Prevalence of Tooth Wear among different age group of patients visiting Private Dental Hospital- A Retrospective study

Running title: Prevalence of tooth wear among different age group of patients visiting dental hospital

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Abstract:

Tooth wear is generally defined as irreversible chronic loss of dental hard tissues caused by mechanical and/or chemical processes without the involvement of bacterial plaque. To some degree, tooth wear is physiological and age dependent. The aim of the study was to evaluate the prevalence of tooth wear among different age groups of patients visiting private dental hospital. Date of age, gender, type of tooth wear of patients were obtained from the records of the dental hospital.The data was analysed using SPSS software. Chi Square Test was performed to compare two proportions. The analysis was done for: age, gender and the type of tooth wear. The Prevalence rates of tooth wear in dental patients were calculated. The patients were ranged in the age group of 20- 30 years, 31-40 years, 41-50 years and above 50 years. The overall prevalence rate for attrition was seen most commonly in the age group of 31-40 years (43.86%) with higher incidence among males. Patients in the age group of 31-40 years (56.41%) showed highest prevalence for abrasion with higher incidence among males and the prevalence rate for erosion was most commonly observed in the age group of patients 31-40 years (26.91%) with higher incidence among males which was found to be statistically significant (P<0.05). The study may help in planning patient's diagnostic protocol and management strategy among dentists.

Keywords: *Abrasion, Attrition, Erosion, Physiological and Tooth wear.*

INTRODUCTION:

Tooth wear is quite a common problem but most often left untreated due to the current substantial decline in dental caries, tooth wear is believed to become most noticeable in future. Increased awareness among people towards orodental health and their interest in keeping their dentition healthy can lead to wear.('Prevalence of dental abrasion and its association with toothbrush frequency among patients attending O.P.D. in Government Dental College and Hospital - A cross sectional study', 2015) The term tooth wear is used to describe the loss of hard tissues caused by friction between the occlusal surface of opposing teeth or between a tooth's occlusal surface and food during masticatory and non-masticatory movements, with no occurrence of dental caries or trauma.(Bishop et al., 1997)The clinical appearance of tooth wear always involves a complex interaction of biological, mechanical and chemical factors.

Based on the etiological factors, tooth wear has been traditionally divided into three types: Attrition, Abrasion and Erosion.(Wei et al., 2016) Attrition is a physiological wearing of dental hard tissues through the tooth contact, without the intervention of foreign substance.(Molnar et al., 1983) Abrasion is a pathological wear of dental hard tissue through abnormal mechanical processes that involve foreign objects or substances that are repeatedly introduced to the mouth and contact the teeth. Erosion the loss of dental hard tissues by chemical dissolution of enamel or dentin through the action of non-bacterial acid from dietary or gastric sources i.e. Intrinsic or extrinsic acids.(Liu et al., 2014)

Tooth wear is a multifactorial condition that results in loss of dental hard tissue. The prevalence of tooth wear widely varies among different populations. Tooth wear can be the result of a natural ageing process and be imperceptible to the majority of the patients. According to kreulen et al. 2010, tooth wear is most common among older age groups and increases with age.(Kreulen et al., 2010) Bery and Pode et al considered tooth wear as a natural ageing process which leads to deposition of secondary dentin reduced alveolar growth resulting in change in muscle

adaptation, compensation and mechanism which leads to change in occlusion resulting in temporomandibular disorders.

Tooth wear could be acceptable among the older age group and would not be so among younger age. Hence, necessary to evaluate the threshold values of tooth wear among different age groups.(Hassan and Omar, 2000) Previously our team had conducted numerous clinical trials (Prabakar, John, I. Arumugham, et al., 2018; Prabakar, John, I. M. Arumugham, et al., 2018b; Khatri et al., 2019; Pratha, Ashwatha Pratha and Prabakar, 2019; Mathew et al., 2020; Samuel, Acharya and Rao, 2020), in-vitro studies (Prabakar, John and Srisakthi, 2016; Kannan et al., 2017; Kumar and Preethi, 2017; Kumar and Vijayalakshmi, 2017; Prabakar, John, I. M. Arumugham, et al., 2018a; Mohapatra et al., 2019)and systematic reviews(Leelavathi, 2019; Neralla et al., 2019; Pavithra and Jayashri, 2019) over the past 5 years. This led us to work on the current topic.Thus, the present study is aimed to measure the prevalence of tooth wear among different age groups of patients visiting dental hospital.

MATERIALS AND METHODS:

A single centre retrospective study was done in an institutional setting. The ethical approval was received from the institution's ethical committee. The study involved selected patients data who were diagnosed with tooth wear: attrition, abrasion, erosion. The necessary approvals in gaining the data were obtained from the institutional ethical committee (SDC/SIHEC/DIASDATA/0619-0320). The number of people involved in this study includes 3 i.e guide, reviewer and researcher.

Selection of Subjects:
All patients who were diagnosed with the tooth wear: attrition, abrasion, erosion from the time period of June 2019 to March 2020 were selected for this study. There were three people involved in this study (guide, reviewer, and researcher). All available data were taken into consideration and there was no sorting process.

Data Collection:
The patient's details were retrieved from the institution's patient record management software (Dental Information Archiving Software). Data regarding patients name, age, gender, type of tooth wear were taken into consideration for this study. Cross verification of the data was done with the help of photographs and radiographs. The data was manually verified, tabulated and sorted.

Inclusion Criteria:
All patients who were diagnosed with tooth wear: attrition, abrasion, erosion in the age group of 20-70 years were taken into consideration.

Exclusion Criteria:
Patients' records that were incomplete were removed from the study. Repetitive entries were excluded as well. Patients aged less than 20 years and more than 70 years were not included in the study.

Statistical Analysis:
The tabulation of data was analysed using SPSS software. (IBM SPSS Statistics 26.0) The method of statistical analysis that was used in this study was Chi Square Test to compare two proportions. The analysis was done for: age, gender, type of tooth wear in this study.

