

## TOBACCO – A POTENTIAL THREAT TO THE ORAL CAVITY

HARISH SANTHOSH PILLAI<sup>1</sup>, NITHYA JAGANNATHAN<sup>2</sup><sup>1</sup>Saveetha Dental College, <sup>2</sup>Department of Oral Pathology, Saveetha Dental College, Saveetha University, Poonamalle High Road, Velappachavadi, Chennai 600077. Email: dr.nithya@ymail.com

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## ABSTRACT

The use of tobacco in developing countries like India has been on a constant rise, though measures have been taken to forbid the products. Tobacco is used in smoke and smokeless forms and both these forms have a direct impact on the health of the individual, involving the lungs, larynx, pharynx and the oral cavity. The lesions developing in the oral cavity includes potentially malignant disorders, squamous cell carcinomas, dental caries, periodontal diseases, tooth loss, pigmentations and a wide range of several other lesions. The review article focuses on the various types of tobacco in practice with a note on their effects on the oral cavity.

**Keywords:** Smokeless tobacco, Smoking, Carcinoma, Hazards.

## INTRODUCTION

Tobacco has been used in both smoke and smokeless forms and its use in children and adolescents is reaching pandemic levels. Studies have shown that around 82,000 – 99,000 children/ adolescents get addicted to this habit every day [1]. The number of deaths associated with these products is also on a rising trend [2]. Considering the enormous health complications associated with the use of tobacco products, it is of utmost importance to understand the various factors that leads to tobacco intake and ways to cease them. This article reviews on the various types of tobacco and its method of use with a note on their effects on the oral cavity.

## Back from Ancient times

The use of tobacco has started since 600 AD in Europe by Columbus from the Carribeans [3, 4]. Later it was introduced by India by the Portuguese in the form of pipes and cigars. Later in mid nineteenth century, Nicotine was identified as the most important component in the tobacco leaves [5]. Considering the harmful nature of these products steps were initiated to ban these products. However it still continues to be used popularly in developing countries [2].

## Forms of tobacco and its pattern of use

Tobacco is used in both smoke and smokeless forms. Smoking forms are more common in western countries while India stands first in the use of smokeless forms of tobacco.

## Smoking form of Tobacco usage

Smoking form includes the use of beedis and cigarattes predominantly with various devices like hooka, hookli, chutta,

dhumthi, chillum [6, 7, 8]. Cigarette smoking is common in urban areas. However the higher pricing of these products compared to other forms makes this more common amongst the middle and upper socioeconomic classes of population.

**Beedi** is a smoking stick of about 4-7.5cms in size, made by rolling a dried piece of rectangular temburni leaf (*Diospyros melanaxylon*) with 0.15-0.25 grams of sun-dried, flaked tobacco arranged in a conical shape. The roll is then secured with the thread [9].

**Chutta** is a kind of reverse smoking wherein the burnt end is kept inside the mouth. It is made up of coarsely prepared roll of tobacco and prevalent in South-eastern parts of India. [9]

**Dhumthi** is yet another type of smoking forms made by rolling the tobacco leaves inside the leaf of the jackfruit tree. The pattern of usage varies in males and females. Females smoke with the burning end inside the oral cavity (reverse smoking) whereas males have a tendency to keep it outside. It is predominant in western India [9].

**Hooka** is made out of metallic or wooden pipes and is a device used for smoking tobacco. This device consists of a spherical receptacle containing water with aromatic substances. The tobacco products pass through the water into the smoking pipe. It is the most common methods of socializing amongst the folks in villages of Northern parts of India [9].

**Hookli** is another form of smoking tobacco device which employs a short clay pipe like device of about 7 cms long [9].

**Chillum** is a 10cms conical clay pipe used to smoke tobacco and tobacco with ganja in northern parts of India. The narrow end of this device is put inside the mouth and wrapped in a wet cloth to act as a filter [9].

Table 1: Smokeless tobacco Composition and Method of use

Product	Composition	Method of use
Betel Quid	Betel leaf, areca nut, slaked lime, tobacco, catechu and condiments. Tobacco is an optional component	The components are mixed together and places in the oral cavity in the buccal / labial vestibule
Khaini	Roasted tobacco flakes mixed with Slaked lime.	This mixture is prepared by keeping the ingredients on the left palm and rubbing it with the right thumb. The prepared pinch is kept in the lower labial or buccal sulcus. Its use is common in eastern India.
Mawa Snuff	Areca nut, tobacco and slaked lime. black-brown powder obtained from tobacco through roasting and pulverization	The mixture is chewed and placed in the vestibule/ floor of the mouth 1. Snuff is used via nasal insufflations and is popular in eastern parts of the country 2. Applied on the gum by finger( Mishri)
Gutka	Smokeless tobacco product (MSTP), a mixture of areca nut, tobacco and some condiments, marketed in different flavours in colourful pouches.	The products are chewed in the oral cavity and placed in the buccal vestibule
Pan masala	Betel quid mixture, which contains areca nut and some condiments, but may or may not contain tobacco.	The mixture is chewed and sucked inside the oral cavity

### Smokeless forms of tobacco use

The smokeless forms of tobacco are prevalent in India and include various forms like betel quid chewing, mishri, khaini, ghutka, snuff, and as an ingredient of pan masala. The table below shows the various forms of smokeless tobacco, its composition and the method of usage of these forms [9].

