

Tobacco Smoking, Is It Really Harmful? A Structured Review and Recent Advances

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Abstract:

Objective: To compare the beneficial and harmful effects of tobacco use and cigarette smoking on oral health. The methodology used: A structured review of the articles which are analyzed and which were concerned about the effect of smoking either positive or negative on oral health. We have included the articles primarily of last decade.

Discussion: Few articles show the positive effect of smoking and tobacco use, while the most of the articles show the negative impact of smoking and tobacco use especially on oral status.

Conclusion: Compared with the beneficial effects, the harmful effects of tobacco use and cigarette smoking on oral health are more. Hence the doctors should usually discourage the patients from using it for stress relief. The minor protection that smoking offers for prevention of Recurrent aphthous ulcer [RAU] may not be useful when a patient may suffer from Lung cancer later.

Key words: Tobacco, Cigarette, positive effect, harmful effect, habit

I. Introduction

The global tobacco industry earns about US\$400 billion per year. Cigarette smoking and tobacco use have a positive and negative effect on the body as a general and oral cavity particularly. They have limited positive effect. Many studies were shown their negative effect on salivary flow rate, which results in an increase in the presence of caries in smokers' teeth. The adverse effect of tobacco use and cigarette smoking involves positive association with periodontal diseases, gingival diseases, teeth discoloration, teeth mobility due to periodontal diseases, bad breath, altered sense of taste, accumulation of plaque, a possibility of oral cancer and mouth ulceration. Smoking plays a role in causing fungal infection, the presence of several types of bacteria in high amount in the cigarette like *Porphyromonas gingivalis*, *Aggregate bacteractinomycetencomitans*,

Bacteroides forsythias, *Prevotella intermedia*, *Fusobacterium nucleated.s* cause gingival and periodontal disease^{2,3,4}. Numerous studies were shown a negative effect of smoking on the immune system, and the high incidence of periodontal diseases in smokers rather than nonsmokers.⁵ The presence of calculus in the oral cavity along with smoking causes a generalized gingival recession.⁶ It is considered as a serious risk factor for precancerous and cancerous lesions of the oral cavity, pharynx, esophagus, pancreas, lung, liver, cervix and bladder.⁷ When the pH of saliva is reduced due to smoking, the acidic bacteria will increase and the beneficial bacteria will decrease that will lead to possibility and occurrence of dental caries.⁸

II. Methodology

We had reviewed articles which appeared in Pub Med, Medline and Google Scholar in the last ten years which were selected from different countries. The articles were selected based on relevance and typicality to our subject which concerns about the positive and negative effect of smoking. We categorized the articles into two major categories, the first category showed the positive influence of smoking and the second category showed the negative effect. We compared between these two categories, we described each category individually and showed the balance need between risk and benefit.

Positive Effect Of Smoking:

Cigarette smoking has several benefits on a smoker's body which include its effect on mental illness by reducing anxiety and schizophrenia. According to an article published in *Neuroscience & Bio-behavioral Reviews*^{9,10}, in 1995 the presence of nicotine in cigarettes alleviates the cognitive, sensory, psychiatric and schizophrenia's physical effect also has its effect on antipsychotic drugs by relief of common side effects of it. The benefit of nicotine in treating schizophrenia, not the only interest, a series of studies confirms that the risk of Parkinson's disease and Alzheimer's disease is lower in the smoker in compare with non-smoker people, the more numbers of cigarettes more protective effect against these diseases.

Cigarette smoking and tobacco use consider as appetite suppressant leading to reduce appetite and weight loss which may reduce the occurrence of obesity. 11 They have effect on reducing risk of some inflammatory disorder due to role of nicotine as anti-inflammatory agent, their anti-inflammatory effect may extend to second-hand smoke especially in children, according to Swedish study the studied groups included 6909 adults and 4472 children observed two generations of Swedish children the children of smoker people lower risk of allergies like allergic rhinitis, allergic asthma, food allergies and atopic eczema than the children of non-smoker people also has the benefit to pregnant women in case of preeclampsia, their occurrence in non-smoker higher than smoker pregnant women.12

When comparing smokers with nonsmoker people, non-smokers have higher death rates and lower responsive to two types of therapy to eliminate plaque from the arteries: fibrinolytic treatment, which is angioplasty and medication, which eliminate plaque from arteries by insert stent or balloon in the arteries. The reason of the smokers have less death rate after the heart attack than non-smokers is the smoke scar the arteries let fat and plaque to accumulate and build in the first place so they are the younger expertise of heart attack before the non-smokers. Clopidogrel is heart drug which may work better in smokers, by activating proteins called cytochromes, which alter the clopidogrel into an active state.13 Logically cigarette smoking and tobacco use should help to the occurrence of aphthous ulcers as sources of chronic irritation or injury to the oral tissues but contrary number of studies shown negative association between presence of the RAU ulcers and smoking.14,15