RESULTS AND DISCUSSION:

After examining the clinical records of patients, the prevalence rates were evaluated. The study included 22,840 participants with attrition. The participants were ranged in the age group of 20-30 years, 31-40 years, 41-50 years and above 50 years. (Figure-1)
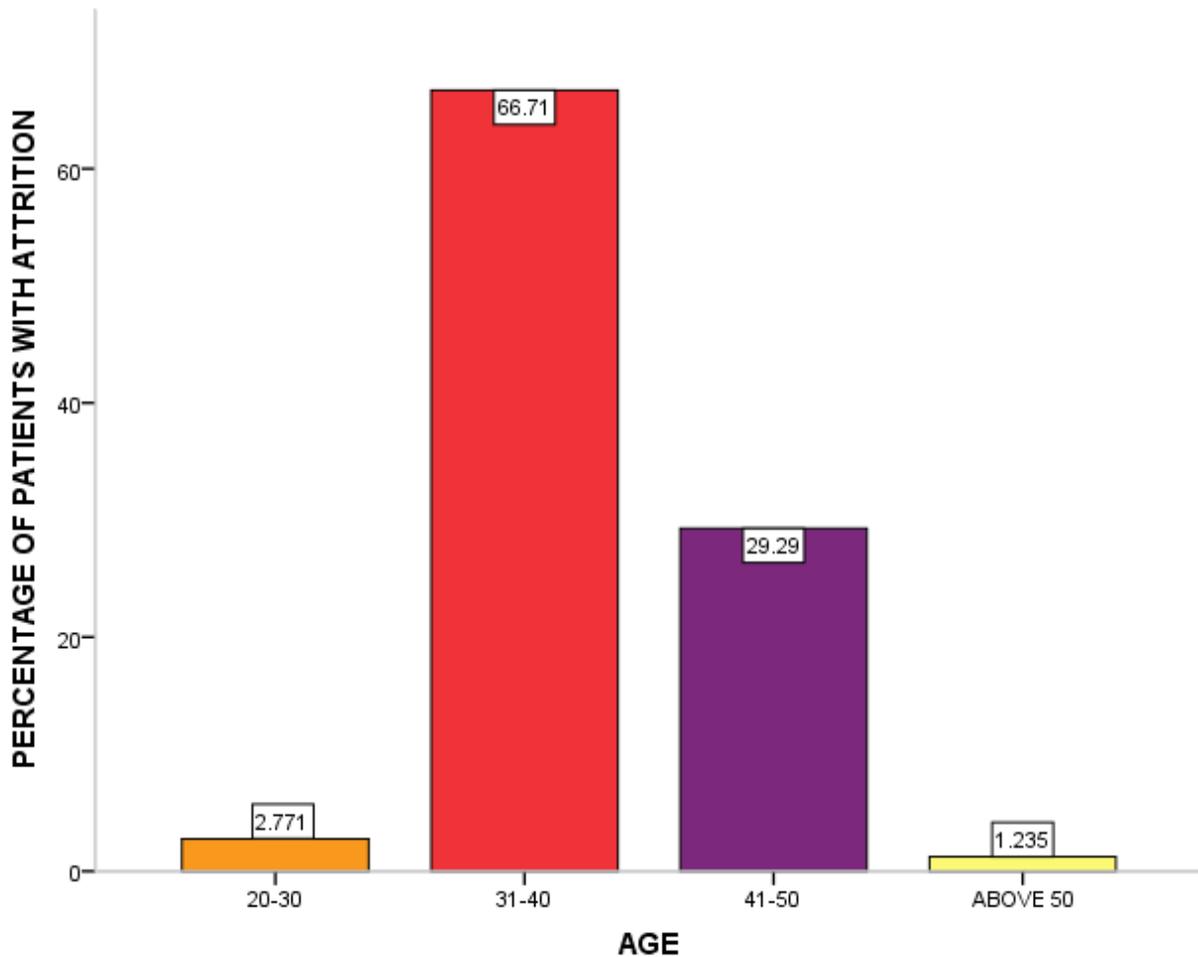
Figure-1: Bar graph represents age wise distribution of patients with attrition. The X-axis represents the different age groups and the Y-axis represents the percentage of patients with attrition. Within different age groups, the most common age group of patients affected with attrition were 31-40 years (66.71% - red colour) and the least common age group of patients affected with attrition were above 50 years (1.23% - yellow colour).

shows age wise distribution of patients with attrition. Within different age groups, the most common age group of patients affected with attrition were 31-40 years (66.71%) and the least common age group of patients affected with attrition were above 50 years (1.235%). (Figure-2)
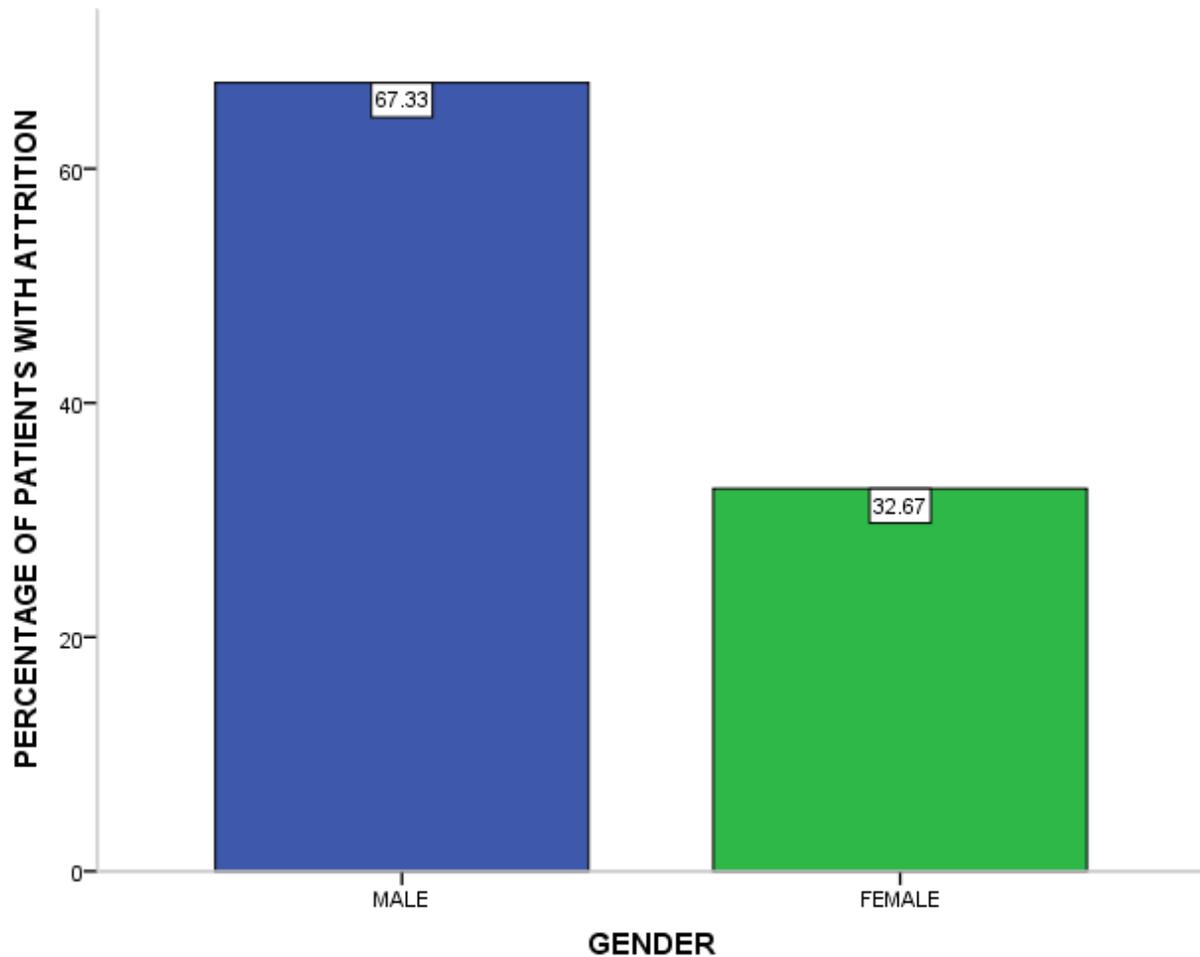
Figure-2: Bar graph represents gender wise distribution of patients with attrition. The X-axis represents gender distribution and the Y-axis represents the percentage of patients with attrition. Males (67.33% - blue colour) were more commonly affected with attrition than females (32.67% - green colour).