### The adverse effects of tobacco in Oral cavity

The adverse effects of tobacco on oral cavity includes oral cancer, precancer, periodontal disease and other mucosal disorders, tooth loss and dental caries

#### Oral Cancer

One of the most common causes associated with the smoking form of tobacco is Oral cancer followed by cancer in the lung and larynx [10]. Numerous studies on the relative incidence of oral cancer have shown that the single factor with the highest attributable risk was smoking, which accounts for 81-87% of oral cancers in males and about 42-47% in females [11]. The intensity and duration of the tobacco smoking has a direct effect on the risk of oral cancer. The differential risk between the non-smokers and smokers and the rapid rise in the progression of the risk with increased amount of smoking suggests that tobacco is the major risk factor for oral cancer [12].

Smokeless tobacco is also associated with the substantial risk of oral carcinomas of the oral cavity. Cancer of the gingival, lower lip and buccal mucosa are common with this type of tobacco usage as they are placed in direct contact with the mucosal surface [13]. This results in genomic effects due to the particle penetration of various kinds of smokeless tobacco forms.

#### Potentially malignant Disorders

There has been a significant association between the occurrence of potentially malignant disorders and tobacco users [14]. The role of smoking in development of leukoplakia and erythroplakia has been validated through several studies and this serves as an important hallmark in the progression to cancer [15,16]. Tobacco is also an independent factor in the aetiology of oral epithelial dysplasia [17].

The placement of smokeless tobacco in the oral cavity is associated with oral mucosal disorders which are commonly leukoplakia, Oral Submucous fibrosis and snuff induced lesions [18]. Amongst the various forms, betel quid and khaini have a stronger association with potentially malignant disorders as compared to other forms [19]. Snuff users have lesions on the inside of the lower lip and rarely on the upper lip depending on different traditional habits of placement of the snuff [20].

#### Periodontal disease

Smoking has a negative impact on the periodontal health, disrupting the physiological turnover of tooth supporting tissues resulting in periodontal tissue breakdown and deterioration of the oral health [21]. It is usually associated with loss of attachment resulting in increase in the pocket depths. However, the inflammatory components of the periodontium in smokers are less extensive and tighter as compared to non-smokers resulting in an increase in the pocket depth [22]. There are also higher grades of gingival recession in smokers as compared to non-smokers. In addition to carrying a larger periodontal disease burden, smokers are also prone to development of other oral diseases earlier than non-smokers [12].

Smoking results in exposure of the periodontium to nicotine and its metabolites which have a steep rise in the saliva and gingival crevicular fluid [23]. There is also a disturbance in the oral microbial flora resulting in a decrease in oxygen tension in the periodontal pockets [24]. Further periodontal destruction is enhanced by a decrease in the humoral and cell mediated immune response of the host which makes an individual susceptible to periodontal disease [25]. Further smoking also has an impact on the bone metabolism resulting in secretion of the bone resorbing factors PGE<sub>2</sub> and IL-1 $\beta$  and a decrease in the uptake of calcium increasing the susceptibility of periodontal disease in smokers [26].

There is also a significant association of smokeless tobacco on gingival recession and the periodontium. A culture of the periodontium shows that there is a ten fold increase in Porphyromonas gingivalis resulting in release of PGE<sub>2</sub>, IL-1 $\beta$  and IL-1 $\alpha$  [27]. It has been found that smokeless tobacco results in increased GCF PGE<sub>2</sub> concentrations resulting in exacerbated gingival inflammation, erythema and ulceration [28].

#### Dental Caries

Tobacco users have a significantly higher number of decayed tooth and several studies have shown that the DMFT values are higher in tobacco users and compared to non users [29]. Smokers are generally associated with increased incidence of root surface lesions and a significant difference in the median values of salivary lactobacillus counts are observed in smokers and non-smokers [30]. Tobacco usage impairs the salivary function, which has a vital role in caries prevention. The buffering capacity also varies and these also affect the susceptibility to caries [31]. Smokeless tobacco are rich in sugar content and this results in increased susceptibility to dental caries, predominantly cervical and root surface caries [32].

#### Other effects of tobacco in oral health

Apart from these pathologies, tobacco smoking is associated with discolouration of teeth, halitosis, with a coated tongue also called black hairy tongue and it delays the wound healing following minor surgical procedures [33, 34]. Further there is association of smokers with candidiasis and there is higher rate of implant failures as compared to non-smokers [35,36]. There also exists an association between tobacco smoking and aphthous ulcerations although the cause is unknown [37]. Tobacco smoking stimulates the oral melanocytes resulting in increased melanin production resulting in pigmentations on the oral mucosa. These diffuse irregular brownish pigmentations are called Smokers Melanosis is reversible on cessation of the habit [38]. Smokers palate is also a common lesion presenting in smokers as a white, plaque-like change on the palatal mucosa due to hyperkeratosis combined with multiple red dots located centrally in small elevated nodules representing the dilated and inflamed duct openings of minor salivary glands. It is attributed to thermal and chemical agents, released from the cigars.

#### CONCLUSION

Tobacco poses a potential threat to the oral cavity, as they are in direct contact with the mucosal surface. Most of the developing countries including India, have a high exposure to the tobacco products in both the smoke and smokeless forms. Considering the ill-effects with relation to health, it is essential that the usage of tobacco in all forms should be got to a standstill. Hence, it is a role of the clinician to educate the public on this aspect for the benefit of the mankind.

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