

# Histopathological evaluation of oral lichen planus

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## ABSTRACT

**Background:** Oral lichen planus( OLP) is a chronic inflammatory disorder affecting mucosal surfaces , which can cause an important discomfort to the patients . To highlight the most characteristic histopathological findings of OLP which are useful in making a diagnosis of OLP. In addition, by studying the association of these findings it was hoped that information about pathogenic mechanism would be obtained.

**Material and Methods :** In this study a retrospective analyses of 194 cases of OLP being diagnosed at Oral and Maxillofacial Pathology Department, College of Dentistry , were obtained over a period of 26 years , spanning from 1985- 2010 . We analyzed the age and sex of the patients, clinical type of lichen planus, site and different histopathological finding, comparing them with each others.

**Results:** (61%) of the patients are female and (39 %) are males, with an average age for both sexes (49.75 years).

The most frequent clinical form is reticular, presented in (78%) of cases, and the most common location is buccal mucosa, presented in (60%) of the patients. The mononuclear infiltration beneath and adjacent to the epithelium, parakeratosis and degeneration of the basal layer of the epithelium were consistent features. Linear regression analysis revealed a positive correlation between basal degeneration and mononuclear infiltration and an inverse correlation between the mononuclear infiltrate and the parakeratosis.

**Conclusion:** Linear regression analysis of the parameters studied provided partial support for a cell- mediated immune mechanism.

**Key words:** Oral lichen planus, histopathological finding. (J Bagh Coll Dentistry 2012; 24(Sp. Issue 2):48-54).

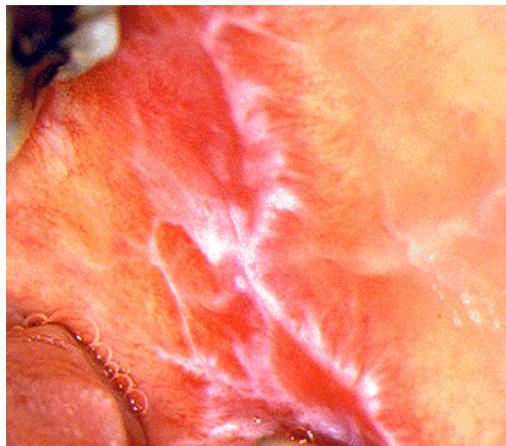
## INTRODUCTION

Lichen planus, a chronic autoimmune mucocutaneous disease affects the oral mucosa beside the skin, genital mucosa, scalp and nails. An immune mediated pathogenesis is recognized in Lichen planus although the exact etiology is unknown <sup>(1)</sup>. OLP is a chronic inflammatory disease with the reported prevalence rate varies from 0.5% to 2.2% of the population. The typical age of presentation is between 30-60 years and the disease is more frequently seen in women <sup>(2)</sup>.

Clinically, OLP has specific and clearly identifiable features <sup>(3)</sup>, usually presenting in one of two main forms the reticular and the erosive forms, although other forms are not rare <sup>(4)</sup>. In fact, according to Mollaoglu <sup>(5)</sup>, four other forms

were originally described the popular, plate – like, bullous and atrophic forms.

The reticular form occurs more frequently and is characterized by white Lacy streaks known as Wickham's striae, which generally are surrounded by discrete erythematous borders. Fig. 1 .Such features may not be evident in certain sites, such as the dorsum of the tongue, where lesions presented as keratotic plaques. The reticular form usually causes no symptoms; it involves the posterior jugal mucosa bilaterally. Other sites may be simultaneously involved, such as the upper and Lateral surfaces of the tongue, the gums and the palate <sup>(4-6)</sup>. In its characteristic reticular form, OLP can be diagnosed clinically in most instances as well <sup>(7)</sup>.



**Figure 1: Oral lichen planus lesion with reticular and erythematous manifestations <sup>(4)</sup>.**

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In the absence of typical reticular LP manifestation elsewhere in the mouth, the non-reticular types may be difficult to diagnose clinically with confidence. In such event, the taking of a biopsy should be considered. <sup>(7)</sup>

It is well accepted that OLP is a chronic possibly life- long, disease that is characterized by remission and exacerbation. Several suggestions for monitoring the severity of OLP have been reported based on clinical aspect, number of involved oral subsites and severity of symptoms <sup>(8)</sup>.

