Assessment of tooth wear among tobacco chewers in South India

ABSTRACT:

Aim: In India, people chew tobacco either alone or in combination with pan or pan masala, which may cause tooth wear. The nature of chewable areca nut and tobacco consumption in India has undergone rapid transformation with introduction of pan masala and gutkha. The negative health effects of tobacco on oral soft tissue including premalignancy and malignancy are well documented, however research on its effect on oral hard tissues especially on tooth wear is lacking.

Materials and methods: The purpose of this study was to assess and compare tooth wear among chewers of various forms/combinations of tobacco products in patients visiting Pvt. Dental College in Tamilnadu, India. The SPSS version 15 (SPSS, Chicago, IL, USA) statistical analysis was used and the results were obtained.

Results: The subjects chewing tobacco had significantly greater tooth wear as compared to the controls. The wear was especially significant in paan chewers compared to the other tobacco combinations. It was also observed that the frequency and duration of chewing tobacco was directly proportional to the number of pathologically worn sights like attrition, abrasion and erosion. The subjects chewing tobacco had significantly greater tooth wear as compared to the controls ($P < 0.001$).

Conclusion: The patients taken here are tobacco chewers, comparison here is the subjects chewing tobacco had significantly greater tooth wear as compared to the controls and the outcome is the most commonly occuring tooth wear among tobacco chewers. Tobacco products containing abrasives contribute to tooth wear and this factor must be taken into account for treatment planning for these patients.

Key words: Tobacco chewers, tooth wear, assessment , abrasives, harmful, health effects.

INTRODUCTION:

In India, tobacco chewing is very popular especially in rural areas and this habit has increased in recent times according to World Health Organization (WHO). According to WHO estimates, about 194 million men and 45 million women use tobacco in smoked or smokeless form in India (1). The nature of chewable areca nut and tobacco consumption in India has undergone rapid transformation with introduction of pan masala and gutkha (2) Although smoking by women is not well accepted in Indian society, consumption of smokeless tobacco is well accepted, and use of tobacco is very common (3). Tobacco use usually begins in adolescents; the time of their observation, understanding, struggling, facing challenges and psychological development (4). Many of the risks to health and life caused by tobacco consumption develop over a long period, and take decades to become fully evident. But tobacco use also inflicts immediate harm on users and their families. (5). The negative health effects of tobacco on oral soft tissue including premalignancy and malignancy are well documented, however research on its effect on oral hard tissues especially on tooth wear is lacking. Tooth wear may be defined as the gradual loss of tooth substance due to repetitive physical contacts or chemical dissolution .(6) Studies have shown that the effect of chewing tobacco on occurrence of tooth wear is high, with users having many times than the risk of nonusers .(7)

Thus, tooth wear is a composite term and includes non carious tooth surface loss by attrition, abrasion and erosion (Addy and Bristol, 2005). (8)

Tobacco is one of the main causes of premature death worldwide. Globally, tobacco kills more people each year around the world than AIDS, drug abuse, and road traffic accidents. By the year 2030, according to current trends, it is assumed that this number will increase to 10 million with 70% of deaths occurring in low and middle income countries. In India, different forms of tobacco are being consumed. Cigarettes and bidis (hand rolled cigarettes that contain unprocessed tobacco) are the two most common forms of tobacco smoked. The most common form of Smokeless tobacco (ST) used is misri, a black powder obtained by roasting and powdering tobacco, which is then applied to the gum by using fingers. Another most common form of ST is chewing of betel quid, a combination of betel leaves, areca nut, slaked lime, tobacco, and condiments; combination of ingredients is altered according to individual preferences. (9)

In recent years, oral cancer is a common health hazard, with approximately 300378 new patients and 2.7 per 100000 mortality worldwide in 2012 and the incidence increased in young and middle-age population groups.(4,9) Tobacco has been established as a risk factor for the

development of premalignant disorders (PMDs) of oral mucosa. According to various studies, the prevalence of oral sub mucous fibrosis (OSMF) in India varies between 0.03% and 3.2%. The most important consideration is the relation between the use of tobacco and related products and the development of lesions. The buccal (cheek) mucosa is the most common site for oral cancer in all regions.(10)

The prevalence of periodontal disease ranges from 78.5%(11) to 100%(12) in some reports. Furthermore, high prevalence of tooth wear of 86.8%(13) has been reported among tobacco users.

