

Review Article

Smokeless Tobacco and Periodontal Health: An Overview

Iram Rizvi¹, Vivek Kumar Bains¹, Vivek Gupta², Himangi Dubey¹

ABSTRACT

The use of tobacco was recognized as such an important causative factors for periodontal disease development and progression. Their use has been related to increased pocket depth, periodontal attachment loss, alveolar bone loss and a higher risk of tooth loss. Nicotine, a major ingredient of tobacco is expected to play a crucial role in aggravating periodontal diseases. Smokeless tobacco being regarded primarily in the form of chewing, as well as snuff are considered as serious contributor of several dental ailments. This is closely linked to the destruction of periodontal tissues and a possible risk for periodontitis and tooth loss is considered. There has also been an increasing recognition over the last 25 years of the influence of smokeless tobacco use in incidence & severity in periodontal diseases. A scientific estimation of concerted efforts should be further undertaken at country - inter country level. Operational research will allow for the outcome and process assessment of group tobacco control strategies and such research can then help to exchange perspectives around countries. Thus, this is important to track these issues and consider the potential public health implications, and accept moral duty to fight against wretched habit.

Keywords: Smokeless Tobacco, Nicotine, Periodontal Disease, Periodontal Tissues, Periodontitis, Tooth Loss

INTRODUCTION

Worldwide, tobacco is a significant health problem, and a major avoidable fatality and impairment. It is estimated that 4.9 million deaths are due to tobacco worldwide by the World Health Organization. This number is expected to increase to 10 million by 2030, to 7 million of such deaths happening in underdeveloped countries, especially India. In the Global Adult Tobacco Survey (GATS), a globally representative survey to monitor the use of tobacco in the world^[1] the state of a epidemic in

India was identified. There are now around 240 million tobacco consumers aged 15 or over in India. According to this report, India faces a Number of epidemics of tobacco use.^[2,3] Smokeless tobacco (ST) chewing warranties special attention in India because of its popularity and widespread social acceptance.^[4] The major factors that persist to encourage people to use smokeless form of tobacco are its low price, ease of purchase, and the widely held misconception of purported medicinal value in curing toothache, headache, and in decreasing hunger. Tobacco smoking has been widely reported and tested for periodontal health.^[5] Tobacco smoking is closely linked to periodontal tissue damage and is seen as a contributing factor for periodontitis and teeth loss, be it in a form of cigarettes,^[6,7] cigar,^[8] or Hookah (water tissue pipe).^[9,10] In comparison, the possible periodontal health effects from chewing tobacco are highly correlated with periodontal tissue damage. In comparison to this, there was significantly less exposure to the possible periodontal health consequences of smokeless (ST), often available under various

Department of Periodontology, ¹Saraswati Dental College, Lucknow (UP), ²Rajendra Institute of Medical Sciences, Ranchi, India.

Address for Correspondence:

Dr. Himangi Dubey, Department of Periodontology, Saraswati Dental College, Lucknow (UP), Lucknow (UP), India. himangidubey11@gmail.com, +91 8004243129

Date of Submission: July 20, 2018

Review Completed: August 5, 2018

Date of Acceptance: September 20, 2018

types, including loose leaves, pouches and snuff.^[10-13]

Tobacco addictive effects are typically dose dependent and the large amount of Nicotine present in various tobacco products is generally known as a highly dependent opioid with heroin, morphine and cocaine as its addictive potential. The absorption by the lungs and less commonly reported by alkaline mucous membranes by passive diffusion have shown that they are not only influenced by local tissues but also by central nervous and cardiovascular systems.^[14] While Ayurveda never suggested, it has been recently recorded in many areas of rural India which smokeless tobacco can be a protective effect on teeth as well as a pain reliever and that use of tobacco products as toothpastes has been documented among adolescents in India, emphasizing continuing misconceptions.^[15] Sadly there is no taboo against the use of ST in relation to smoking. This paper aims to research the effect of various types of non-smoking smoking on periodontal health.

