

# Comparison between the clinical and pathological diagnosis of white patches in oral cavity among patients attending teaching clinics

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## ABSTRACT

**Background.** Oral white lesions may arise from a thicker keratin coating or the buildup of non-keratinized substances. Thus, when a physician encounters a white spot on the oral mucosa, the initial concern is to determine if it can be removed by using a piece of gauze or not. The objective was to analyze the agreement between the clinical and pathological diagnosis of white lesions in the oral cavity.

**Methods.** A total of 22 clinical reports of patients with oral white lesions were diagnosed both clinically and histopathologically. The clinical and histological diagnoses were then compared. This study was done in the Department of Oral Diagnosis in our College of Dentistry, University of Basrah, Iraq, from October 2014 to April 2022.

**Results.** Among 22 cases, 11(50%) were males and 11(50%) were female with an average age of 34-69 years. Buccal mucosa was involved in the major part of cases (30.6%) floor of mouth (5.6%), dorsum of the tongue (8.3%), lateral part of the tongue (2.8%).

**Conclusions.** The results of this study suggest that there is a low level of agreement between the clinical and histological diagnoses. Therefore, enhancing diagnostic abilities is crucial for enhancing therapy results.

**Keywords:** oral white lesion, lichen planus, biopsy, leukoplakia

## INTRODUCTION

Oral white lesions are frequently observed. The majority of these lesions exhibit a white appearance as a result of atypical keratin deposition and the presence of saliva in the oral cavity [1-5]. Oral white lesions can be categorized as either benign, pre-malignant, or malignant [1,6]. These lesions can be diagnosed using a combination of patient history, clinical examination, and histological testing [1,7,8]. The global prevalence of oral cavity lesions increased from 2.45% to 4.31% over ten years, namely from 1994 to 2004 [8].

Discrepancies ranging from 17% to 42% have been found in the published literature concerning the clinicohistopathologic association of various oral lesion types. The clinicopathologic correlation of oral lesions might vary due to several factors, such as the selection of the most suitable area for

histopathology and the variation in the percentage and type of patients across different studies. The disparity is also influenced by the subjective variance of the doctor and a histopathologist. Strict clinical and histological criteria are necessary for accurate diagnosis [9].

Oral white lesions are commonly observed during clinical examinations. These lesions manifest as white patches in the oral cavity. The oral mucosa may exhibit a white look as a result of various circumstances. Stimulation of the oral epithelium can lead to an augmented production of keratin, resulting in hyperkeratosis. The presence of aberrant keratin allows for the uniform reflection of light, which is due to the continuous exposure of the hyperkeratotic tissue to saliva [10]. Acanthosis refers to the abnormal yet harmless thickening of the stratum spinosum. Additionally, the buildup of fluid within and

outside the epithelium might lead to a clinical whitening effect. Exposure of the oral mucosa to toxic substances can lead to necrosis of the oral epithelium, which may manifest as a white lesion. Microorganisms, namely fungi, could generate pale-colored pseudomembranous composed of shed epithelial cells, fungal mycelium, and neutrophils. These pseudomembranous are only loosely connected to the oral mucosa [11].

White lesions in the oral cavity are frequently observed and can have several causes, some of which may be linked to dermatological conditions [12]. Some cases of oral white patches may be attributed to local factors such as material alba and furred tongue (accumulated waste due to inadequate oral hygiene), burns, keratoses, skin transplants, and scars. Additional factors that can contribute to this condition include congenital conditions like Fordyce spots and leukoedema, as well as inflammatory reasons such as infections like fungal (e.g., pseudomembranous, and hyperplastic candidiasis), viral (hairy leukoplakia), and bacterial (syphilitic mucous patches). Non-infectious causes include conditions like Lichen planus and lupus erythematosus [13]. Commonly encountered oral white lesions include hyperkeratosis (frictional keratosis), oral lichen planus, leukoplakia, pseudomembranous candidiasis, and squamous cell carcinoma [14].

The aim is to assess the clinicopathological correlation and patterns, agree on the diagnosis, and impart a positive influence on the need to realize that a biopsy followed by histopathological analysis is required for almost all of the white oral lesions.

