saveetha University. Study population included all the DAI patients who have attended college from August 2019 – March 2020. The patients from the age 15-30 years who were included and they should have been interpreted by DAI index. All the DAI index patients who have been interpreted were included in the study within the age group of 15-30 years old and their case records were reviewed. Cross verification was done using photographic verification and diagnosis of the patient.

The DAI Index (Jenny J and Cons NC, 1986) was adopted by the World Health Organization in 1989, evaluates 10 occlusal characteristics: overjet, negative overjet, tooth loss, diastema, anterior open bite, anterior crowding, anterior diastema, width of the anterior irregularities (mandible and maxilla) and antero-posterior spring relationship. The DAI has four stages of malocclusion severity: a score lower than or equal to 25 (no or slight treatment need), a score between 26 and 30 (elective treatment), a score between 31 and 35 (treatment highly desirable) and a score greater than 36 (treatment mandatory)

The data was obtained from 65 patient dental case records. The data was collected and reviewed by two examiners and documented. Further, the data was imported in IBM SPSS software version 20.0. The independent variables were age and gender while the dependent variables were oral behaviour and DAI index score. Descriptive statistics, chi square tests and Pearson's correlation tests were done to identify the distribution, association and correlation between severity of malocclusion and type of oral behaviour respectively.

RESULTS AND DISCUSSION

In the present study, after excluding incomplete records, 65 samples were obtained. All the study participants had one or multiple non nutritive oral behaviour

Out of 65 samples, 67.69% males and 32.31% females were present. This shows a male predilection in the study sample (Figure.1). The age groups were divided into 15-20 years, 21-25 years and 26-30 years in which 92.31% , 6.15% and 1.54% were present respectively (figure 2).

Results of the study revealed that 73.31% had minor malocclusion ,13.85% had definite malocclusion ; 9.23% had severe malocclusion 4.62% had handicapping malocclusion (figure3).

The distribution of type of oral behaviour were as follows: 75.38% had mouth breathing and lip biting ; 12.31% had thumb sucking; 4.62% had mouth breathing , lip biting and tongue thrusting; 4.62% had thumb sucking, mouth breathing and lip biting and 3.08% had mouth breathing, lip biting and nail biting (figure 4)

There was no significant difference found between age, gender with severity of malocclusion and type of oral behaviour ($p > 0.05$). But there was a statistically significant association found between severity of malocclusion and type of oral behaviour with a chi square value of 43.020^a ($p < 0.01$) (Figure 5). Positive correlation was found between malocclusion and non - nutritive oral behaviour (significance < 0.01)(table 1)

In this retrospective study , the male population (67.69%) was more distributed than the female population . Similar to a study done by Farah S. Abdul Rahim et al in 2014 (Abdul Rahim *et al.*, 2014). In contrast, in a study by Lívia Patrícia Versiani Gonçalves et al in 2010, more females were present (Andersen, 2010). Mouth breathing is a para functional habit whereby air passes exclusively or partially through the mouth instead of nose and is accompanied by skeletal and functional alterations. It can be either congenital or acquired causes (Zicari *et al.*, 2009)

Brin *et al.*, 1998 has shown many environmental factors related to malocclusion including eating habits, non nutritive sucking and early weaning (Brin *et al.*, 1998, Jefferson, 2010).

Tongue thrusting , an abnormal tongue position with deviates from normal swallowing pattern and it may be associated with mouth breathing to cause abnormal speech and abnormal protrusion of mandible and open bite.(Graber, 1963; Viggiano *et al.*, 2004)

Many authors also found that mouth breathers have a high prevalence of narrow dental arches and dental crowding in particularly upper arches.(Wagaiyu and Ashley, 1991; Vig, 1998; Harari *et al.*, 2010) These problems need interdisciplinary approach of pediatrician, ENT, orthodontist and speech therapist(Grippaudo *et al.*, 2016) In the present study, 75.38% had mouth breathing and lip biting whereas thumb sucking had a low prevalence. In a study done by Giugliano D et al in 2014, similar findings were found in which 71.3% had mouth breathing and lip biting (Giugliano *et al.*, 2014). In a study done by E G Palentonio et al in 2019, contrastive findings were found in which mouth breathing and thumb sucking had equal prevalence (Paolantonio *et al.*, 2019)