Oral diseases such as dental caries or periodontal disease are highly prevalent and their consequences are not only physical; they are also economic, social, and psychological. (14). The negative consequences of tobacco chewing in oral soft tissue is predominantly significant and its malignancy and premalignancy has been documented in many cases. But its impact on hard tissues of the oral cavity, especially structures like tooth needs more information.(15) Worldwide tobacco use among the adult is associated with a high risk of oral health problem. The adult groups are considered as the important population of the country and prevalence of tobacco use particularly, in recent year, had an increasing trend in this age group especially among the adult population.

MATERIALS AND METHODS:

This retrospective study examined the records of patients from 01 June 2020 to 01st January 2021 who visited saveetha dental college and hospital. Ethical approval was taken from the institutional review board/ SDC/SIHEC/DIASDATA/0619-0320. The study population included patients who chew tobacco and who have had a history of chewing tobacco. The study sample included both male and female gender, predominantly South Indians. The study population was 300 tobacco chewing patients aged between 18-80 years who visited university hospital. Sample size was 300 tobacco chewing patients in which 163 patients in the hospital database were diagnosed with tooth wear. The necessary data such as age, gender, findings of the teeth and type of tobacco used was recorded. Incomplete

patient records were excluded. Data was recorded in Microsoft Excel and exported to the statistical package of social science for windows (SPSS) and subjected to statistical analysis. Chi square tests are used for comparison of groups.

RESULTS **and DISCUSSION**:

The overall response for each finding and the percent analysis was calculated. It was found that out of the total sample size, 28.22% of the patients were aged between 18 to 30yrs, 42.94% of the patients were aged between 30 and 50yrs and 28.83% of the patients were aged between 50 and 80yrs [Figure 1] in the sample population. 39.88% of the patients were female and 60.12% of the patients were males who consumed tobacco [Figure 2]. 8.59% of the patients have abrasion who consumed tobacco, 49.69% of the patients who consumed tobacco have attrition, 12.27% of the patients who consume tobacco have erosion and 23.32% of the patients who consume tobacco have no findings of tooth wear [Figure 3]. 79.75% of the patients use paan whereas only 20.25% of the patients used gutkha [Figure 4]. These are represented statistically through graphs below.