shows gender wise distribution of patients with attrition. Males (67.33%) were more commonly affected with attrition than females (32.67%). (Figure-3)
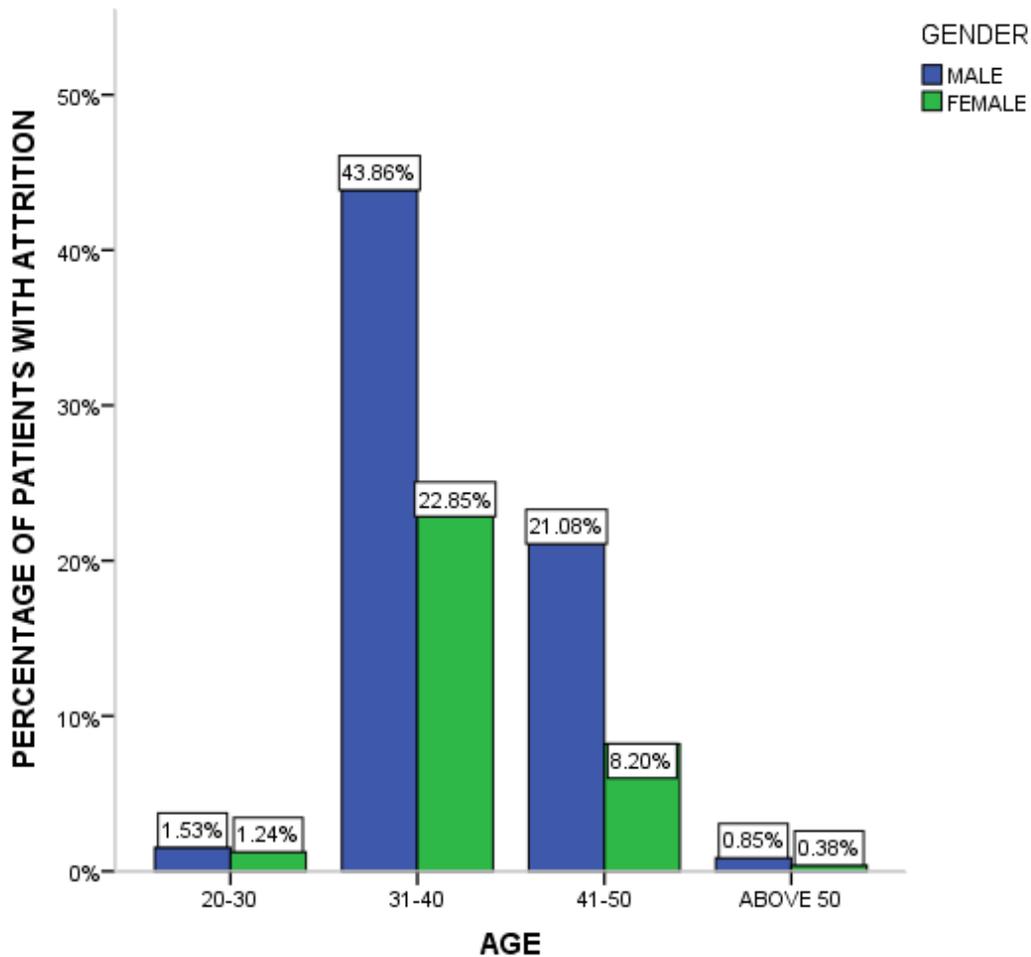
Figure-3: Bar graph representing the association of age and gender wise distribution of patients with attrition. The X-axis represents the different age groups and the Y-axis represents the percentage of patients with attrition. Within different age groups, the most common age group of patients affected with attrition were 31-40 years (43.86% - blue colour) and was highly prevalent among males (67.3% - blue colour). There was a statistical significant difference seen among patients with attrition in relation to age and gender (chi square value- 125.2, p value <0.05).