In the present study, 72.31% had minor malocclusion and only 4.62% had handicapping malocclusion . similar findings was found in a study conducted by faezeh et al in 2010 in which 54.5% had minor malocclusion (Eslamipour et al., 2010) but in a study done by Farah S et al in 2014, 83.2% had severe and handicapping malocclusion(Abdul Rahim *et al.*, 2014)

In the present study , a significant association and positive correlation between severity of malocclusion and type of malocclusion ($p < 0.01$) was established (Calisti et al., 1960; Paolantonio *et al.*, 2019).However, it was in contrast to David Giugliano et al in 2014. (Giugliano *et al.*, 2014)

Hence early diagnosis and prevention of non nutritive oral behaviour will reduce its severity on malocclusion

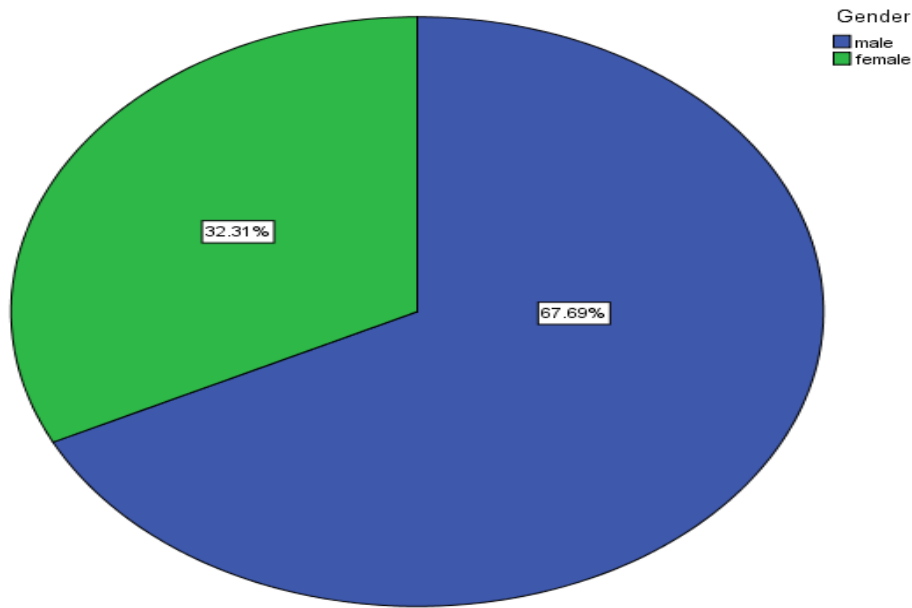


Figure 1: Gender wise distribution of the study population .Depicts the gender distribution in the study population . It was found that more than 50% of the population were male.

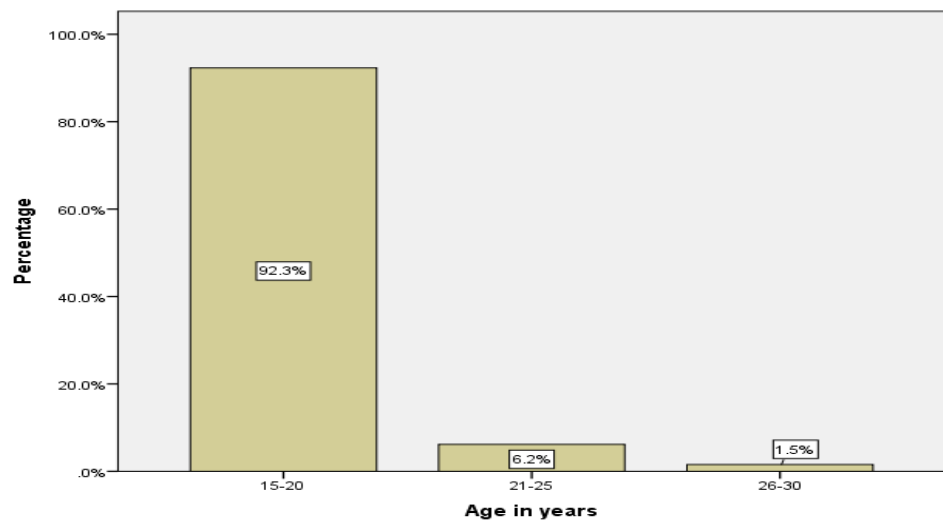


Figure 2: Age wise distribution of the study population. Shows the distribution of study population based on age. X axis represents the age group of the study participants and Y axis represents the percentage of people present in each group. Majority of the study participants belonged to the 15-25 years old age group (92.3%), whereas 1.5% belonged to the 26-30 Years.