Negative effect of smoking:

Tobacco use and cigarette smoking have a significant and negative impact on oral health and dental therapy. The local and systemic effect of tobacco use and a cigarette smoking on oral health depends on frequency, method, and duration of use and is amount dependent. They have been related to periodontal disease, caries, tooth loss, dental implant failure, peri-implant disease, oral soft tissue changes and oropharyngeal cancer. In general, smokers people have greater chance and prevalence of periodontal diseases than nonsmokers people.16

Multiple studies showed higher levels of oral debris thus reduce the oral hygiene habit and increase plaque formation as well as greater attachment loss and deeper pocket in smokers than non-smokers.17,18,19,20 Adults who smoke, children exposure to secondhand smoke have a greater risk of tooth loss.21,22,23 Early studies suggest that smoking reduce the incident of caries due to high concentration of thiocyanate and caries-inhibiting effect in smoker's saliva but the decrease in pH of saliva in smoker's and presence of large number of bacteria especially Lactobacilli and Streptococcus mutants which indicate a high susceptibility to caries, but since the caries is multifactorial diseases that exhibit variable factors participate in incidence of caries-like age, oral hygiene habits, drinking, eating habits, visits to the dentist and health standards, it is hard to state the association between one positive factor which can lead to increase in caries incidence in smokers, therefore, it is difficult to determine the strength of association between smoking and dental caries.24,25 Studies show that smokers had beside the bad oral hygiene, less basic outlook on health, also had various eating habits, probably consuming a huge amount of sugar in products such as snacks and soft drinks as well as coffee or tea.26,27,28 Smoker reported as less preventive visit to dentist and less familiar with oral hygiene such as dental floss and toothbrush, these fact along with sugars and sweeteners that added to cigarette include glucose, sucrose, and fructose, as well as product that has huge amount of sugar that present in tobacco like honey, cones and maple syrup, molasses extracts, and fruit juices contribute to increasing the incidence and prevalence of caries among smokers, However, a direct pathological Association between smoking and dental caries is still missing. The above findings point to assume that smoking has some effect on high caries incidence.29,30 Smoking consider as a relative contraindication for the dental implant, increase the risk of implant failure and associated with peri-implant diseases occurrences such as peri-implantitis and peri-implant mucositis.31,32,33 Smoking along with the presence of calculus in the oral cavity act as a factor for different form of the gingival recession either localized or generalized. Smokers when compared with non-smokers there is a change in the response of microcirculation of plaque accumulation and increase in inflammation lead to rising blood vessels in the gingival as well as a decrease of oxygen concentration in gingival tissues. 34,35

There is the relation between smoking and surface epithelial changes such as smoker's melanosis related to pipe or cigarette smoking which effect different site of oral cavities like maxillary and mandibular alveolar mucosa or buccal mucosa and commissures. Nicotinic stomatitis from smoking is related to hard palate mucosa, consist of hyperkeratosis and acanthosis of palatals epithelium, inflammation in the connective tissues, salivary glands and salivary gland duct squamous metaplasia.36 Studies show a higher prevalence of occurring oral leukoplakia among smokers, with a dose-response association between tobacco use and oral leukoplakia, according to intervention studies show after the cessation of smoking regression of the lesion occur.37 Discoloration of teeth, dental restorations, and prosthesis are very indicated in smokers. A recent study conducted in British adults showed the high possibility to teeth discoloration than the non-smoker, 20 % of

smokers reported to have moderate and severe levels of tooth discoloration compared to 15 % in non-smokers. Discoloration result from smoking is more aggressive than that caused by drinks consumption. Smoking is found to be associated with bad breathing. It has been seen that smoking effect the decreased function of smell, and it is also associated with deteriorating of taste perception.^{35,36} Use of types of tobacco products and Cigarette smoking cause oral cancer. Oral cancer more common in men

than in women. Mostly effect middle-aged or elderly people. Cigarette smokers have two to five times higher risk of presence oral cancer than that of non-smokers, the risk of oral cancer increase if the number of cigarettes and years smoked increase. Cessation decreases the risk. Tobacco-specific N-nitrosamines and aromatic amines, that presented in tobacco smoke are considered the major carcinogens factor that aid in cause oral cancer from smoked tobacco products.^{37,38,39,40}

III. Discussion

According to Veena Kumari⁹ et al (2005) stated that nicotine found in cigarettes has the benefit of decrease sensory, psychiatric, cognitive, and physical effects of schizophrenia, and also enhance relief of side effects of antipsychotic drugs. Fratiglioni L¹⁰ et al (2000) pointed that multiple academic studies support that the risk of Parkinson's disease [PD] and Alzheimer's disease [AD] is higher in non-smokers than in smokers. Doctor Laura Fratiglioni of Huddinge University Hospital in Sweden states, a possibility of incidence of PD or AD among smokers tend to be lower than nonsmokers by 50% with age and gender-matched cigarette smoking exerts biologic and neuroprotective undefined effect on the development of PD and AD."