shows the association of age and gender wise distribution of patients with attrition. Within different age groups, the most common age group of patients affected with attrition were 31-40 years (43.86%) and was highly prevalent among males (67.3%) which was found to be statistically significant (p<0.05). (Figure-4)
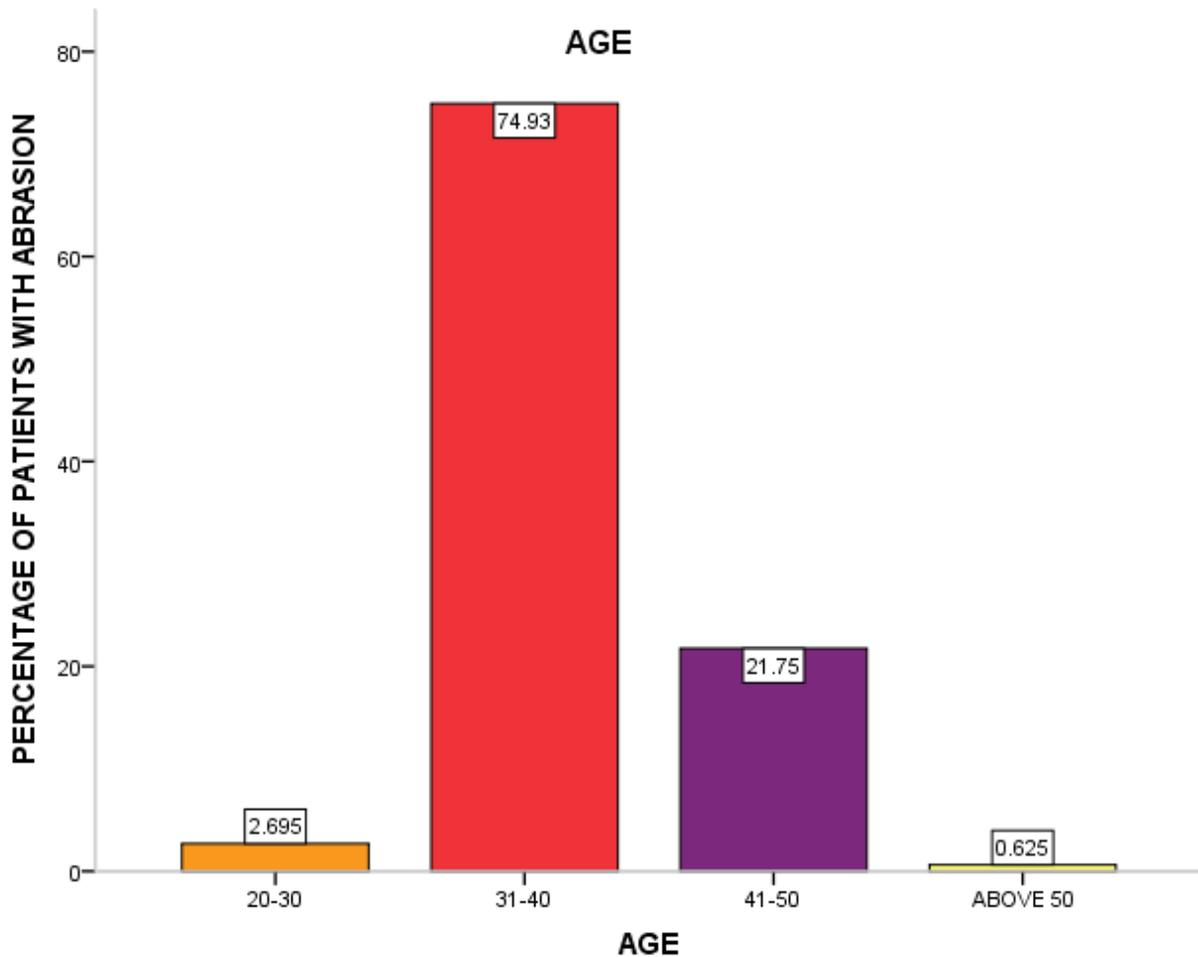
Figure-4: Bar graph represents age wise distribution of patients with abrasion. The X-axis represents the different age groups and the Y-axis represents the percentage of patients with abrasion. Within different age groups, the most common age group of patients affected with abrasion were 31-40 years (74.93% - red colour) and the least common age group of patients affected with attrition were above 50 years (0.625% - yellow colour).

shows age wise distribution of patients with abrasion. Within different age groups, the most common age group of patients affected with abrasion were 31-40 years (74.93%) and the least common age group of patients affected with abrasion were above 50 years (0.625%). (Figure-5)
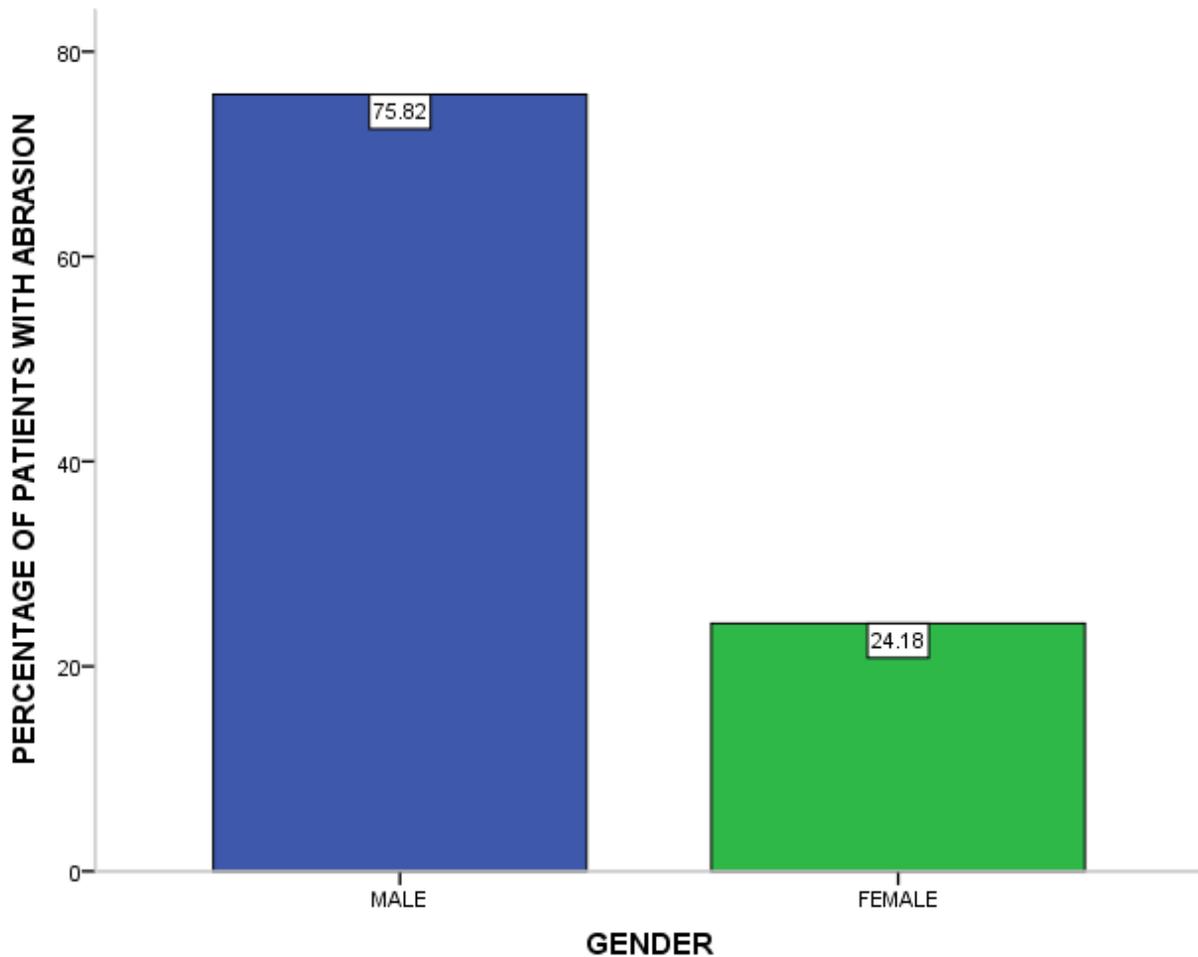
Figure-5: Bar graph represents gender wise distribution of patients with abrasion. The X-axis represents gender distribution and the Y-axis represents the percentage of patients with abrasion. Males (75.82% - blue colour) were more commonly affected with abrasion than females (24.18% - green colour).