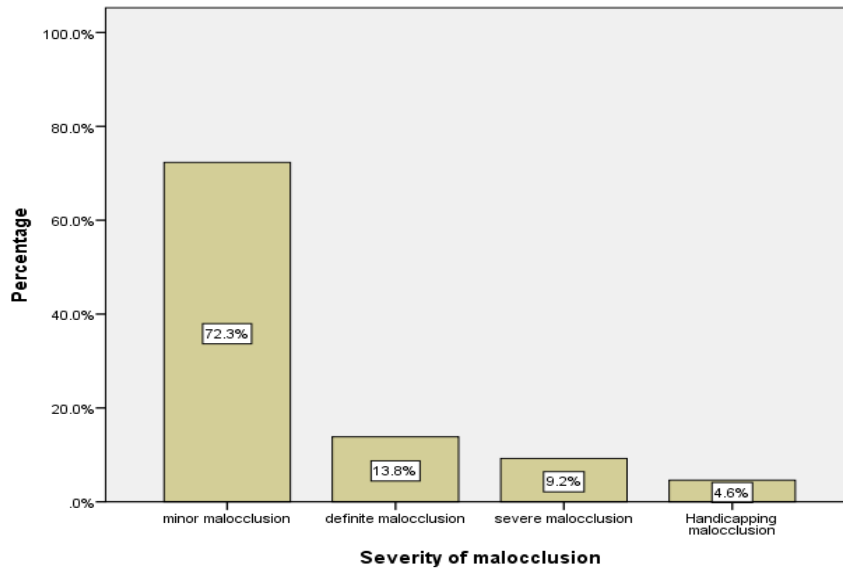


Figure 3 Distribution of severity of malocclusion among study population. Shows the distribution of malocclusion in the study sample. X axis represents the severity of malocclusion and Y axis represents the percentage of study samples present in each score group. Minor malocclusion was more prevalent in the study population (72.31%)

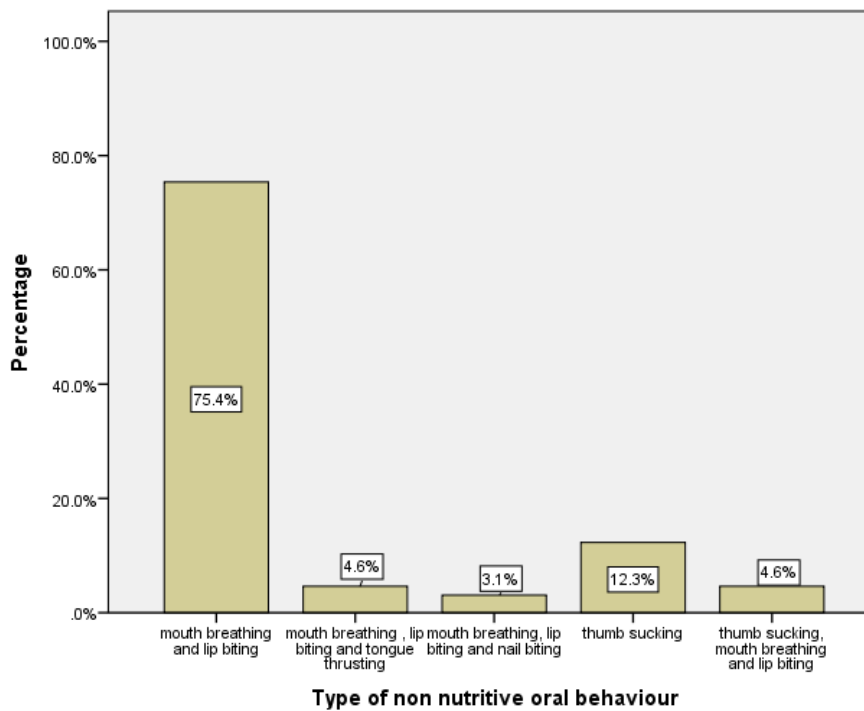


Figure 4: Distribution of type of non nutritive oral behaviour among study subjects. Shows the distribution of type of oral behaviour in the study sample. X axis represents the type of non nutritive oral behaviour and Y axis represents the percentage of study samples present in each score group. Mouth breathing and lip biting was more prevalent in the study population (75.38%)