### Histopathological aspect

In 1978 a set of histopathological criteria for OLP has been provided by the WHO that probably is still regarded as authoritative source <sup>(9)</sup>.

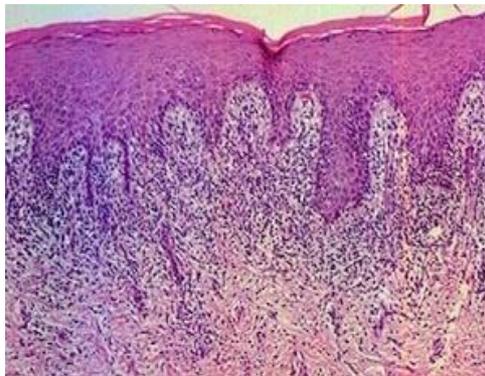
The histological criteria include the existence of a band of lymphocytic inflammatory infiltrated in the subepithelial connective tissue, hydropic degeneration of the basal layer and the absence of the epithelial dysplasia. If the above three criteria are met, the lesion is considered a typical LP from a histological perspective and as for those that do not meet one of the histological criteria, they are

considered to be lesions that histologically compatible with LP <sup>(10)</sup>.

The histological feature of OLP was first described by Dubreuill in 1906 and later by Shklar (1996). Shklar described three classic histological features which are overlying keratinization, a dense band- like layer of lymphocytic infiltrate within the underlying connective tissue and liquefaction degeneration of based cell layer <sup>(1)</sup>.

Pindborg et al. <sup>(11)</sup> have further described the histological feature of OLP which have similar features to that described by Shklar above. Within the based layer degenerating basal keratinocytes form colloid (civatte, hyaline, or cytoid) bodies that appear as homogenous eosinophilic globules. The ultrastructure of colloid suggests that they are apoptotic keratinocytes. An eosinophilic band which represents thickened basement membrane may also be presented.

The essential histological feature of OLP are liquefactive degeneration of basal epithelial cells, dense, band-like inflammatory infiltrate consisting of lymphocyte, normal maturation epithelium , saw- tooth appearance of rate ridges, civatte bodies and hyperkeratosis <sup>(1)</sup> (Figure 2)



**Figure 2: Histopathological features of oral lichen planus <sup>(1)</sup>.**

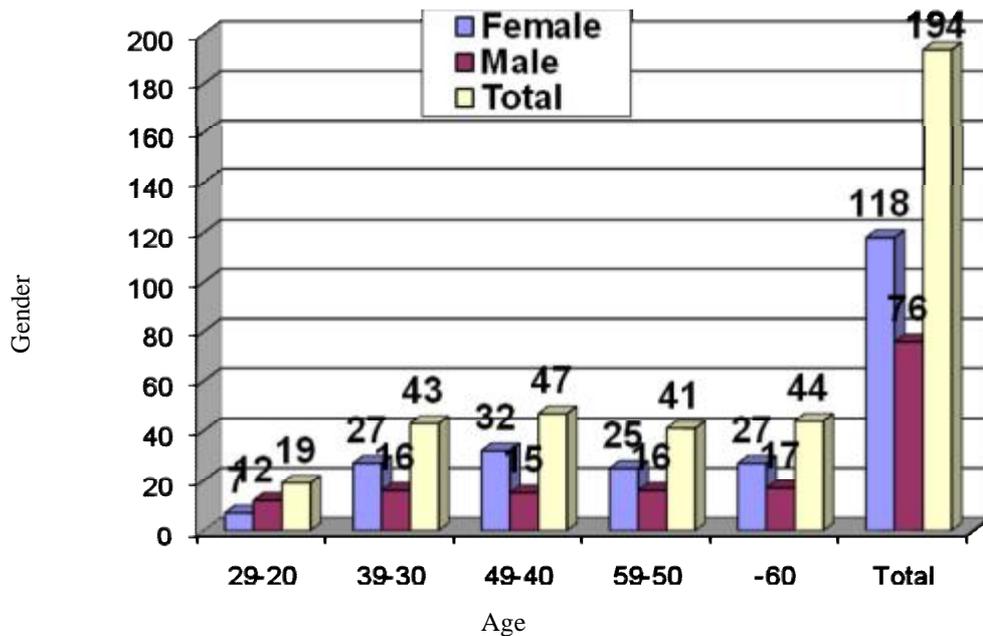
The aim of this study is to highlight the most characteristic histopathological finding of OLP in an attempt to describe more precisely the parameters which are useful in making a histopathological diagnosis of OLP. Rather, it was hoped that a set of parameters could be defined which would be diagnostic of the disease despite the variability of its presentation. In addition, by studying the associated of these parameters it was hoped that information about pathogenic mechanism would be obtained.