shows gender wise distribution of patients with abrasion. Males (75.82%) were more commonly affected with abrasion than females (24.18%). (Figure-6)
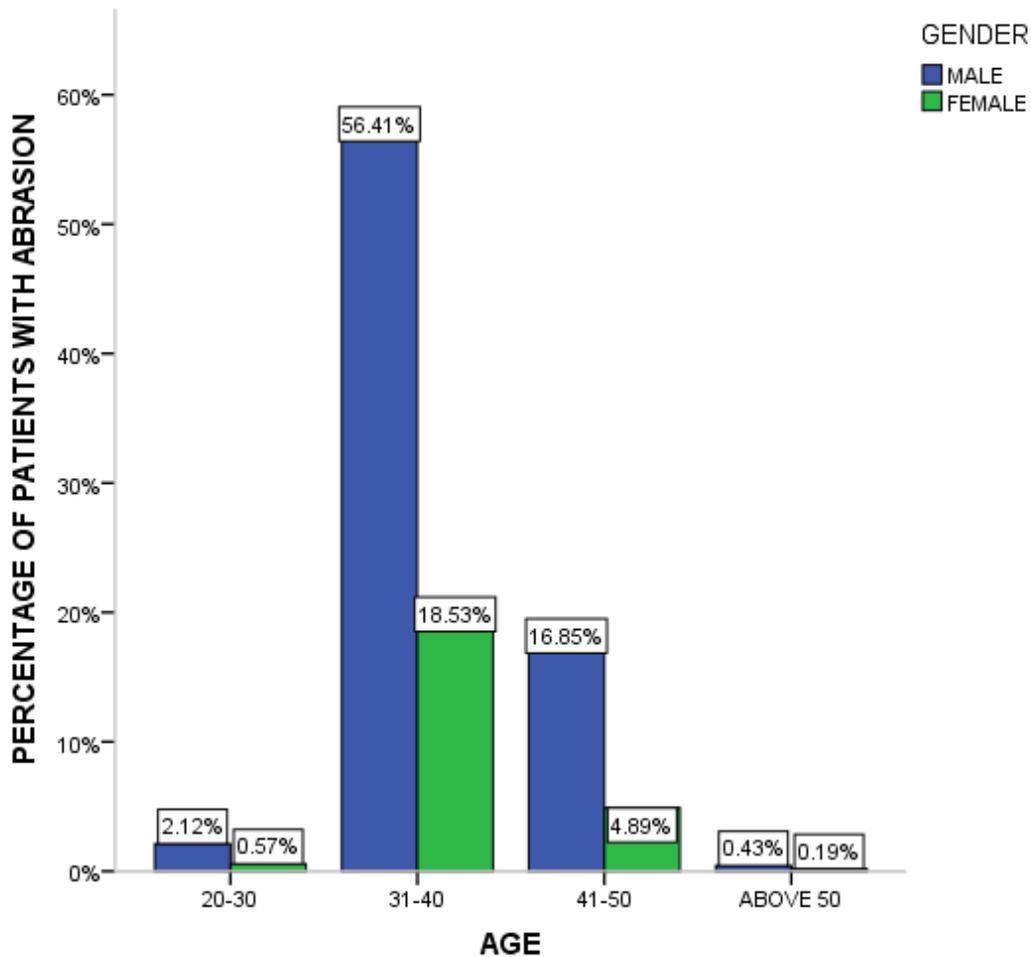
Figure-6: Bar graph represents the association of age and gender wise distribution of patients with abrasion. The X-axis represents the different age groups and the Y-axis represents the percentage of patients with abrasion. Within different age groups, the most common age group of patients affected with abrasion were 31-40 years (56.41% - blue colour) and was highly prevalent among males (75.8% - blue colour). There was a statistical significant difference among patients with abrasion in respect to age and gender (chi square value- 18.10, p value <0.05).