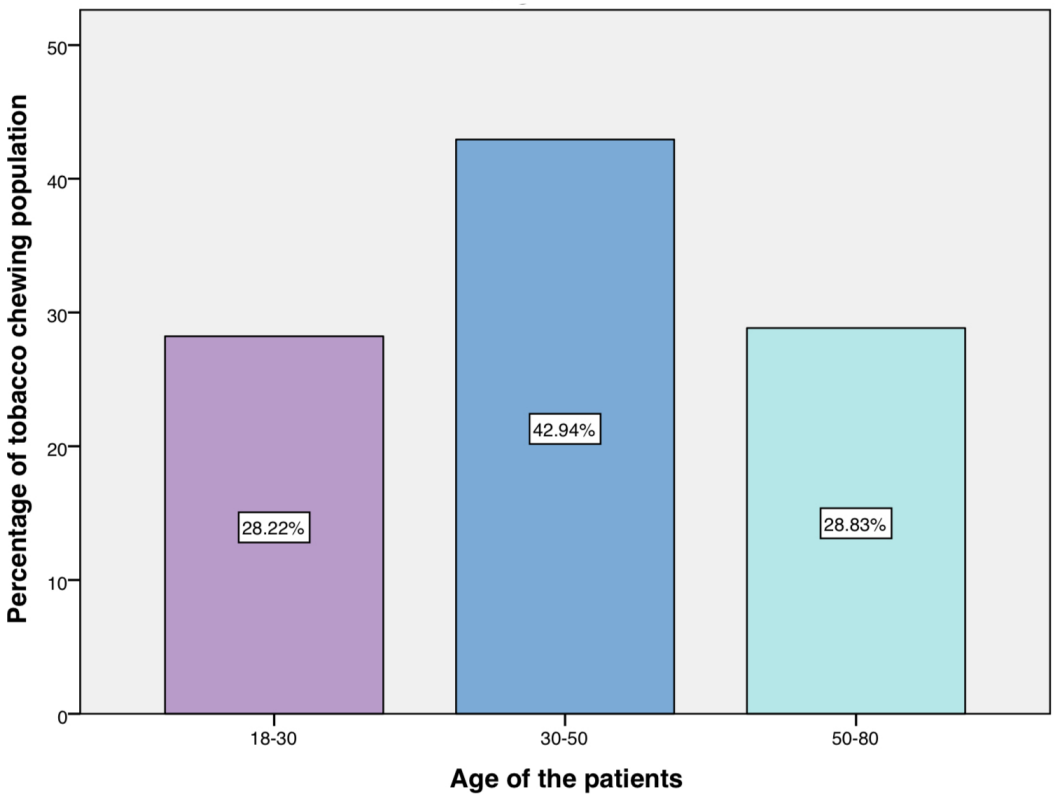

Figure 1: Bar chart shows age distribution of tobacco chewing patients in the sample population. Purple denotes the patients aged between 18 and 30 and Indigo denotes the patients aged between 30 and 50 and Blue denotes the patients aged between 50 and 80. 28.22% of the patients were aged between 18 and 30, 42.94% of the patients were aged between 30 and 50 and 28.83% of the patients were aged between 50 and 80.

