



ISSN Print: 2394-7489  
ISSN Online: 2394-7497  
IJADS 2021; 7(1): 421-424  
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[www.oraljournal.com](http://www.oraljournal.com)  
Received: 22-11-2020  
Accepted: 24-12-2020

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## Clinical and histopathological presentation of oral leukoplakia among different forms of tobacco users: A comparative study

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DOI: <https://doi.org/10.22271/oral.2021.v7.i1f.1165>

### Abstract

**Aim:** To compare the clinical and histopathological presentation of oral leukoplakia among different forms of tobacco users.

**Material and Methods:** This study was carried out among 300 patients with oral leukoplakia, analyzing the corresponding clinical factors and histopathological findings, different forms of tobacco usage and assessing associations between the different clinical presentations and epithelial dysplasia.

**Results:** Out of a total of 300 subjects, most (87.33%) of the subjects were males, among 138 tobacco chewers, maximum (60.87%) were having homogenous leukoplakia, among 85 tobacco smokers, maximum (61.18%) were seen with homogenous leukoplakia and among 77 subjects having mixed habit, maximum of 51.95% were diagnosed as having homogenous leukoplakia. The association between clinical type of leukoplakia and habit type was statistically not significant (Chi-square= 5.0806,  $p=0.5336$ ). Majority of the cases which were clinically diagnosed as leukoplakias presented a histological diagnosis of hyperkeratosis (45%) and mild epithelial dysplasia (33.33%). The association between histopathological type of leukoplakia and habit type was found to be statistically significant (Chi-square= 23.2166,  $p=0.0007$ ).

**Conclusion:** Most of the patients were having homogenous leukoplakia and majority of the cases which were clinically diagnosed as leukoplakias presented a histological diagnosis of hyperkeratosis, mild epithelial dysplasia.

**Keywords:** oral leukoplakia, potentially malignant disorders, tobacco

### Introduction

Cancer is one of the leading causes of adult death globally, oral malignancies the serious concerns in most of the developing nations, including India. In increased incidence of oral malignancies is attributed to intense consumption of tobacco in any form<sup>[1]</sup>.

Different varieties of tobacco products consumption are prevalent in India and they vary from region to region. The most widespread is the chewing of betel-quid with tobacco and this has been regarded as a major risk factor for malignancies affecting the oral cavity<sup>[2]</sup>.

The specific type of tobacco consumed and the form in which it is used do have correlation between the developments of various oral pathologies. The role of smoking as an etiological factor for oral leukoplakia is very well established previously. Both, smoking of tobacco and tobacco chewing are regarded as attributing factors for various potentially malignant disorders<sup>[2]</sup>.

Oral cavity cancer is currently the most common cause of cancer related deaths among Indian men, which is usually preceded by oral potentially malignant disorder like oral leukoplakia and/or oral submucous fibrosis, and early detection of this lesion stage is most crucial for its prevention and early treatment.<sup>3</sup>

Apart from the particular type or form of the consumed, the frequency and duration of tobacco consumption also known to contribute to the clinical presentation and severity of the oral mucosal pathologies<sup>[4, 5]</sup>.

The present study would help to understand the type of tobacco usage and its association with oral leukoplakia (potentially malignant disorder).

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It will also serve as a useful tool in educating the patients about the harmful effects of tobacco use and thereby preventing the various potentially malignant disorder and even oral malignancies. Thus the aim of the present study was to compare the clinical and histopathological presentation of oral leukoplakia among different forms of tobacco users.

### Material and Methods

This study was carried out after obtaining the ethical clearance from the institutional review board and the consent from the patients was obtained. Three hundred patients with history of tobacco use and clinically and histopathologically confirmed cases of oral leukoplakia were included in the study. Patients who were using tobacco for at least and more than one year, minimum and more than three times a day were incorporated.

### The subjects were divided into three groups on the basis of tobacco consumption

**Group I:** Tobacco chewers

**Group II:** Tobacco smokers

**Group III:** Mixed habit

The data collected during clinical examination and interview was recorded in specially prepared proforma for study. Based on clinical presentation, the leukoplakia was categorized as homogenous leukoplakia, nodular leukoplakia, speckled leukoplakia and verrucous leukoplakia.<sup>1</sup>

Histopathologically leukoplakia was graded into three categories based on WHO criteria (1978)

- 1) Mild dysplasia
- 2) Moderate dysplasia
- 3) Severe dysplasia

### Statistical Analysis:

The collected data were entered into SPSS 20.0 version statistical software and analyzed by chi-square test of significant for assessment of association between two attribute. The statistical significance was set at 5% level of significance ( $p < 0.05$ ).