shows the association of age and gender wise distribution of patients with abrasion. Within different age groups, the most common age group of patients affected with abrasion were 31-40 years (56.41%) and was highly prevalent among males (75.8%). (Figure-7)
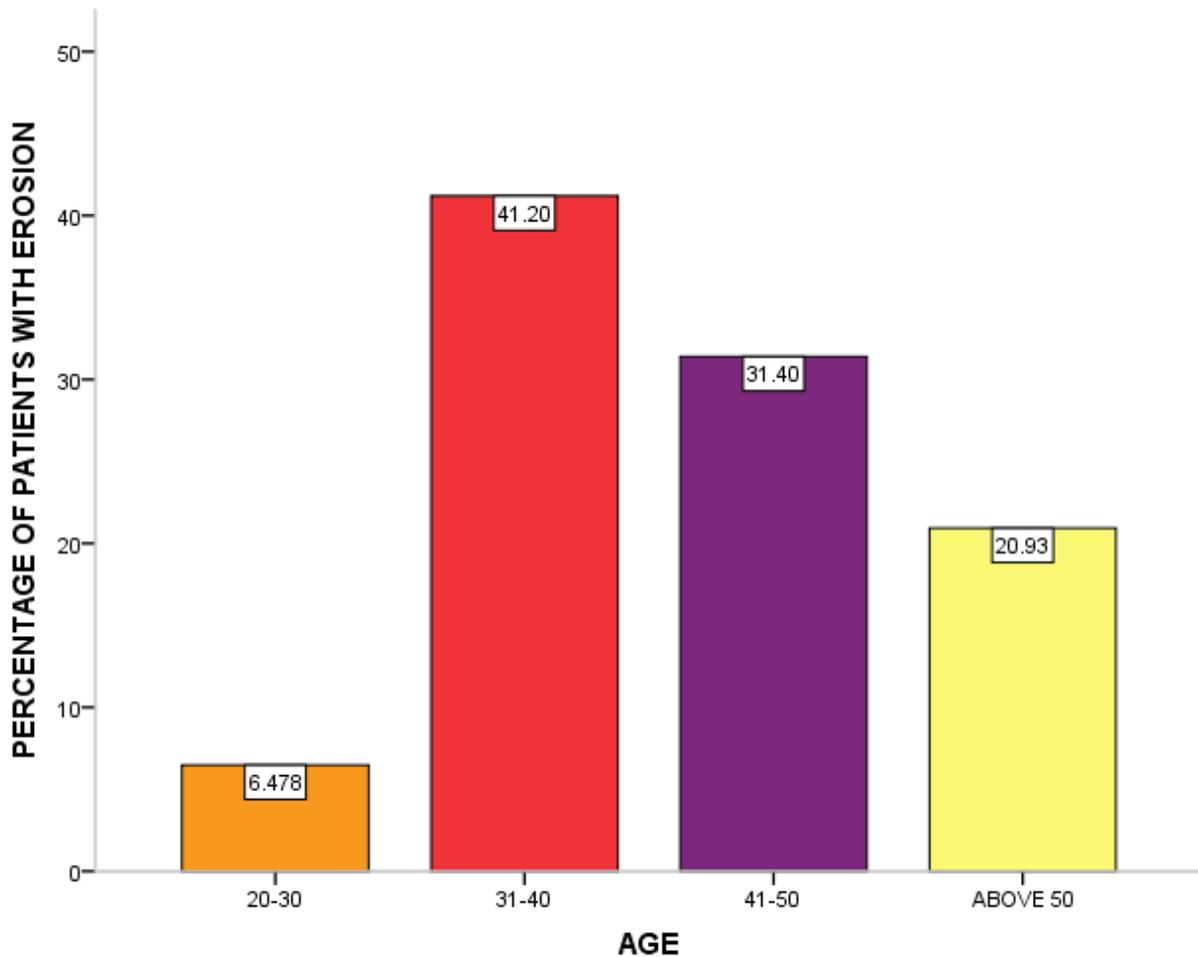
Figure-7: Bar graph represents age wise distribution of patients with erosion. The X-axis represents the different age groups and the Y-axis represents the percentage of patients with erosion. Within different age groups, the most common age group of patients affected with erosion were 31-40 years (41.20% - red colour) and the least common age group of patients affected with erosion were 20-30 years (6.478% - orange colour).

shows age wise distribution of patients with erosion. Within different age groups, the most common age group of patients affected with erosion were 31-40 years (41.20%) and the least common age group of patients affected with erosion were 20-30 years (6.478%).(Figure-8)
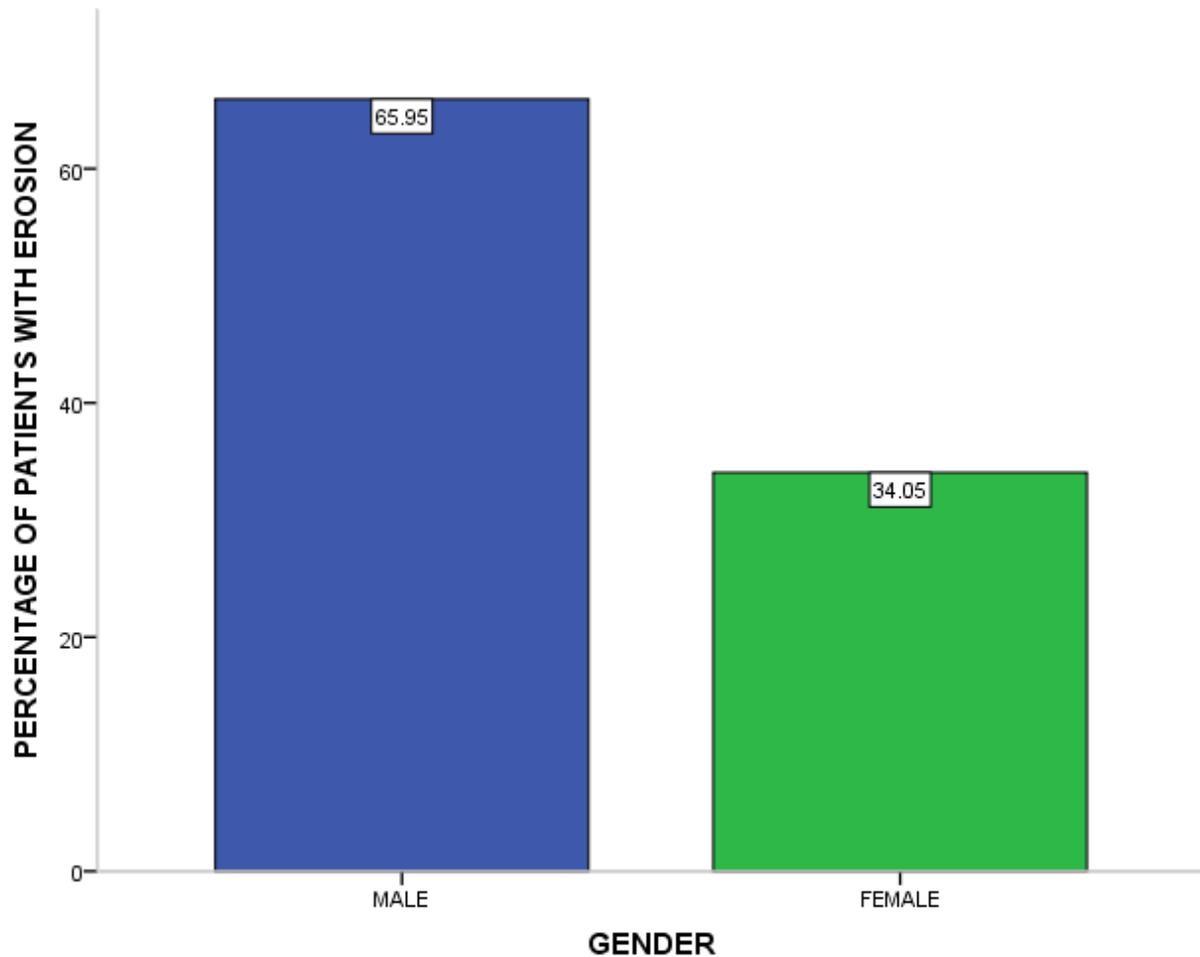
Figure-8: Bar graph represents gender wise distribution of patients with erosion. The X-axis represents gender distribution and the Y-axis represents the percentage of patients with erosion. Males (65.95% - blue colour) were more commonly affected with erosion than females (34.05% - green colour).