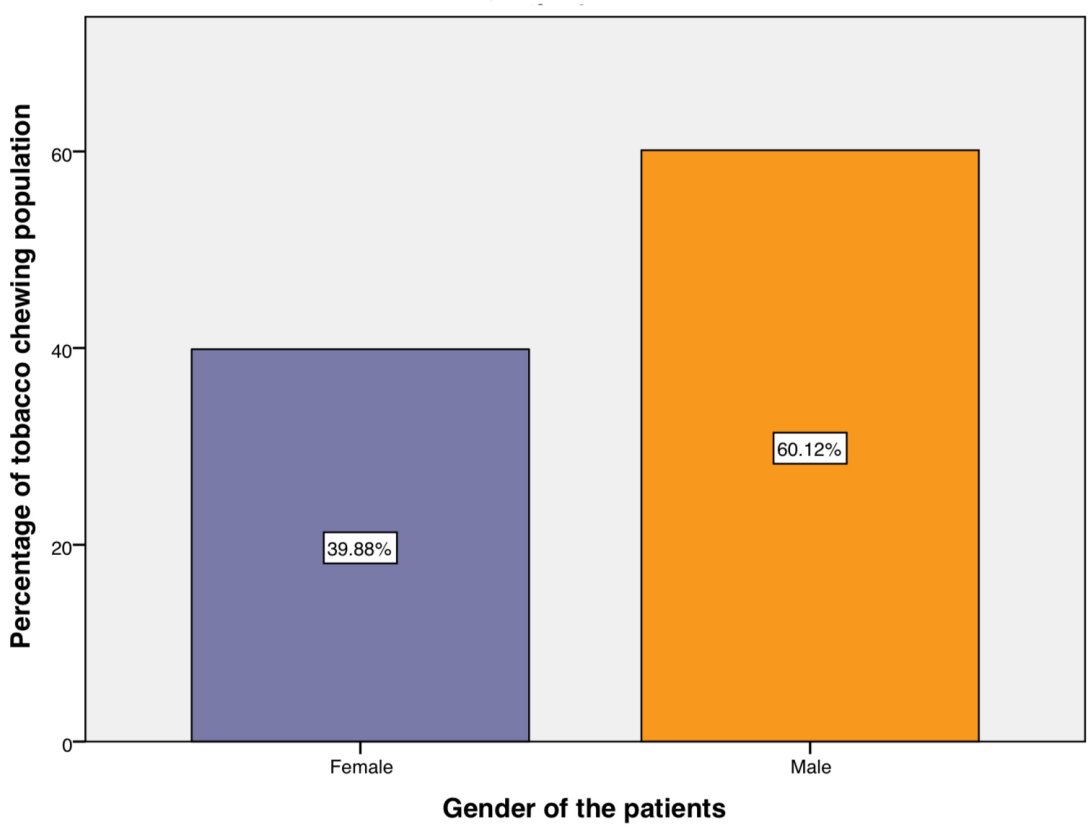

Figure 2: Bar chart shows gender distribution of tobacco chewing patients in the sample population. Purple denotes the female population and orange represents the male population. 39.88% of the patients were female and 60.12% of the patients were male.

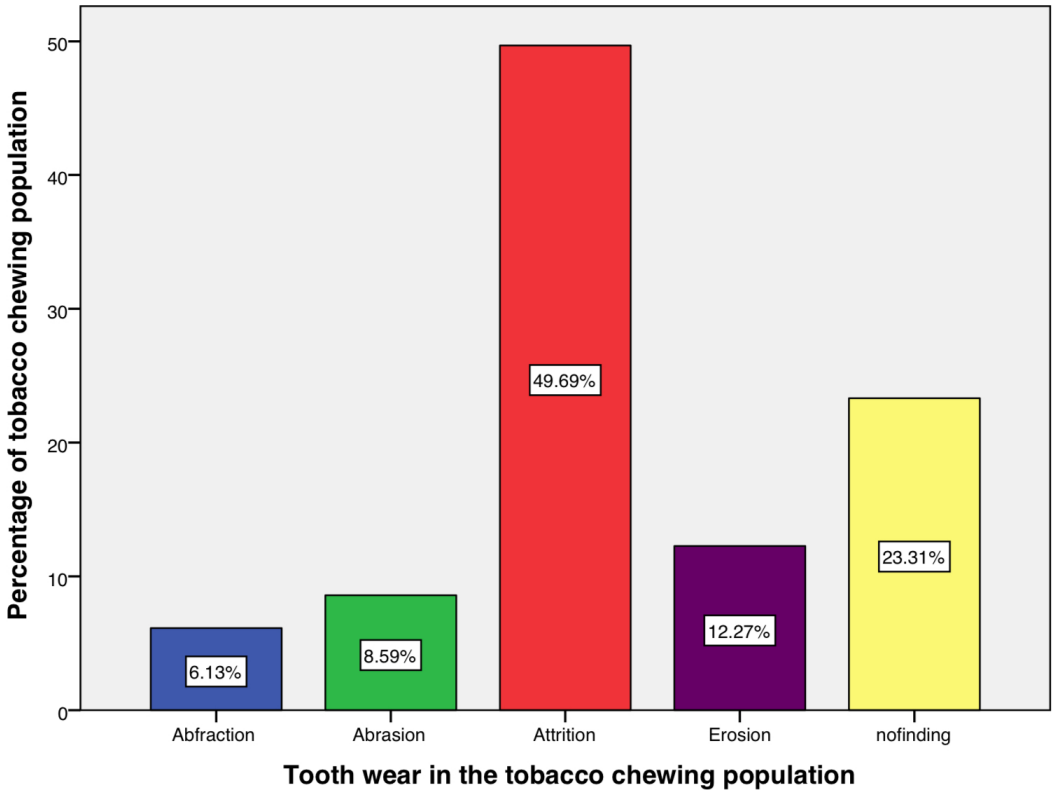

Figure 3: Bar chart shows findings of tooth wear among tobacco chewing patients in the sample population. Red denotes attrition, Blue denotes abfraction, green denotes abrasion, purple denotes erosion and yellow denotes no findings among the tobacco chewing population population. 8.59% of the patients have abrasion, 49.69% of the patients have attrition,12.27% of the patients have erosion and 23.32% of the patients have no findings of tooth wear.