MATERIALS & METHODS

In pubmed databases (<http://www.ncbi.nlm.nih.gov/pubmed>), which have been searched for "smokeless tobacco." the abstracts from all relevant papers have been critiqued extensively and articles relevant to the topic have been included in the final search. Medline / Pubmed central / Google "smokeless tobacco" For additional details, relevant literature on "smokeless tobacco in periodontal health" was evaluated in traditional periodontal textbooks, public dentistry; bibliographies of papers and review articles along with related peer reviewed journals.

ATTITUDES AND BELIEFS REGARDING SMOKELESS TOBACCO USE

Smokeless Tobacco Practice

Paan (betel quid): Tobacco Paan (betel quid) is generally mistakenly referred to as betel nut chewing and is made of a betel leaf, areca nut, slaked lime. Incidentally, following its adoption, tobacco is a key component of the paan, and tobacco is currently used by the most common paans. Paan masala contains all paan compounds

that have been dehydrated to prevent the end product from being lost. It has come in enticing packages and paan masala, which is very popular in the city and is rapidly becoming popular in rural communities.^[16]

Mainpuri tobacco: Mainpuri Tobacco is quite famous in Uttar Pradesh Zone, India. It consists primarily of slaked lime and tobacco, finely cut areca nut, camphor and cloves.

Mawa: Mawa is a thin shavings with tobacco and slaked lime and famous in Gujarat (India) in youngsters.

Slaked lime: The slaked lime (khaini) and tobacco is a blend of sun-dried tobacco and slaked lime, widely known in several places as khaini, its use is widespread in Bihar, Maharashtra and western and central India. The palm has a low amount of tobacco, and a tiny amount of slacked lime has been added. Then the products are combined with the thumb vigorously and inserted in the mouth.

Snus: Snus could be loaded and swallowed in the buccal or in the labial groove, a Swedish snuff offered in teabag as well as pouches and sold in India by the Swedish Match Company under the brand name 'Click.' Mishri is a roasted powdered tobacco prepared on a hot metal surface till it is uniformly black. Women who use it initially in order to clean their teeth soon use mishri more than once a day and practice in Maharashtra is popular.

Gul: Gul is indeed a pyrolysed derivative of tobacco that is sold in small tin cans across different labels and used as dentifrice in the eastern India. Bajjar, dry snuff (or tapkeer), commonly used on teeth and gums in women of Gujarat.^[16]

Gudhaku: Gudhaku is a paste consisting of tobacco, molasses and it can be rendered by consumers itself and commercially available in a metal box. It is widely in use for Bihar, Orissa and Uttar Pradesh. Gudhaku is primarily used by women on teeth and gums.^[16]

Creamy snuff: Creamy snuff is sold on behalf of Ipcos, Denobac, Tona, Ganesh and is referred to as tobacco toothpaste, which is used for cleaning

teeth in India, including tobacco, clove oil, glycerin, spearmint, menthol and camphor.

Tobacco water: Tobacco water known as Tuibur is created in Manipur by passing smoke through water. It is called tuibur in Mizoram and Hidakphu in Manipur. Help in cessing tobacco , gutka flavor for chewers and mint flavour smokers has been launched with a 2% nicotine under brand name good kha.^[16]

Chimó: Chimó, mainly used in the Venezuela, is composed of tobacco leafs, sodium bicarbonate, brown sugar, mammon-black ashes, and vanilla and anisettes flavoring.

Nicotine Lozenge: Nicotine Lozenge consists of tobacco, mint and eucalyptus, and used in the most part in the United States.

Loose Leaf Chew: Loose Leaf Chew is made from blade tobacco, sweetener and/or liquorice and also called spit tobacco. A piece of tobacco of about 0,75 to 1 inch in diameter, usually to the rear of the mouth, has been positioned here between cheek and the lower lip and chewed or placed there.

Moist plug: Moist plug contained tobacco leaves enriched as well as fine tobacco, sweet, and/or liqueur and plug (chew) . Plug (chew), made primarily of refined tobacco leaves, fine smoking, sweetener and/or licorice, with less than 15 percent moisture is available under trademark Canwood .

Twist roll: Twist roll consists of smoking, leaf extracts from tabaco, is held between the cheek and the lower lip. Dark, air-treated leaf tobacco is processed with such a tar-like extract of tobacco leaves and tweaked into rope-like dry coils, with a flexible but stable rope throughout the final product.