shows gender wise distribution of patients with erosion. Males (65.95%) were more commonly affected with erosion than females (34.05%). (Figure-9)
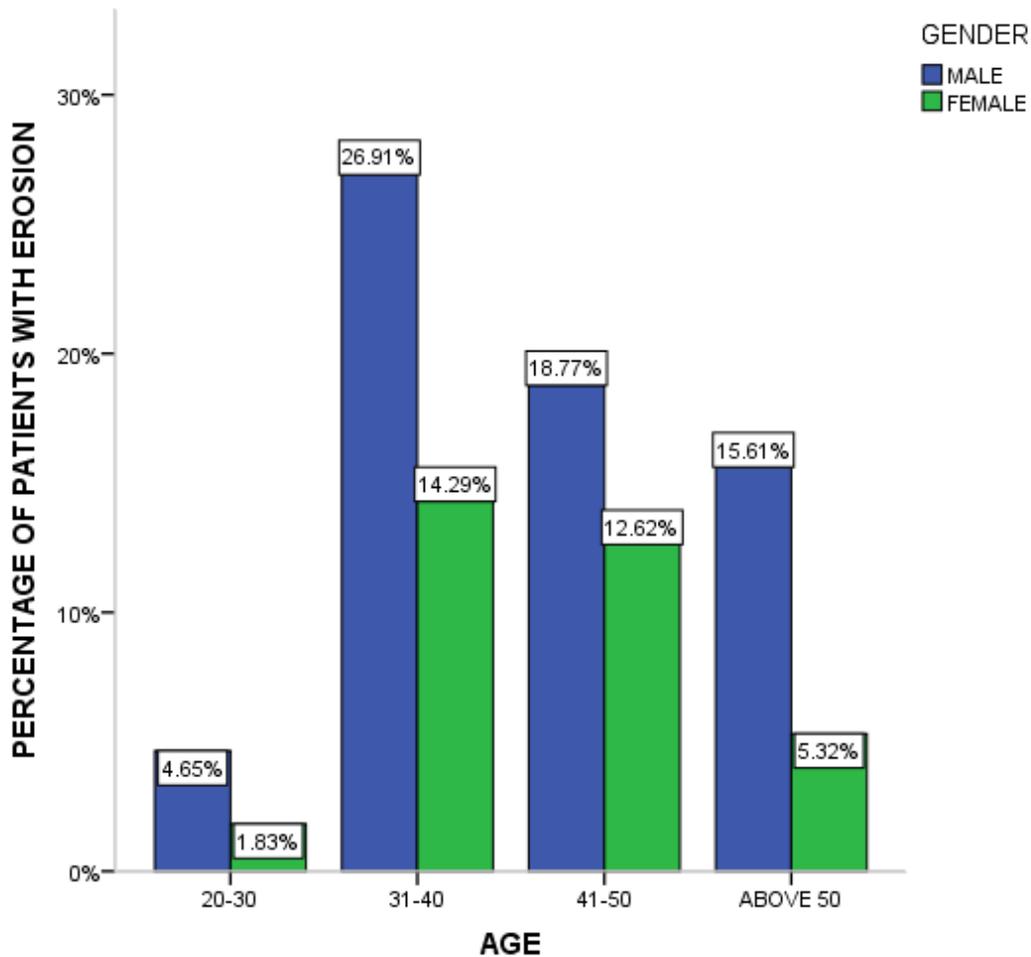
Figure-9: Bar graph representing the association of age and gender wise distribution of patients with erosion. The X-axis represents the different age groups and the Y-axis represents the percentage of patients. Within different age groups, the most common age group of patients affected with erosion were 31-40 years (26.91% - blue colour) and was highly prevalent among males (65.9% - blue colour). There was a statistical significance among patients with erosion in respect to age and gender (chi square value- 8.033, p value <0.05).

shows the association of age and gender wise distribution of patients with erosion. Within different age groups, the most common age group of patients affected with erosion were 31-40 years (26.91%) and was highly prevalent among males (65.9%) which was found to be statistically significant (p<0.05).

Tooth wear is a prevalent condition in a patient population due to the changes in dietary patterns. Oral habits are repetitive behaviors in the oral cavity that result in the loss of tooth structure, including dietary habits, brushing techniques, parafunctional habits and regurgitation. This effect depends on the nature, onset and duration of the habits. The role of acidic food and drinks is more important to the progression of tooth wear. The coarseness or grit of the diet during function is a main causative factor in the occlusal wear.(Liu et al., 2014) In the present study, the prevalence of attrition was 66.71% in the age group of 31-40 years which is in line with the study conducted by Zhao wei et al, who reported with the prevalence rate of 67.5% in the age of 35-49 years (Berry and

Poole, 1976) similar to that reported in Israel (Vered et al., 2014), London (Bartlett et al., 2013), and Ireland (Burke et al., 2010).

The prevalence of abrasive lesions was highest in the age group of 31-40 years (74.93%). This findings is in line with the findings of Borcic J (Borcic et al., 2004). This is explained with an increase in chronicity of tooth brushing and the use of abrasives for cleaning the teeth increases proportionality so is the abrasive lesion. These lesions may vary from narrowly notched wedge-shaped lesions at the cement-enamel junction to extending broadly into the cementum region.('Prevalence of dental abrasion and its association with toothbrush frequency among patients attending O.P.D. in Government Dental College and Hospital - A cross sectional study', 2015) Previous studies have reported that the prevalence of dentin hypersensitivity (erosion) among adults ranged from 4% to 67.7% which is consistent with our results. There is substantial evidence demonstrating that consumption of acidic food and drinks is a risk factor for tooth wear. Additionally, an in-vitro study shows that beverages have the potential to erode dentin hard tissues.(Wei et al., 2016)

Men in our study had higher prevalence of tooth wear than women. In contrast, epidemiologically, men have longer levels of TMJ symptom severity than do women (Sorberg, 1983). The higher prevalence in men may be explained by stronger maximal masseter muscle function, muscle fibre mass and stronger ligaments. These would also support the joint and possibly modulate any harmful effects of tooth wear more effectively.(Seligman, Pullinger and Solberg, 1988) Therefore with the prevalent figures of this study, there will be an increased demand on the clinician to manage the sensitivity of exposed dentin with teeth being retained longer.