## METHODS

### Study design and setting

This is a retrospective study carried out from October 2014 to April 2022 with a record of 22 biopsies from patients with oral white lesions diagnosed in the histopathology laboratory in the College of Dentistry, University of Basrah.

### Inclusion criteria

- All patients with oral white lesions.
- Age above 18 years.
- Comfortability and well-being.

### Exclusion criteria

- Uncomfortable cases.
- Loss of histopathology.
- Under 18-years-old.
- Cancerous cases.

### Ethical approval

This study was approved by the Ethical Board Committee of the Department of Oral Diagnosis, Col-

lege of Dentistry, University of Basrah (no. 310 on 22/12/2013).

### Data collection

The data analyzed the age, sex of the patient, past medical history (anemia, diabetes mellitus, and hypertension), and smoking habits. The lesion characters included the duration of the lesion (months to years), symptoms (pain/burning sensation, ulcer, lymphadenopathy), the site of the lesion (labial mucosa, gingival, right buccal mucosa, left buccal mucosa, dorsum of the tongue, ventral surface of the tongue, lateral part of tongue and floor of mouth) and lesion features (uniformly white, white with red spots, erosions, and ulcers).

### Clinical and histopathological diagnosis

Clinically, the pathologists reached the diagnosis of *lichen planus*, hyperkeratosis, leukoplakia and squamous cell carcinoma. The biopsies were done via incisional and excisional. After that, the histology findings were lichen planus, hyperkeratosis, and leukoplakia.

### Statistical analysis

All analyses were performed using the IBM Statistical Package for the Social Sciences, software version 22.0 (IBM Corp., NY, USA). Descriptive statistics (mean, SD, frequency, and %) were used to describe the characters. Kappa value was used to assess the differences between the etiology groups at a statistical significance level of  $P < 0.05$ .

## RESULTS

In this study there were 22 patients included, 11(50%) of them being females and the other 11 (50%) males, while their ages ranged from (27-80) with mean age of  $52.5 \pm 12.3$  years. The majority of patients were those between 40-59 years old (50.0%) followed by those above 60 years (36.4%). Most of the patients had a negative past medical history (81.8%), while only two patients had hypertension (9.2%) and the other two had anemia, or diabetes mellitus. Regarding the smoking habit, the majority of them were non-smokers (81.8%) and only 4 patients were smokers (Table 1).

The duration of these lesions ranged between one month to more than five years, the mean duration was  $1.5 \pm 1$  years. About 36.4% of patients mentioned less than six months and another 8 patients mentioned a duration between six months and one year. In addition to the white lesion in the oral cavity around 8 (29.6%) patients mentioned the presence of a burning sensation or pain, while five patients have an ulcer in the oral cavity (Figure 1), on

**TABLE 1.** Variables of the study

Variables		No.	%
Sex	Male	11	50.0
	Female	11	50.0
Age	<40	3	13.6
	40-59	11	50.0
	≥60	8	36.4
Past medical history	Anemia	1	4.5
	Diabetes mellitus	1	4.5
	Hypertension	2	9.2
	No history	18	81.8
Smoking habit	Smoker	4	18.2
	Non-smoker	18	81.8

the other hand, most of them had no other symptom (40.7%). Regarding the site of these white lesions, most of the lesions were located in the right buccal mucosa (33.3%) (Figure 2) and the left buccal mucosa (30.6%); the next most common location was the gingival (11.1%). About 11 (39.3%) patients had a uniformly white lesion followed by 10 (35.7%) patients who had white lesions with red spots, only two patients had erosions (Table 2).

Clinically the diagnosis of the white lesions was Lichen planus in 15 (68.2%) patients, followed by Leukoplakea in 4 (18.2%) patients, only one case was suspected to be squamous cell carcinoma (4.5%) (Table 3).

As all 22 cases were subjected to biopsies, 20 (90.9%) of them underwent incisional biopsy and only two had an excisional biopsy (Table 4).