Gutkha: Gutkha is available as Manikchand, Moolchand, Tulsi, Shimla, Sikandar, Pan Parag marketed brands in India, Southeast Asia and United Kingdom. The products are made from betel nut, catachu, tobacco, sugar, saffron. It's kept and gnawed throughout the mouth. Things spit out usually, but ingested occasionally.

Iq'mik: In Alaska, Iq'mik is famous with tobacco and punk ash. Users pick a small slice and chew that iq'mik and a few pre-chew and bring the

iq'mik into a small box that can be used by others, such as children and teething infants at times.

Qiwam: Qiwam is a common type of cardamom, saffron, aniseed and additive like musk among the Indian highest socio-economic classes. Paste is applied and chewed into the mouth.

Nass: Nass (Naswar, Niswar, etc) in Central Asia, Iran, Afghanistan, Pakistan and Baluchistan (India) are commonly known as Naswar. In Nass, tobacco, ash, cotton or sesame oil, and in Naswar: tobacco, slaked lime, indigo, cardamom , sugar, menthol, and tea. It can be inhaled into t he nostrils, too.

Chewing Tobacco: Chewing Tobacco are small raw bits, which are available as more rough cuts or as plug packaging; typically, a chewing (wad or quid) is inserted into a cheek pouch.^[17]

Moist Snuff: The Moist Snuff brands in the United States are known as spit nicotine or slip bandits such as Copenhagen, Skoal, Skoal Bandits, and Happy Days. This is typically sold in a thin, round tin as a finely ground or crushed type of tobacco is inserted here between lip and cheek or gum.^[17] For the different products of industry, the nicotine content of non-fermented Swedish moist snuff range from 5 to 11 mg/g.^[18]

Toombak: Toombak is often used in Sudan and contains primarily of tobacco and sodium bicarbonate and is branded as a 10 g ball or saffa.

Zarda: In India and Arab countries, Zarda is sold as a Baba, Bharat and Gopal label. It contains tobacco, lime, spices, vegetables, and areca nuts.

Distribution of smokeless tobacco users:

The correlation of a smokeless tobacco by the advertisement agencies with masculinity, athletics and strong outdoors success approaches young males. Researchers raised severe concerns regarding the substantial reduction by advertisement and marketing agencies in the age for tobacco start-up, and attraction by youngsters to non-smoked tobaccoists^[19,20] and subsequently, vigorous marketing by young males of smokeless tobacco by the ST industry is generating tremendous interest in health effects.^[16]

SYSTEMIC EFFECTS OF THE SMOKELESS TOBACCO

Dentists may not be concerned explicitly with the systemic consequences of smokeless tobacco use. Awareness of these consequences will also aid in the counseling of patients. Smokeless tobacco stimulates the immune system response as well as in vivo and in vitro studies.^[21] The multiple potentially toxic compounds which are in contact with oral mucosa and teeth through mouth carrying of tobacco were nicotine and tobacco-associated nitrogen, polycyclic`c-armed hydrocarbons and polonium.^[22] In fact, nicotine becomes toxic and absorbs both in the mucosal and gastrointestinal tract via the blood.^[23] The correlation between production of PGE2 and IL-1 pro inflammatory cytokines in smokeless tobacco induced by mucus lesions is doubled by the exposure of keratinocytes and monocytes to aqueous extracts, which leads to enhanced keratinocyte proliferation.^[24] Nicotine intake has been found by others^[25] to be improved IL-2 development and to have reduced IL-12 development from macrophages^[26] and a decline in clinical oral fibroblast.