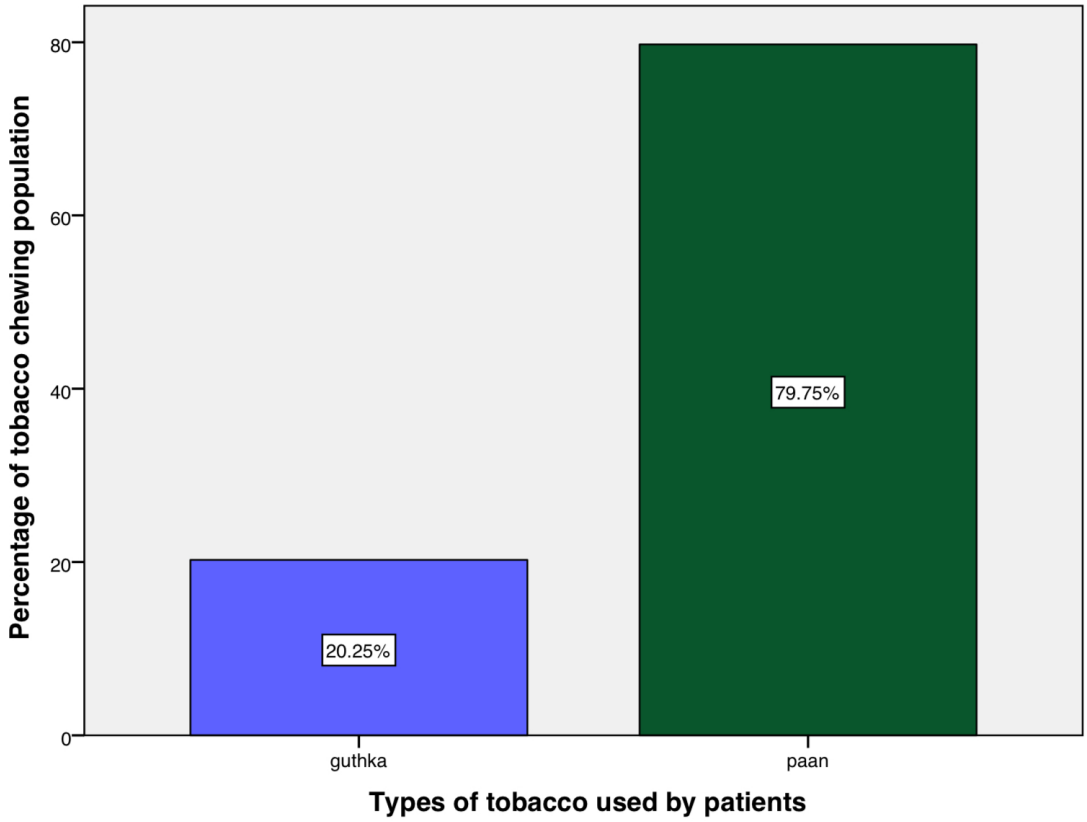

Figure 4: Bar chart shows the distribution of types of tobacco used by patients in the sample population. Blue denotes the patients who use gutkha and Green denotes the patients who use paan. 79.75% of the patients use paan whereas only 20.25% of the patients used gutkha.