Histopathologically, most of the cases were diagnosed as Lichen planus (72.7%), and 4 cases were

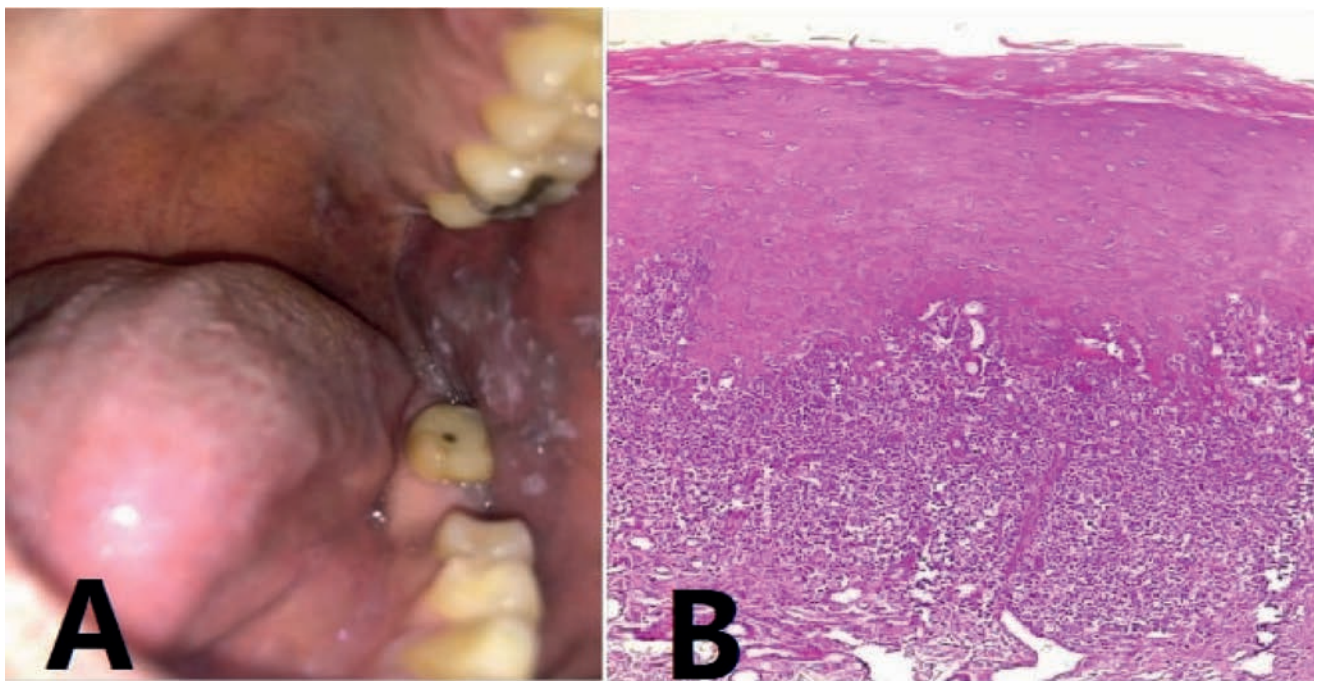
diagnosed as Leukoplakia. No case was diagnosed as a cancer (Table 5).

**TABLE 2.** The characters of the white lesion in the study

Characters		No.	%
Duration	<6 months	8	36.4
	6months – 1year	8	36.4
	>1year	6	27.3
Symptoms	Pain/burning sensation	8	29.6
	Ulcer	5	18.5
	Lymphadenopathy	3	11.1
	No symptoms	11	40.7
Site	Labial mucosa	2	5.6
	Gingival	4	11.1
	Right buccal mucosa	12	33.3
	Left buccal mucosa	11	30.6
	Dorsum of tongue	3	8.3
	The ventral surface of the tongue	1	2.8
	The lateral part of the tongue	1	2.8
	Floor of mouth	2	5.6
Characteristics of lesion	Uniformly white	11	39.3
	White with red spots	10	35.7
	Erosions	2	7.1
	Ulcers	5	17.9

**TABLE 3.** The clinical diagnosis of the white lesion

Clinical diagnosis	No.	%
Lichun planus	15	68.2
Hyperkeratosis	2	9.1
Leukoplakea	4	18.2
Squamous cell carcinoma	1	4.5