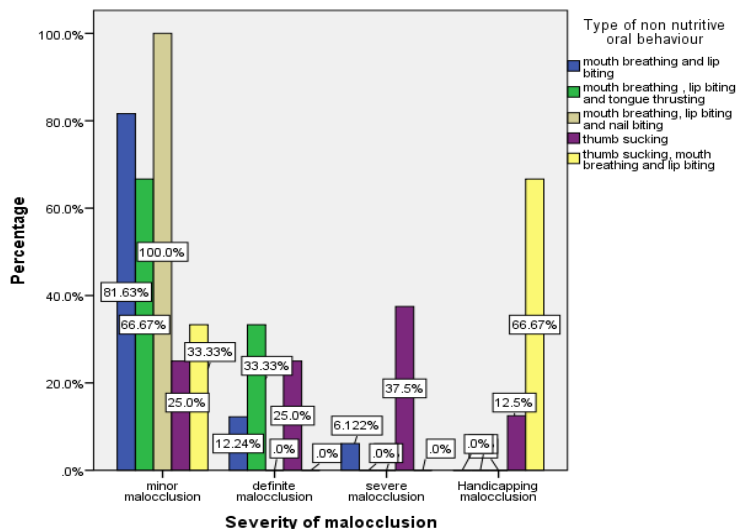


Figure 5 : Association between severity of malocclusion and type of non nutritive oral behaviour. Represents the association between severity of malocclusion and type of non nutritive oral behaviour. X axis represents severity of malocclusion and Y axis represents type of non nutritive oral behaviour. Thumb sucking, mouth breathing and lip biting habit was more prevalent in handicapping malocclusion and the association between severity of malocclusion and type of oral behaviour was done using chi-square tests (p value = 0.000) which was found to be statistically significant. Chi square value = 43.020^a

Table 1: Correlation between severity of malocclusion and type of non nutritive oral behaviour. Represents the correlation between severity of type of malocclusion and type of non nutritive oral behaviour. Correlation between severity of malocclusion and type of oral behaviour was done using Pearson correlation tests (p value = 0.001) and was found to be positively correlated. Pearson correlation value = 0.555

Variables		Type of malocclusion	Type of non nutritive oral behaviour
Type of malocclusion	Pearson Correlation	1	.555**
	Sig. (2-tailed)		.000
	N	65	65

Type of non nutritive oral behaviour	Pearson Correlation	.555**	1
	Sig. (2-tailed)	.000	
	N	65	65
**. Correlation is significant at the 0.01 level (2-tailed).			

CONCLUSION

Within the limits of the study, the present study concludes that there is a positive correlation between severity of malocclusion and non nutritive oral behaviour. However more prospective studies should be formulated, to determine the association of malocclusion with individual oral behaviour.

AUTHOR CONTRIBUTIONS

All authors contributed to the design and implementation of the research, analysis of the results and to the writing of the manuscript.

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

- Abdul Rahim, F. S. et al. (2014) 'Malocclusion and orthodontic treatment need evaluated among subjects with Down syndrome using the Dental Aesthetic Index (DAI)', *The Angle orthodontist*, 84(4), pp. 600–606. doi: 10.2319/062813-480.1.
- Andersen, M. (2010) *Bruxism: Theory and Practice*. Quintessence Pub. Available at: <https://play.google.com/store/books/details?id=2kp5PwAACAAJ>.
- Basra, A. S. et al. (2016) 'Deleterious Oral Habits among School Going Children - A Cross-Sectional Study', *JBR Journal of Interdisciplinary Medicine and Dental Science*. doi: 10.4172/2376-032x.1000206.
- Brin, I. et al. (1998) 'Does a secular trend exist in the distribution of occlusal patterns?', *The Angle orthodontist*, 68(1), pp. 81–84. doi: 10.1043/0003-3219(1998)068<0081:DASTEI>2.3.CO;2.
- Calisti, L. J. P., Michael Cohen, M. and Fales, M. H. (1960) 'Correlation between Malocclusion, Oral Habits, and Socio-economic Level of Preschool Children', *Journal of Dental Research*, pp. 450–454. doi: 10.1177/00220345600390030501.
- Chopra, A. et al. (2015) 'The Predisposing Factors between Dental Caries and Deviations from Normal Weight', *North American journal of medical sciences*, 7(4), pp. 151–159. doi: 10.4103/1947-2714.156011.