Shamaz Mohamed⁴¹ et al (2014) concluded their study which conducted in India, by a protective effect of the incidence of RAU and use of tobacco.

Axell T et al⁴², Shapiro S et al⁴³ and McRobbie H et al⁴⁴, all mentioned in their series that the smoking provides some kind of protection, It was Axell T et al suggestion that the increase in the surface keratinization protects the tissues from chemicals of smoking and penetration by the pathogenic bacteria. Shapiro et al and Mc Robbie et al further postulated that even the use of nicotine chewing gum was also associated with the decrease in the RAU. They suggested a stellar role of nicotine in the prevention of RAU.

Wanjek C¹³ has summarized the protective effects of smoking as follows:

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| <ul style="list-style-type: none">A. Protective effect of smoking on osteoporosisB. Preventive effect on Parkinsonism diseaseC. Control of obesityD. Low mortality rates in heart attack patientsE. Activates the action of Clopidogrel through cytochrome pathway. |
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Sajith Vellappally et al⁴⁵ (2007) found that Smoking is related to systemic diseases such as cardiovascular diseases, different lung disorders and various types of cancer. It has been demonstrated that smoking is dangerous especially to women and children. Cigarette smoking and tobacco use negatively influence oral cavity. It has been proved that it also causes diseases like periodontitis, leukoplakia, and various other oral diseases. It has been established that smoking beside bad oral hygiene, food habits, dental visits and all health standards, is related to high caries incidence, but the direct effect of smoking on incidence of dental caries is still controversy, while the other study by Sajith Vellappally et al⁴⁶ (2007) stated that oral smokeless tobacco consider as contributory factor for a higher possibility of incidence of dental caries. Some smokeless tobaccos have the presence of high amount of different types of sugars and sweeteners which are added. This may also result in the higher levels of caries.

Kemal Üstün et al⁴⁷ (2007) found Gingival Crevicular fluid [GCF] volume higher in smokers than in nonsmokers, while the increase of GCF occurred with the degree of inflammation. When the volume of GCF increased that mean presence of an inflammation in smokers. The elements of the GCF must be examined to understand the progression of a disease. In a post- menopausal women, according to Xiaodan Mai et al⁴⁸ (2013) there is a direct relation between cigarette smoking and tooth loss. These authors relate this to worsening periodontal disease. Guoqin Yu et al⁴⁹ (2017) found cigarette smoking had an effect on the microbial populations of the buccal mucosa. As per their observations, other parts of the oral cavity were affected minimally. The exact importance of this finding is still unclear and they have suggested further research with larger samples. Vijaya Kumar et al⁵⁰ (2011) The study concludes that non-smokers had higher mean blood vessel density and blood vessel lumen area compared to smokers. In smokers, the high percentage of small sized blood vessels compared to nonsmokers, in nonsmokers high medium and large sized blood vessels compared to smokers. In smokers mean thickness of gingival epithelium was higher compared to nonsmokers. When the vascular density, a thickness of the gingival epithelium, and size of blood vessels was compared between smokers and nonsmokers, no difference was observed.

Narayan TV and Shilpashree S 51 did an extensive meta-analysis review of leukoplakia undergoing the Malignant Transformation and they found that smoking, tobacco abuse, and gutka all were impacting of the leukoplakia, but most affected was the speckled leukoplakia. It has the highest level of malignant transformation. Cecil J et al 52 in their study of the burnout in undergraduate medical students found that excessive indulgence of smoking and alcohol abuse was noted. These habits were associated with emotional exhaustion [EE] and depersonalization [DP].

IV. Conclusion

Cigarette smoking and tobacco use have been confirmed to provide various benefits to the health of smokers. It is known to relax the persons who are under stress as shown in burnout study by Cecil J et al 52 amongst the medical students. Also, beneficial effects in prevention of RAU 41 and in the Surprisingly, tobacco may provide substitutional reduce or prevention for some diseases in some individuals. For example the work of Fratiglioni L, Wang HX 10 suggests that smoking affords a neuroprotective effect on the development of AD and PD The minuscule good effects of smoking like prevention of Aphthous ulcers and prevention of Parkinsonism are far unbalanced by the risk of malignancy of upper aerodigestive tract and Lung cancer risk. Even taking the minimal health benefits of smoking in consideration, tobacco smokers can expect to live shorter lives and have many chronic diseases and cancers. The study by Sandhu KS et al with the Indo-Tibetan Border Police found that they used cigarette smoking to reduce the occupational stress.⁵³ Thus we observe that the bad effects of health far outstrip the very less beneficial effects of smoking and thus it is a good idea to help patients under stress to use different methods of stress control like exercise, meditation, and music therapy. 54

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