**FIGURE 1.** (A) Clinical appearance of lichen planus (B) Histopathologic features of lichen planus

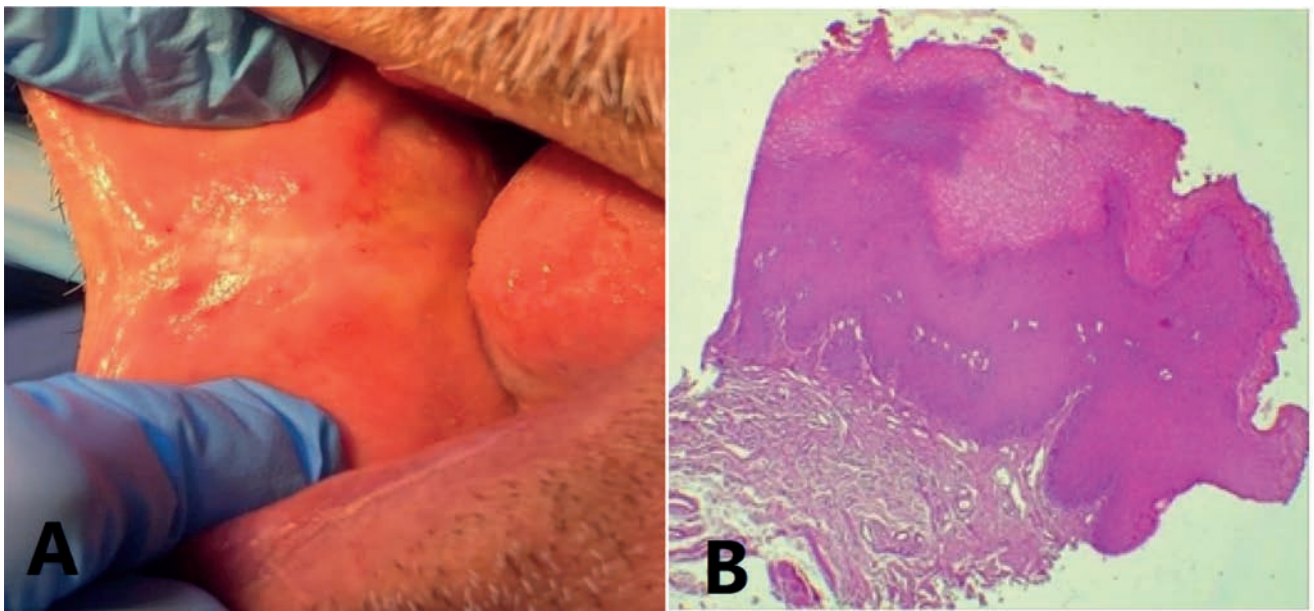


FIGURE 2. (A) Clinical appearance of leukoplakia (B) Histopathologic features of leukoplakia

TABLE 4. The type of biopsy

Type of biopsy	No.	%
Incisional	20	90.9
Excisional	2	9.1

TABLE 5. The histopathological diagnosis of white lesion

Histopathological diagnosis	No.	%
Lichen planus	16	72.7
Hyperkeratosis	2	9.1
Leukoplakia	4	18.2

Table 6 presents the link between the clinical diagnosis and pathological diagnosis. Among the 15 patients diagnosed with Lichen planus clinically, only 13 were confirmed by histological investigation. One instance showed hyperkeratosis and the other exhibited Leukoplakia. The clinical diagnosis initially suggested squamous cell carcinoma, however, the histological examination revealed hyperkeratosis. The agreement metric, represented by a kappa value of 0.332, indicates a correlation of only 33% between the clinical and histological diagnoses.

TABLE 6. The clinicopathological correlation

Clinical	Histopathological			Total
	Lichen planus	Hyperkeratosis	Leukoplakia	
Lichen planus	13	1	1	15
Hyperkeratosis	1	0	1	2
Leukoplakia	2	0	2	4
Squamous cell carcinoma	0	1	0	1
Total	16	2	4	22
P-value = 0.032		kappa value = 0.313		

### DISCUSSION

The present study involved 22 oral white lesion biopsy records attending the Dental Clinics at the College of Dentistry, University of Basra that were diagnosed clinically and histopathological as white lesions. In this study there is an equal ratio of both males and females, 11 cases (50%) were males while 11 cases (50%) were females, this is incompatible with a study by Guang et al. [15], that study’s possible causes include a small sample size, a lack of dental facilities, and the rarity of private and general dentistry offices in the locations we studied (40 male cases and 21 female cases, or 66% and 34%, respectively). This could potentially be linked to the overall diminished dental consciousness within our population, as well as the influence of faith-based healing and a widespread apprehension or unease towards any form of surgical procedures.