### Results

Out of a total of 300 subjects, 262 (87.33%) were males and only 38 (12.67%) were females. Further, out of 138 tobacco chewers, 76.81% were males and 23.19% were females. Similarly, out of 85 tobacco smokers, 92.94% were males and 7.06% were females, but, all the 77 subjects with mixed type of habit form were males (100%). The differences between male and female subjects with different habit form was found to be statistically significant (Chi-square=27.3951,  $P = 0.0001$ ) at 5% level of significance (Table 1).

Among 300 patients, 84 (28.00%) were belonging to  $\leq 29$  yrs of age group, 76 (25.33%) were of 30-39 years of age group, 79 (26.33%) were belonging to 40-49 years of age group and 61 (20.33%) subjects were in 50+ years of age group. However, a maximum of 27.54% of tobacco chewers were belonging to  $\leq 29$  yrs of age group, similarly a maximum of 29.41% of tobacco smokers belonging to 30-39 years of age group and 29.87% having mixed habit were belonging to  $\leq 29$  yrs of age group. The difference between these parameters was not statistically significant (Chi-square=3.4576,  $p=0.7497$ ) (Table 2).

Out of 138 tobacco chewers, maximum (60.87%) were having homogenous leukoplakia followed by a minimum of 6.52% having nodular leukoplakia. However, among 85 tobacco

smokers, maximum (61.18%) were seen with homogenous leukoplakia followed by a minimum of 9.41% with nodular leukoplakia. Similarly, among 77 subjects having mixed habit, maximum of 51.95% were diagnosed as having homogenous leukoplakia followed by a minimum of 7.79% as nodular leukoplakia. The association between clinical type of leukoplakia and habit type was statistically not significant (Chi-square= 5.0806,  $p=0.5336$ ). (Table 3)

Among 138 tobacco chewers, maximum (50.00%) of respondents showed hyperkeratosis on biopsy followed by a minimum of 2.90% were found with severe type of dysplasia. Further, among 85 tobacco smokers, maximum (54.12%) of subjects were seen with hyperkeratosis followed by a minimum of 9.41% with severe type of dysplastic change. Similarly, among 77 subjects having mixed habit, maximum (50.65%) of subjects were seen with mild type of leukoplakia on biopsy followed by a minimum of 6.49% with severe type. The association between histopathological type of leukoplakia and habit type was found to be statistically significant (Chi-square= 23.2166,  $p=0.0007$ ) (Table 4).

### Discussion

The carrying out of clinical and histopathological correlation studies is very much significant to know the profile of a determined subjects affected by a different type of pathologies. In the case of potentially malignant disorders, this understanding will aid in planning public policies in diagnosing and establishing preventive and management protocols in individuals at risk for this group of lesions, as they may later develop malignancies of oral cavity. Keeping this fact in mind, the present study evaluated the patients with oral leukoplakia, trying to characterize them clinically and histopathologically among different forms of tobacco users.

In a correlative study of smokeless tobacco induced lesion and smoke induced, it was observed that all the lesions of leukoplakia were associated with smoking habits and particularly bidi smoking was more frequently recorded. Smokeless tobacco habits were also seen with leukoplakia, which was mainly in the form of gutkha<sup>[1]</sup>.

Znaor *et al.*, carried out a study to assess the effect of different patterns of smoking, chewing and alcohol drinking in the development of the oral, pharyngeal and esophageal neoplasms and to determine the interaction among these habits. They noted that tobacco chewing as the strongest risk factor for oral cancer, with the highest odds ratio (OR) for chewing products containing tobacco. The strongest risk factor for pharyngeal and esophageal cancers was tobacco smoking.<sup>4</sup> In a study conducted to assess prevalence and correlation of oral lesions among tobacco smokers, tobacco chewers, areca nut and alcohol users, the commonest habit noted was smoking followed by smokeless tobacco usage. About 40% of patients had no clinically detectable changes in their mucosa and leukoplakia was the commonest among these pathologies<sup>[5]</sup>.

In an epidemiologic house-to-house survey carried out among random sample, the annual incidence rate of oral leukoplakia per 1,000 adults was found to be 2.1 for men and 1.5 for women. The rate was maximum in the individuals who were consuming the tobacco in mixed form. During the same point of time, oral malignancy developed in only those subjects, who were having a history of a previously diagnosed oral lesion. Malignant transformation was significantly higher among the speckled leukoplakia cases. The rate of malignant transformation was also more among leukoplakias associated with tobacco chewing habits. These findings suggest that

leukoplakias associated with different form of tobacco consumption may have a different natural history [6].