- Eslamipour, F., Borzabadi-Farahani, A. and Asgari, I. (2010) 'Assessment of orthodontic treatment need in 11- to 20-year-old urban Iranian children using the Dental Aesthetic Index (DAI)', *World journal of orthodontics*, 11(4), pp. e125–32. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/21490981>.
- Ferreira, H. R. et al. (2015) 'Prolonged Pacifier Use during Infancy and Smoking Initiation in Adolescence: Evidence from a Historical Cohort Study', *European Addiction Research*, pp. 33–38. doi: 10.1159/000365351.
- Giugliano, D. et al. (2014) 'Relationship between Malocclusion and Oral Habits', *Current Research in Dentistry*, pp. 17–21. doi: 10.3844/crdsp.2014.17.21.
- Graber, T. M. (1963) 'The "three M"s": Muscles, malformation, and malocclusion', *American Journal of Orthodontics*, pp. 418–450. doi: 10.1016/0002-9416(63)90167-2.
- Grippaudo, C. et al. (2016) 'Association between oral habits, mouth breathing and malocclusion', *Acta otorhinolaryngologica Italica: organo ufficiale della Societa italiana di otorinolaringologia e chirurgia cervico-facciale*, 36(5), pp. 386–394. doi: 10.14639/0392-100X-770.
- Harari, D. et al. (2010) 'The effect of mouth breathing versus nasal breathing on dentofacial and craniofacial development in orthodontic patients', *The Laryngoscope*, pp. 2089–2093. doi: 10.1002/lary.20991.
- Harini, G. and Leelavathi, L. (2019) 'Nicotine Replacement Therapy for Smoking Cessation-An Overview', *Indian Journal of Public Health Research & Development*, 10(11), p. 3588. doi: 10.5958/0976-5506.2019.04144.5.
- Jefferson, Y. (2010) 'Mouth breathing: adverse effects on facial growth, health, academics, and behavior', *General dentistry*, 58(1), pp. 18–25; quiz 26–7, 79–80. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/20129889>.
- Kannan, S. S. D. et al. (2017) 'Awareness and attitude towards mass disaster and its management among house surgeons in a dental college and hospital in chennai, india', in *Disaster Management and Human Health Risk V. Disaster Management 2017*, Southampton UK: WIT Press (WIT Transactions on The Built Environment), pp. 121–129. doi: 10.2495/DMAN170121.
- Khatri, S. G. et al. (2019) 'Retention of moisture-tolerant fluoride-releasing sealant and amorphous calcium phosphate-containing sealant in 6-9-year-old children: A randomized controlled trial', *Journal of the Indian Society of Pedodontics and Preventive Dentistry*, 37(1), pp. 92–98. doi: 10.4103/JISPPD.JISPPD_173_18.
- Klocke, A., Nanda, R. S. and Kahl-Nieke, B. (2002) 'Anterior open bite in the deciduous dentition: Longitudinal follow-up and craniofacial growth considerations', *American Journal of Orthodontics and Dentofacial Orthopedics*, pp. 353–358. doi: 10.1067/mod.2002.126898.
- Kumar, R. P., Pradeep Kumar, R. and Vijayalakshmi, B. (2017) 'Assessment of Fluoride Concentration in Ground Water in Madurai District, Tamil Nadu, India', *Research Journal of Pharmacy and Technology*, p. 309. doi: 10.5958/0974-360x.2017.00063.4.