No associations between hypertension or heart rate or ST usage were proposed in^[16] however, with significant amount of sodium in smokeless tobacco, despite reverse relationships respectively HDL and serum cotinine concentrations among ST consumers studied.^[27] Nicotine symptoms include raised heart rhythm and catecholamine ,blood pressure, and increased levels of overall ST plasma cholesterol of contrast to Non-User. Cigarette smoking pharmacology and nicotine addiction was reported.^[28]

EFFECT OF SMOKELESS-TOBACCO ON ORAL MUCOSA

Commonly on mucosal surfaces in which the product is held so in the nearby periodontium the oral impacts with smokeless tobacco are often seen. That lesions are typically clearly distinguished from healthy tissue clinically. The site or lesion can be white or yellow brown to greater use of tobacco products, which can create a thickened, wrinkled appearance.^[29] These white lesions must be diagnosed in a best-practice way with tobacco-related leukoplakia. Leukoplakia is, by definition, a white plaque or patch that could

not be classified like any other disease clinically or pathologically.^[30]

EFFECT OF SMOKELESS-TOBACCO ON PERIODONTAL DISEASES

Tobacco use is recognized as being a clear reported association among smokeless tobacco and oral carcinoma, with white oral mucous lesions.^[31] Such lesions are widely observed in mouths where smokeless tobacco products are put in the 50-60% range of non-smokers.^[32, 33, 34] There was definite connection in the use of smokeless tobacco and generalized periodontal conditions.^[35] Localized attachment losses in form to gingival recession arise in 25% – 30% of smokeless consumers of tobacco.^[32,34] This attachment loss is widely found in adjacent to buccal region, where smokeless tobacco products typically put.

An analysis of male healthcare practitioners found that the association among chewing and chance of tooth loss which occurs between non-dentists^[36] is important. Mavropolous *et al.*^[36] discovered enhanced blood supply in human gingiva in relation of local exposure to snuff. Johnson and Slach *et al.*^[15] addressed the impact of smoked and non-smoked tobacco on periodontal diseases, and said that in the form of gingival recession and white mucosal lesions, the most common symptoms of non-smoked tobacco are found at the placement sites. Several studies on young adults have uncovered that perhaps the utilization of tobacco without smokes is substantially linked with Gingival Recession.

Offenbacher & Weather^[38] suggested, in comparison to Weintraub & Burt *et al.*,^[18] that gingival disease would become an important consideration in the gingival recession for smokeless tobacco consumers. Mechanical and/or chemical trauma could be the causative factor in the development of gingival recessions; chemical injury caused by severely exposed gingiva to smokeless tobacco / quid can result in thinning, with marginal loss of gingiva in buccal sites more prone to alveolar dehiscence.^[16,18] Monten *et al.*^[18] observed that the attachment loss of snuff consumers in baseball players was considerably greater than that observed in healthy controls.

ROLE OF PERIODONTIST IN TOBACCO CESSATION

Dentistry has a good record of prevention care as a regular component of patient treatment. Periodontics provides several possibilities for patient interactions: while effective therapy and specifically throughout the continuous long-term rehabilitation process. Tobacco use in dental clinic has so many different solutions, including brief interference to extensive abstinence programs incorporating all of the office's employees.

If Periodontists are actively engaged in educating the patient about harmful effects of smokeless tobacco, more patients will cease using such products. Therefore periodontists and dentists must proactively recognize oral lesions and carry out counseling. Dental health professionals must come asking health questions concerning the consumption of tobacco, and educate patients, whenever feasible, the indications of hard and soft tissue deterioration as well as the initial stages for an oral lesion.^[39] If a patient has regularly for a longer period used smokeless tobacco, a mucosal lesion biopsy must be performed to avoid dysplasia or carcinoma. If the dentist is unable to perform an adequate marginal biopsy or is limited by anatomical structures, therefore the referral of patients to a specialist in Periodontology or maxillofacial surgery and Oral medicine or pathology .

Finally, dentists must inform the patient of the underlying impacts of smokeless tobacco. Interestingly, research has demonstrated that the involved mucosa can return to normal after the lesions have been recognized early on when it ceases to use smokeless tobacco.^[40] If patients are aware of dental threats and periodontal complications, certain long-term gains will be obtained and possible future oral carcinomas can be avoided.^[41]

CONCLUSION

Based on the current data, smokeless tobacco may be inferred as a major risk factors in oral and periodontal pathology.. Further work is also important for further understanding the pathways by which tobacco is used for periodontal damage. It appears that there is a down-regulation of anti-

inflammatory factors coupled with an enhanced control of pro-inflammatory cytokines. Therefore, abstinence of tobacco is the primary remedy for resorting tobacco losses to periodontal risk and treatment. Tobacco-cessation initiatives can also include smokeless forms in dental settings. If these reforms are effectively enforced, periodontist will play a key role in combating this social challenge to smokeless tobacco use and thereby lead to reducing the financial pressure of these habitats and improving oral and general wellbeing and associated quality of life.