In this study, the age distribution ranged from 27 to 80 years. Most lesions were observed between 40 and 59 years old (50%), followed by those above 60 years (36.4%) as presented in Table 1, which is compatible with the study of Gurung et al. [15] who reported that the age distribution ranged from 29 to 86 years.

In this study, most of the lesion sites were located on the right and left buccal mucosa, accounting for 12 (33.3%) and 11 (30.6%) cases, respectively, followed by the gingiva (11.1%). This is consistent with other studies by Gurung et al. [15], Neville and Day [16], and Silverman et al. [17]. The buccal mucosa was the most often observed site, as reported by Silverman et al. [17]. They discovered that 46% of patients had lesions in the buccal mucosa, followed by the gingiva in 40% of cases. Also, in a study conducted by Gurung et al. [15], it was found that the buccal

mucosa was the most often affected area for lesions. The distribution of personal habits in this study is presented in Table 2. Out of the total cases, only 4 individuals (18.2%) reported having the personal habit of smoking, while the majority (81.8%) were nonsmokers. This finding contradicts the results of a study conducted by Silverman et al. The study conducted by [17] revealed that 73% of the overall study group were tobacco users, however, only 47% of those who developed cancer were smokers. The duration of the lesions in this study varied from one month to over five years, with an average duration of  $1.5 \pm 1$  years. This contradicts the findings of Soyelle et al., who found that the average duration of lesions is  $2.5 \pm 3.6$  years, ranging from 2 days to 25 years [18].

The study found that lichen planus lesions accounted for 72.7% of all biopsied lesions, with leukoplakia lesions making up 18.2% and hyperkeratosis 9.1%. This finding agrees with Simi et al's study [19], which also found that lichen planus lesions accounted for 72.7% of all biopsied lesions.

A total of fifteen lesions, or 68.2% of the total, were clinically identified as oral lichen planus (OLP). Of those, thirteen were confirmed histopathological as OLP, one as hyperkeratosis, and the other as leukoplakia, demonstrating a correlation between the two methods of diagnosis.

The second most prevalent lesion was leukoplakia, which was identified in 4 cases. Out of those cases, 2 were confirmed to be leukoplakia by histopathology, whereas 2 were diagnosed as lichen planus. A third lesion was hyperkeratosis; two cases were clinically diagnosed; one case was confirmed to be leukoplakia on histological investigation, and the other case was confirmed to be Lichen planus on histopathological testing. Histopathological examination confirmed the clinical suspicion of SCC as hyperkeratosis in one patient.

Based on the kappa rating scale, the clinicopathological agreement was 0.313, which is considered fair. Histopathological diagnosis correlates as little

as 33% with clinical diagnosis. When compared to research in established scientific literature, such as those by Patel et al. [20] and Williams et al. [21], our concordance index of 33 was low.

Improving the concordance rates among various disciplines, particularly between pathologists and surgeons, can be achieved through fostering proficiency and solid interdisciplinary relationships. A decent and suitable biopsy specimen, along with the right methods of transporting the specimen to the laboratory, would also be beneficial to the improvement of concordance. Accuracy in the interpretation of plain radiographs and imaging techniques would also be beneficial [22]. To improve the early detection and diagnosis of diseases and biopsied lesions, discordances should be rigorously evaluated by all disciplines, with oral pathology being the primary focus of this examination [23].

## CONCLUSIONS

In this study most white lesions have no symptoms, some have burning sensation/pain. The white lesion most commonly appears in the buccal mucosa. The characteristic of most white lesions were uniformly white and /or white with red spots. The majority of these lesions clinically and histopathologically were Lichen planus. The measurement of agreement, known as the Kappa value, is equal to 0.332, which indicates that the correlation between clinical and histological diagnosis is as low as 33 percent. That's why the biopsy for histopathological examination is mandatory for definitive diagnosis.

*Conflict of interest:* none declared

*Financial support:* none declared

*Acknowledgment:*

All authors thank Sura Amer Ali, Nooralhuda Habib Flayyih, Nooralhuda Habib Flayyih, Maryam Walid Khalid, and Aalaa Riyad Gatia for their help.

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