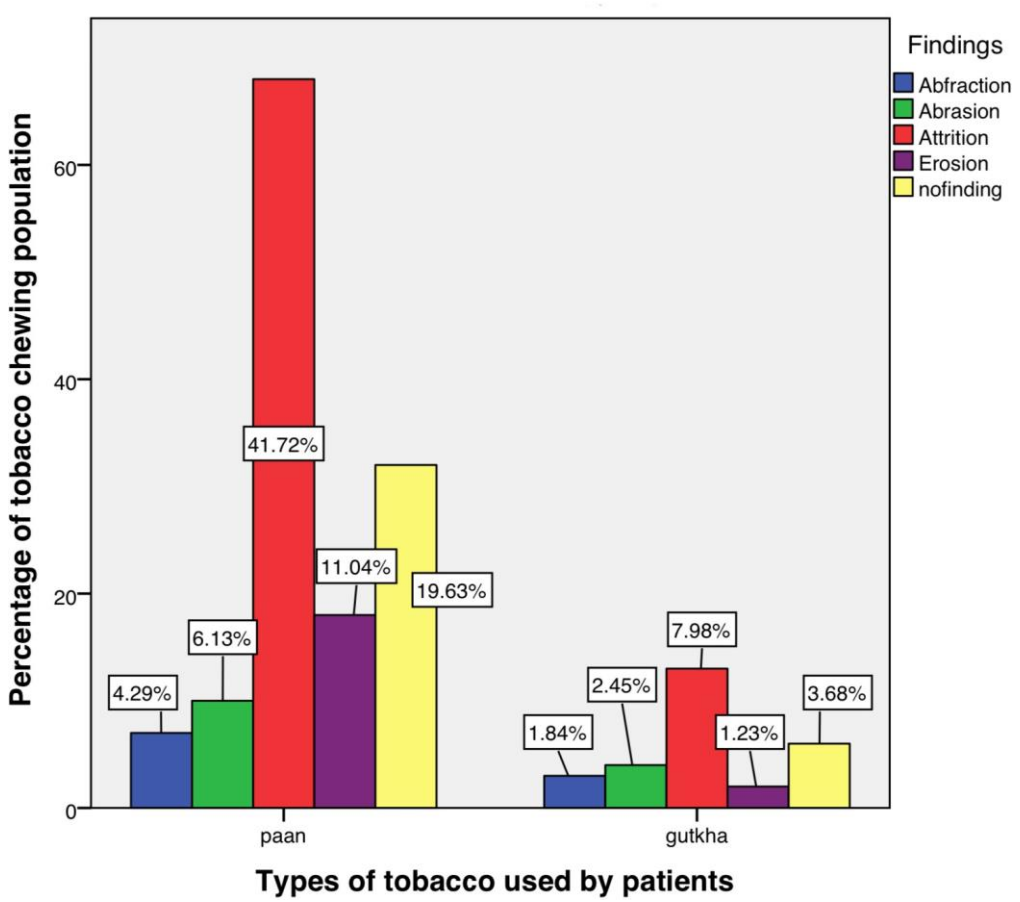

Figure 5: Bar chart depicting the association between the types of tobacco used by patients and its consequential tooth wear among tobacco chewing patients. X axis denotes the type of tobacco used by patients and Y axis denotes the percentage of tobacco chewing patients who have tooth wear. Blue denotes abfraction, green denotes abrasion, red denotes attrition, purple denotes erosion and yellow denotes no findings of tooth wear. Chi square test was done and the association was found to be not significant. (Pearson chi square value :3.281 , df:4 , p value: 0.512 ie p >0.05). Hence, not statistically significant although 43% have attrition in both patients who have paan and gutkha.