Source of support : Nil

Conflict of interest : None reported

REFERENCES

1. World Health Organization. Global adult tobacco survey: Indonesia Report 2011.
2. Schwartz RL, Wipfli HL, Samet JM. World No Tobacco Day 2011: India's progress in implementing the framework convention on tobacco control. *Indian J Medical Res.* 2011;133:455.
3. Reddy KS, Gupta PC. Tobacco control in India. New Delhi: ministry of health and family welfare, Government of India. 2004:43-7.
4. Ansari ZA, Bano SN, Zulkifli M. Prevalence of tobacco use among power loom workers-A cross-sectional study. *Indian J Community Med.* 2010;35:34.
5. Muttappallymyalil J, Sreedharan J, Divakaran B. Smokeless tobacco consumption among school children. *Indian J Cancer* 2010;47:19.
6. Johnson GK, Hill M. Cigarette smoking and the periodontal patient. *J Periodontol.* 2004;75:196-209.
7. Tomar SL, Asma S. Smoking-attributable periodontitis in the United States: findings from NHANES III. *J Periosontol.* 2000;71:743-51.
8. Albandar JM, Streckfus CF, Adesanya MR, Winn DM. Cigar, pipe, and cigarette smoking as risk factors for periodontal disease and tooth loss. *J Periodontol.* 2000;71:1874-81.
9. Krall EA, Garvey AJ, Garcia RI. Alveolar bone loss and tooth loss in male cigar and pipe smokers. *J Am Dent Assoc.* 1999;130:57-64.
10. Natto S, Baljoon M, Bergström J. Tobacco smoking and periodontal health in a Saudi Arabian population. *J Periodontol.* 2005;76:1919-26.
11. Dietrich T, Maserejian NN, Joshipura KJ, Krall EA, Garcia RI. Tobacco use and incidence of