CONCLUSION:

The present study shows that the overall prevalence rate for attrition, abrasion and erosion occurred in the age group of 31-40 years with higher incidence among males. Thus, it can be concluded that the frequency of tooth brushing, change in dietary habits, parafunctional habits are significantly associated with the occurrence of tooth wear. So it is hereby recommended that the population must be educated and guided with appropriate prophylactic measures that are effective for oral cleanliness but still harmless to oral tissues. So we as dentists and our paradental staff be wholeheartedly involved in preventing such lesions by teaching correct tooth brushing technique to prevent this problem from becoming worse and become a burden to our society, dental professionals should try to combat the problem from its early stages.

AUTHOR CONTRIBUTIONS: All authors discussed the results and contributed to the final manuscript. H.Firdus Fareen, Pradeep Kumar.R carried out the experiment. H.Firdus Fareen, Pradeep Kumar.R wrote the manuscript with support from Sri.Rengalakshmi.

CONFLICT OF INTEREST:
There are no conflicts of interest.

REFERENCES:

1. Bartlett, D. W. et al. (2013) 'Prevalence of tooth wear on buccal and lingual surfaces and possible risk factors in young European adults', Journal of dentistry, 41(11), pp. 1007–1013.

2. Berry, D. C. and Poole, D. F. (1976) 'Attrition: possible mechanisms of compensation', Journal of oral rehabilitation, 3(3), pp. 201–206.

3. Bishop, K. et al. (1997) 'Wear now? An update

on the etiology of tooth wear', Quintessence international , 28(5), pp. 305–313.

4. Borcic, J. et al. (2004) 'The prevalence of non-carious cervical lesions in permanent dentition', Journal of oral rehabilitation. Wiley Online Library, 31(2), pp. 117–123.

5. Burke, F. M. et al. (2010) 'Fluoridation and tooth wear in Irish adults', Community dentistry and oral epidemiology, 38(5), pp. 415–421.

6. Hassan, A. K. and Omar, S. (2000) 'Root caries among Benghazi patients', Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit, 6(2-3), pp. 494–496.

7. 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', Disaster Management and Human Health Risk V. doi: 10.2495/dman170121.

8. Khatri, S. 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 Indian Society of Pedodontics and Preventive Dentistry, p. 92. doi: 10.4103/jisppd.jisppd_173_18.

9. Kreulen, C. M. et al. (2010) 'Systematic Review of the Prevalence of Tooth Wear in Children and Adolescents', Caries Research, pp. 151–159. doi: 10.1159/000308567.

10. Kumar, R. P. and Preethi, R. (2017) 'Assessment of Water Quality and Pollution of Porur, Chembarambakkam and Puzhal Lake', Research Journal of Pharmacy and Technology. A & V Publications, 10(7), pp. 2157–2159.

11. Kumar, R. P. and Vijayalakshmi, B. (2017) 'Assessment of fluoride concentration in ground water in Madurai district, Tamil Nadu, India', Research Journal of Pharmacy and Technology. A & V Publications, 10(1), pp. 309–310.

12. Leelavathi, L. (2019) 'Nicotine Replacement Therapy for Smoking Cessation-An Overview', Indian Journal of Public Health Research &. search.ebscohost.com. Available at:
http://search.ebscohost.com/login.aspx?direct= true&profile=ehost&scope=site&authtype=craw ler&jrnl=09760245&AN=141274498&h=gY L53P0RTDuihXfEOqLsBmolOVY%2Fn1jwd 7eokhNcHN%2F5g8CVaYKbt1wU4UOsqeC Y51fRbe6Ner1I6TkeG%2FuwDg%3D%3D&c rl=c.

13. Liu, B. et al. (2014) 'Tooth wear in aging people: an investigation of the prevalence and the influential factors of incisal/occlusal tooth wear in northwest China', BMC Oral Health. doi: 10.1186/1472-6831-14-65.

14. 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.

15. 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. Prof.(Dr) RK Sharma, 10(10), pp. 375–380.

16. Molnar, S. et al. (1983) 'Tooth wear rates among contemporary Australian Aborigines', Journal of dental research, 62(5), pp. 562–565.

17. 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. International Journal of Research in Pharmaceutical Sciences, Sponsored by JK Welfare & Pharmascope Foundation, 10(4), pp. 3197–3203.

18. Pavithra, R. P. and Jayashri, P. (2019) 'Influence of Naturally Occurring Phytochemicals on Oral Health', Research Journal of Pharmacy and Technology. A & V Publications, 12(8), pp. 3979–3983.

19. Prabakar, J., John, J., Arumugham, I., 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, p. 233. doi: 10.4103/ccd.ccd_132_18.

20. Prabakar, J., John, J., Arumugham, I. M., et al. (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.

21. Prabakar, J., John, J., Arumugham, I. M., et al. (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.

22. 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.

23. 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.

24. 'Prevalence of dental abrasion and its association with toothbrush frequency among patients attending O.P.D. in Government Dental College and Hospital - A cross sectional study' (2015) Indian Journal of Dental Advancements, 07(02). doi: 10.5866/2015.7.10112.

25. 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.

26. Seligman, D. A., Pullinger, A. G. and Solberg, W. K. (1988) 'The prevalence of dental attrition and its association with factors of age, gender, occlusion, and TMJ symptomatology', Journal of dental research, 67(10), pp. 1323–1333.

27. Vered, Y. et al. (2014) 'Dental erosive wear assessment among adolescents and adults utilizing the basic erosive wear examination (BEWE) scoring system', Clinical oral investigations, 18(8), pp. 1985–1990.

28. Wei, Z. et al. (2016) 'Prevalence and Indicators of Tooth Wear among Chinese Adults', PloS one, 11(9), p. e0162181.