- Kumar, R. P. and Preethi, R. (2017) 'Assessment of Water Quality and Pollution of Porur, Chembarambakkam and Puzhal Lake', *Journal of advanced pharmaceutical technology & research*, 10(7), p. 2157. doi: 10.5958/0974-360X.2017.00380.8.
- Liu, Z., McGrath, C. and Hägg, U. (2009) 'The impact of malocclusion/orthodontic treatment need on the quality of life. A systematic review', *The Angle orthodontist*, 79(3), pp. 585–591. doi: 10.2319/042108-224.1.
- Lorente, A. A. et al. (2019) 'Oral Malocclusion and Its Relation to Nutritive and Non-nutritive Habits in School Children', *Open Journal of Dentistry and Oral Medicine*, pp. 1–8. doi: 10.13189/ojdom.2019.070101.
- 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*. doi: 10.1007/s00784-020-03204-9.
- Mistry, P. et al. (2010) 'The occlusal effects of digit sucking habits amongst school children in Northamptonshire (UK)', *Journal of Orthodontics*, pp. 87–92. doi: 10.1179/14653121042939.
- Mohapatra, S. et al. (2019) 'Assessment of Microhardness of Enamel Carious Like Lesions After Treatment with Nova Min, Bio Min and Remin Pro Containing Toothpastes: An in Vitro Study', *Indian Journal of Public Health Research & Development*, p. 375. doi: 10.5958/0976-5506.2019.02832.8.
- Neralla, M. et al. (2019) 'Role of nutrition in rehabilitation of patients following surgery for oral squamous cell carcinoma', *International Journal of Research in Pharmaceutical Sciences*, pp. 3197–3203. doi: 10.26452/ijrps.v10i4.1622.
- Paolantonio, E. G. et al. (2019) 'Association between oral habits, mouth breathing and malocclusion in Italian preschoolers', *European journal of paediatric dentistry: official journal of European Academy of Paediatric Dentistry*, 20(3), pp. 204–208. doi: 10.23804/ejpd.2019.20.03.07.
- Pavithra, R. P., Preethi Pavithra, R. and Jayashri, P. (2019) 'Influence of Naturally Occurring Phytochemicals on Oral Health', *Research Journal of Pharmacy and Technology*, p. 3979. doi: 10.5958/0974-360x.2019.00685.1.
- Prabakar, J., John, J., Arumugham, I. M., Kumar, R. P. and Srisakthi, D. (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. doi: 10.4103/ccd.ccd_132_18.
- Prabakar, J., John, J., Arumugham, I. M., Kumar, R. P. and Sakthi, D. S. (2018a) 'Comparative Evaluation of the Viscosity and Length of Resin Tags of Conventional and Hydrophilic Pit and Fissure Sealants on Permanent Molars: An In vitro Study', *Contemporary clinical dentistry*, 9(3), pp. 388–394. doi: 10.4103/ccd.ccd_131_18.

- Prabakar, J., John, J., Arumugham, I. M., Kumar, R. P. and Sakthi, D. S. (2018b) 'Comparing the Effectiveness of Probiotic, Green Tea, and Chlorhexidine- and Fluoride-containing Dentifrices on Oral Microbial Flora: A Double-blind, Randomized Clinical Trial', *Contemporary clinical dentistry*, 9(4), pp. 560–569. doi: 10.4103/ccd.ccd_659_18.
- Prabakar, J., John, J. and Srisakthi, D. (2016) 'Prevalence of dental caries and treatment needs among school going children of Chandigarh', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 27(5), pp. 547–552. doi: 10.4103/0970-9290.195683.
- Pratha, A. A., Ashwatha Pratha, A. and Prabakar, J. (2019) 'Comparing the effect of Carbonated and energy drinks on salivary pH- In Vivo Randomized Controlled Trial', *Research Journal of Pharmacy and Technology*, p. 4699. doi: 10.5958/0974-360x.2019.00809.6.
- 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. doi:10.1111/jphd.12348.
- Tomita, N. E., Bijella, V. T. and Franco, L. J. (2000) 'Relação entre hábitos bucais e má oclusão em pré-escolares', *Revista de Saúde Pública. Faculdade de Saúde Pública da Universidade de São Paulo*, 34(3), pp. 299–303. doi: 10.1590/S0034-89102000000300014.
- Viggiano, D. et al. (2004) 'Breast feeding, bottle feeding, and non-nutritive sucking; effects on occlusion in deciduous dentition', *Archives of disease in childhood*, 89(12), pp. 1121–1123. doi: 10.1136/adc.2003.029728.
- Vig, K. W. (1998) 'Nasal obstruction and facial growth: the strength of evidence for clinical assumptions', *American journal of orthodontics and dentofacial orthopedics: official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*, 113(6), pp. 603–611. doi: 10.1016/s0889-5406(98)70219-7.
- Wagaiyu, E. G. and Ashley, F. P. (1991) 'Mouthbreathing, lip seal and upper lip coverage and their relationship with gingival inflammation in 11-14 year-old schoolchildren', *Journal of clinical periodontology*, 18(9), pp. 698–702. doi: 10.1111/j.1600-051x.1991.tb00112.x.
- Zicari, A. M. et al. (2009) 'Oral breathing and dental malocclusions', *European journal of paediatric dentistry: official journal of European Academy of Paediatric Dentistry*, 10(2), pp. 59–64. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/19566370>.