- tooth loss among US male health professionals. *J Dent Res.* 2007;86:373-7.
12. Bergström J. Tobacco smoking and risk for periodontal disease. *J Clin Periodontol.* 2003;30:107-13.
 13. Fisher MA, Taylor GW, Tilashalski KR. Smokeless tobacco and severe active periodontal disease, NHANES III. *J Dent Res.* 2005;84:705-10.
 14. Ghate SW, Tegginamani AS, Vanishree HS, Agrawal A, Pathak S. Tobacco effects on oral cavity: A concise review. *J Indian Dent Assoc.* 2017;11.
 15. Reddy KS, Gupta PC. Tobacco control in India. New delhi: ministry of health and family welfare, Government of India. 2004:43-7.
 16. Reddy KS, Gupta PC. Tobacco use in India: Practices, patterns and prevalence. Report on Tobacco Control in India. New Delhi, India: Ministry of Health and Family Welfare, Government of India. 2004.
 17. Ernster VL, Grady DG, Greene JC, Walsh M, Robertson P, Daniels TE, Benowitz N, Siegel D, Gerbert B, Hauck WW. Smokeless tobacco use and health effects among baseball players. *J Am Med Assoc.* 1990;264:218-24.
 18. Weintraub JA, Burt BA. Periodontal effects and dental caries associated with smokeless tobacco use. *Public Health Reports.* 1987;102:30.
 19. Johnson GK, Slach NA. Impact of tobacco use on periodontal status. *J Dent Edu.* 2001;65:313-21.
 20. Bala DV, Bodiwala IN, Patel DD, Shah PM. Epidemiological determinants of tobacco use in Gujarat state, India. *Indian J Community Med.* 2006;31:173-6.
 21. Fisher MA, Taylor GW, Tilashalski KR. Smokeless tobacco and severe active periodontal disease, NHANES III. *J Dent Res.* 2005;84:705-10.
 22. Hoffmann D, Hecht SS. Nicotine-derived N-nitrosamines and tobacco-related cancer: current status and future directions. *Cancer Res.* 1985;45:935-44.
 23. Gritz ER, Baer-Weiss V, Benowitz NL, Van Vunakis H, Jarvik ME. Plasma nicotine and cotinine concentrations in habitual smokeless tobacco users. *Clin Pharmacol Ther.* 1981;30:201-9.
 24. Johnson GK, Slach NA. Impact of tobacco use on periodontal status. *J Dent Educ.* 2001;65:313-21.
 25. Petro TM, Anderson LL, Gowler JS, Liu XJ, Schwartzbach SD. Smokeless tobacco extract decreases IL-12 production from LPS-stimulated but increases IL-12 from IFN- γ -stimulated macrophages. *Int Immunopharmacol.* 2002;2:345-55.
 26. Alpar B, Leyhausen G, Sapotnick A, Günay H, Geurtsen W. Nicotine-induced alterations in human primary periodontal ligament and gingiva fibroblast cultures. *Clin Oral Investig.* 1998;2:40-6.
 27. Petro TM, Anderson LL, Gowler JS, Liu XJ, Schwartzbach SD. Smokeless tobacco extract decreases IL-12 production from LPS-stimulated but increases IL-12 from IFN- γ -stimulated macrophages. *Int Immunopharmacol.* 2002;2:345-55.
 28. Benowitz NL, Jacob P, Yu L. Daily use of smokeless tobacco: systemic effects. *Ann Intern Med.* 1989;111:112-6.
 29. Hirsch JM, Heyden G, Thilander H. A clinical, histomorphological and histochemical study on snuff-induced lesions of varying severity. *J Oral Pathol Med.* 1982;11:387-98.
 30. Kramer IR. Definition of leukoplakia and related lesions: an aid to studies on oral precancer. *Oral Surg Oral Med Oral Pathol.* 1978;46:518-39.
 31. Wray A, McGuirt WF. Smokeless tobacco usage associated with oral carcinoma: incidence, treatment, outcome. *Arch Otolaryngol Head Neck Surg.* 1993;119:929-33.
 32. Robertson PB, Walsh M, Greene J, Ernster V, Grady D, Hauck W. Periodontal effects associated with the use of smokeless tobacco. *J Periodontol.* 1990;61:438-43.
 33. Greer Jr RO, Poulson TC. Oral tissue alterations associated with the use of smokeless tobacco by teen-agers: Part I. Clinical findings. *Oral Surg Oral Med Oral Pathol.* 1983;56:275-84.
 34. Poulson TC, Lindenmuth JE, Greer RO. A comparison of the use of smokeless tobacco in rural and urban teenagers. *CA Cancer J Clin.* 1984;34:248-61.
 35. Wouters FR, Salonen LW, Frithiof L, Hellden LB. Significance of some variables on interproximal alveolar bone height based on cross-sectional epidemiologic data. *J Clin Periodontol.* 1993;20:199-206.
 36. Mavropoulos A, Aars H, Brodin P. The acute effects of smokeless tobacco (snuff) on gingival blood flow in man. *J Periodont Res.* 2001;36:221-6.
 37. Johnson GK, Slach NA. Impact of tobacco use on periodontal status. *J Dent Educ.* 2001;65:313-21.
 38. Offenbacher S, Weathers DR. Effects of smokeless tobacco on the periodontal, mucosal and caries status of adolescent males. *J Oral Pathol Med.* 1985;14:169-81.
 39. Christen AG. The case against smokeless tobacco: five facts for the health professional to consider. *J Am Dent Assoc* 1980;101:464-9.

40. Stevens VJ, Severson H, Lichtenstein E, Little SJ, Leben J. Making the most of a teachable moment: a smokeless-tobacco cessation intervention in the dental office. *Am J Public Health.* 1995;85:231-5.
41. Wray A, McGuirt WF. Smokeless tobacco usage associated with oral carcinoma: incidence, treatment, outcome. *Arch Otolaryngol Head Neck*

Surg. 1993;119:929-33.

To cite: Rizvi M, Bains VK, Gupta V, Dubey H. Smokeless Tobacco and Periodontal Health: An Overview. *Asian J Oral Health Allied Sc* 2018;8(2):51-57.