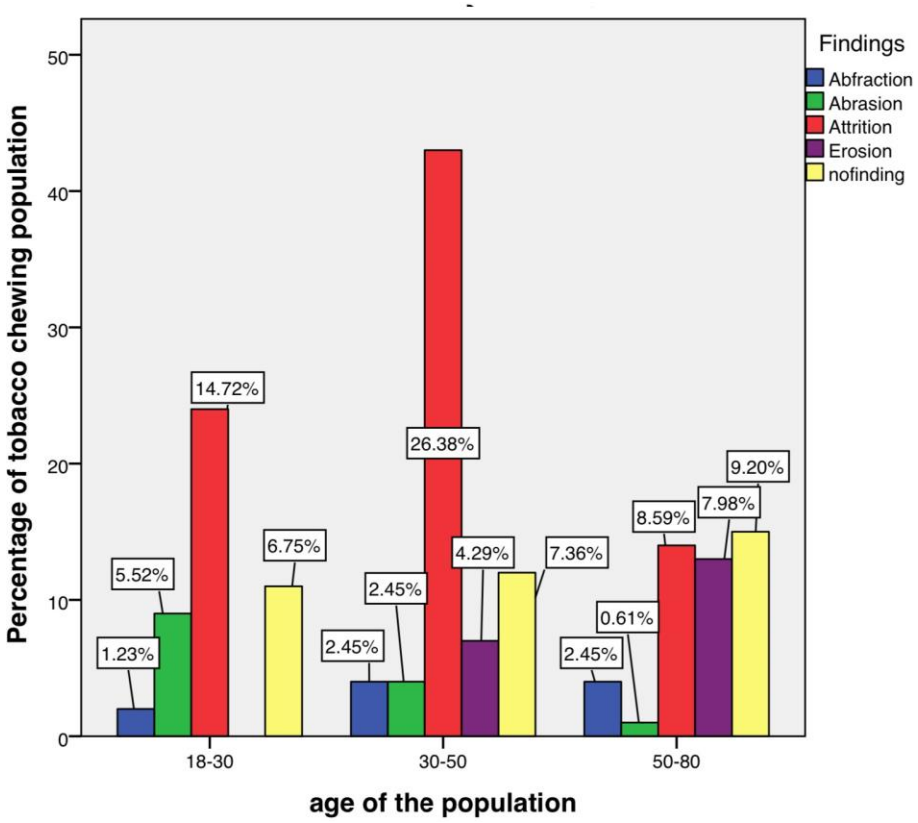

Figure 6: Bar chart depicting the association between the age of the population and types of tooth wear in the tobacco chewing population. X axis denotes the age of tobacco chewing patients and Y axis denotes the percentage of tobacco chewing patients who have tooth wear.Blue denotes abfraction, green denotes abrasion, red denotes attrition, purple denotes erosion and yellow denotes no findings of tooth wear. Chi square test was done and the association was found to be not significant. (Pearson chi square value :17.729 , df: 4, p value: 0.001 ie p <0.05). Hence, statistically significant because 43% mostly aged between 30-50 show most findings tooth wear.

Tobacco use is one of the greatest burdens to the health and well-being of male and females. Tobacco kills nearly 6 million people every year, of which nearly 5 million die due to the direct use of tobacco.

In some studies, the majority of tobacco users did not use any cleaning aid to clean their teeth, which showed that present study individuals had a poor oral hygiene. This is in agreement with the studies done. (16)Some gutka chewers showed poor oral hygiene hence; awareness should be created by conducting more oral health education programs about the importance of oral hygiene. Effective self care oral hygiene practices such as tooth brushing, use of interdental cleaning are the key means of preventing and controlling periodontal and dental diseases.

42.94% of the majority tobacco consuming products were the patients aged between 30 and 50. The next majority is patients aged between 50 and 80 (28.83%) and then patients aged 18-30 (28.22%). This was mainly due to stress, mostly mental and sometimes physical. The patients who worked and patients who were influenced by their parents and friends were the highest consuming population. And some were patients who weren't aware of the ill effects of tobacco consumption. Tobacco is the biggest enemy of public health today and the distributors are one of the richest business groups. Prevalence of tobacco use in India is continuously increasing but there are considerable changes in the methods of its use. Tobacco is the second major cause of death in the world. WHO sources emphasize the rate of tobacco consumption especially in developing countries as an epidemic. Tobacco death toll is expected to double by 2025 from the present 5 million deaths (approx). Every 6.5 seconds, one dies because of tobacco related disease globally. This is occurring mostly in developing countries, adding significantly to their burden of disease, poverty and economy .

The tooth wear was significantly higher in males (60.12%) compared to females (39.88%). The similar results are found in the study conducted by (Al-Zarea et al., 2009) wherein the prevalence of tooth wear was found to be more in male than in female participants. This could be due to the use of heavy masticatory forces in males and also due to the fact that females are more conscious about their oral health, thus allowing early detection of the disease and restoring the lesions.