Similarly, in a cross-sectional study, oral mucosal lesions were found in 26.8% of individuals who had tobacco smoking and chewing habits as compared to 2.8% of subjects without tobacco use. Oral leukoplakia (8.2%) and oral submucous fibrosis (7.1%) were the prevalent oral mucosal lesions found in these individuals [7].

It has been reported in the literature that, clinically, leukoplakia usually presents as a homogeneous lesion. Scheifele *et al.* observed homogeneous leukoplakia to clearly predominate (86.8%) as compared to non-homogenous type, [8] similarly, Rubert *et al.*, found in their study that 81.6% of the patients were having homogeneous type of oral leukoplakia, in accordance to this, most of the cases in our study were found to be of homogenous leukoplakia [9].

In our study, majority of the cases which were diagnosed clinically diagnosed as leukoplakia presented a histological diagnosis of hyperkeratosis (45%) mild epithelial dysplasia (33.33%), which suggests a less aggressive nature. This finding was similar to that of Ariyawardana *et al.*, [10] Harris *et al.*, [11] and Queiroz *s.* [12].

Whenever we plan to treat any potentially malignant DISORDER, it is mandatory to carry out a histopathological analysis, to rule out the possibility of malignancy and to establish the presence of dysplastic changes, because treatment of these lesions is usually guided by the definitive

diagnosis obtained by biopsy.<sup>13,14</sup> Lesions presenting with moderate and severe epithelial dysplasia or those which persist after removal of the possible etiological factors must be completely excised [15]. Despite the need for diagnosing the potentially malignant diseases at an early stage, many times these lesions tends to be unnoticed to the dental practitioners, and frequently are handled inadequately, probably for being, in general, asymptomatic [16, 17].

**Table 1:** Distribution of subjects according to gender

Gender	Tobacco chewers	%	Tobacco smokers	%	Mixed habit	%	Total	%
Male	106	76.81	79	92.94	77	100.00	262	87.33
Female	32	23.19	6	7.06	0	0.00	38	12.67
Total	138	100.0	85	100.0	77	100.00	300	100.00

Chi-square=27.3951, P = 0.0001\*  
\*p<0.05

**Table 2:** Distribution of subjects according to age

Age groups	Tobacco chewers	%	Tobacco smokers	%	Mixed habit	%	Total	%
<=29 yrs	38	27.54	23	27.06	23	29.87	84	28.00
30-39 yrs	37	26.81	25	29.41	14	18.18	76	25.33
40-49 yrs	36	26.09	22	25.88	21	27.27	79	26.33
50+ yrs	27	19.57	15	17.65	19	24.68	61	20.33
Total	138	100.00	85	100.00	77	100.00	300	100.00

Chi-square= 3.4576, p=0.7497

**Table 3:** Distribution of subjects according to clinical type of leukoplakia in tobacco chewers, smokers and with mixed habit

Diagnosis	Tobacco chewers	%	Tobacco smokers	%	Mixed habit	%	Total	%
Homogenous leukoplakia	84	60.87	52	61.18	40	51.95	176	58.67
Speckled leukoplakia	29	21.01	15	17.65	15	19.48	59	19.67
Nodular leukoplakia	9	6.52	8	9.41	6	7.79	23	7.67
Verrucous leukoplakia	16	11.59	10	11.76	16	20.78	42	14.00
Total	138	100.00	85	100.00	77	100.00	300	100.00

Chi-square= 5.0806, p=0.5336

**Table 4:** Distribution of subjects according to histopathological category in tobacco chewers, smokers and with mixed habit

Biopsy	Tobacco chewers	%	Tobacco smokers	%	Mixed habit	%	Total	%
Hyperkeratosis	69	50.00	46	54.12	20	25.97	135	45.00
Mild	41	29.71	20	23.53	39	50.65	100	33.33
Moderate	24	17.39	11	12.94	13	16.88	48	16.00
Severe	4	2.90	8	9.41	5	6.49	17	5.67
Total	138	100.00	85	100.00	77	100.00	300	100.00

Chi-square= 23.2166 p=0.0007\*

**Conclusion**

In the present study, most of the patients were having homogenous leukoplakia and majority of the cases which were diagnosed clinically diagnosed as leukoplakias presented a histological diagnosis of hyperkeratosis and mild epithelial dysplasia.

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