70.75% of the patients use paan while only 20.25% patients use gutkha in spite of Gutkha having much more deleterious effect on health than plain tobacco and is one of the most highly advertised tobacco products in all the media (17). Prevalence figures suggest that tooth wear must be the fourth dimension risk factor for the aesthetics, function and longevity of the human dentition behind acute trauma, caries and periodontal disease . The term 'tooth wear' (TW) is a general term that can be used to describe the surface loss of dental hard tissues from causes other than dental caries, trauma or as a result of developmental disorders. It is a normal physiological process that is macroscopically irreversible and is cumulative with age . Smokeless tobacco is a blanket term that refers to a number of tobacco products that are used by means other than smoking. These uses include chewing, sniffing, placing the product between the teeth and gum, and application to the skin. According to American Cancer Society (ACS) a common misconception is that many people think using smokeless tobacco is safer than smoking. A person who uses eight to 10 dips or chews a day receives the same amount of nicotine as a heavy smoker who smokes 30 to 40 cigarettes a day and just because there's no smoke, doesn't mean it's safe. Smokeless tobacco, like cigarettes and other forms of tobacco, is addictive. The nicotine in smokeless tobacco is absorbed more slowly than in smoking, but it remains in the body longer. Much concern has been expressed over the effects of smokeless tobacco on the mucous membranes of the oral cavity, particularly the increased risk of oral cancer. This is indeed a major problem. However, the possibility of direct damage to the dentition by materials found in smokeless tobacco and cigars also should be a concern.

49.69% of the patients had attrition, 8.59% of the patients had abrasion, 12.27% of the patients had erosion. We can see attrition being predominantly significant with the statistics above. The similar results are found in the study conducted by (Bartlett et al. in 2011). Several authors have reported excessive dental attrition in users of oral forms of tobacco (18). When teeth are gradually worn away by abrasion, the tooth normally forms secondary dentin. However, when teeth are exposed to increased amounts of abrasives, the secondary dentin is also worn down. In extreme cases, the entire clinical crown may be worn away . Since long-time users of oral tobacco products can experience severe dental attrition, it has suspected that tobacco might contain abrasive materials capable of wearing away dentin. Tobacco contains tiny silica particles

which can abrade the dentition of chronic users. These deposits of silica have been found in stems, roots and leaves of more than 400 varieties of plants . Some silica particles found in tobacco products may be the result of fallout from airborne dust. A significant portion of the particles are part of the leaf structure as the result of metabolic processes of the plant itself. Tobacco leaves are not subjected to any specific cleaning process before being incorporated into various smoking and smokeless products. Thus any abrasive particles clinging to the surface are included in the prepared product. Since most of the abrasive particles are present within the plant structure, washing would have little effect on reducing the abrasive content.(19) When tobacco products containing abrasive silica are mixed with saliva and chewed, an abrasive paste is formed that over time can wear down teeth very efficiently. The minute size of most particles prevents the chewer from perceiving the product as objectionably "gritty," but the particles are abrasive in spite of their small size (20).

CONCLUSION:

Within the limitations of the study, we conclude that majority of the tobacco chewing population especially those who had a paan chewing habit had attrition of the teeth compared to that of the other wasting disease of teeth.When tobacco products containing abrasive silica are mixed with saliva and chewed, an abrasive paste is formed that over time can wear down teeth very efficiently. For proper management of tooth wear, it's diagnosis, etiology and risk factors must be evaluated. Studies to determine the prevalence tooth wear and associated risk factors can facilitate better assessment, planning of preventive measures, and carry out treatment more effectively. As abrasive materials in tobacco may contribute to dental attrition in chronic tobacco chewers, their effects should be taken into consideration during dental treatment planning. Furthermore, such studies are important for designing comprehensive tobacco control policies which are necessary to reduce the burden of tobacco related oral diseases and implementing proper dental treatments.

Our team has extensive knowledge and research experience that has translate into high quality publications(Jayasree et al. 2021),(Sivakumar et al. 2021),(Uma Maheswari et al. 2020),(Avinash

et al. 2020),(Chaitanya et al. 2018),(Gudipaneni et al. 2020),(Chaturvedula et al. 2021),(Patil et al. 2021),(Ezhilarasan et al. 2019; Sharma et al. 2019; Perumalsamy et al. 2018; Rajeshkumar et al. 2019; Mehta et al. 2020; Rajakumari et al. 2020),(PradeepKumar et al. 2021; R et al. 2021; Ezhilarasan et al. 2021; Sarode et al. 2021; Kavarthapu and Gurumoorthy 2021),(Preethi et al. 2021)

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