### MATERIALS AND METHODS

A retrospective study was carried out on a sample of 194 biopsy specimens of patients diagnosed

with OLP, the tissue were fixed in neutral – buffered formalin (10%) embedded in paraffin and section were cut at 6 $\mu$ . They were stained with hemotoxylin and eosin stain, by examine case sheets in Oral and Maxillofacial Pathology Department, College of Dentistry , Baghdad University from the 1985 to 2010.

The cases selected for study showed at least 3 of the histological parameters listed in table 1. in addition to a mononuclear infiltrate which closely apposed the epithelium . The group comprised 118 female (61%) and 76 males (39%) with age ranging from 20-82 years and with mean age (49.75years) (Figure 3).



**Figure 3: Age and gender distribution of oral lichen planus patients**

The parameters listed in table 1 were scored according to the method of assessment described. Scoring was carried out by only one observer with frequent referral to a reference slide in order to optimize the reproducibility of the assessment made. All sections were scored along their length. The scoring of the parameters were subjectively done from+ to++++ as seen in table (1) and according to width of keratin, severity of edema, severity of basal layer degeneration and density of mononuclear infiltrate.

The statistical analysis of the data was performed using the statistical Package for Social Sciences (SPSS) version. The linear regression analysis was used to show the relationship between the different parameters and the results obtained are considered significant at  $r < 0.5$ .

## RESULTS

The biopsies were taken from various sites including buccal mucosa 161 causes (60%) , tongue 21 cases (11%) , alveolar mucosa 10 cases(5%) , palate 4 cases (2%), lip 11 cases (6%), gingiva 7 cases (4%) and there were 27 cases (14%) showed involvement of more than one site in the oral cavity by the disease.

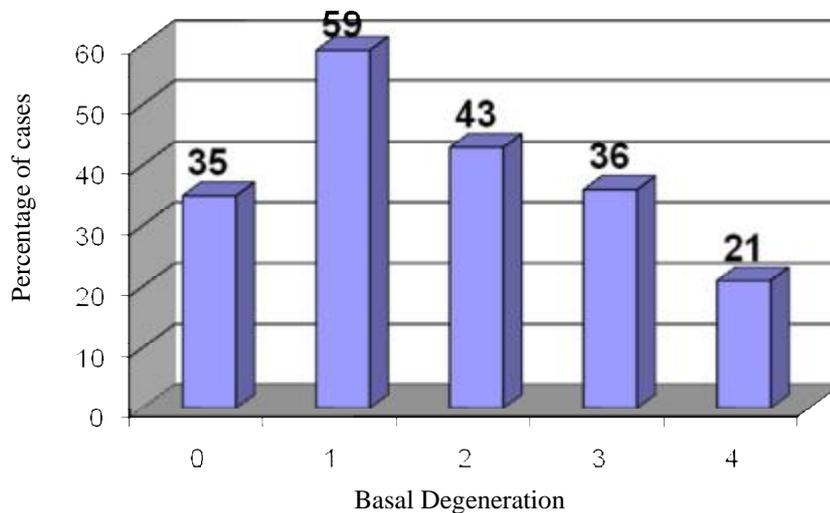
### Clinical Picture:

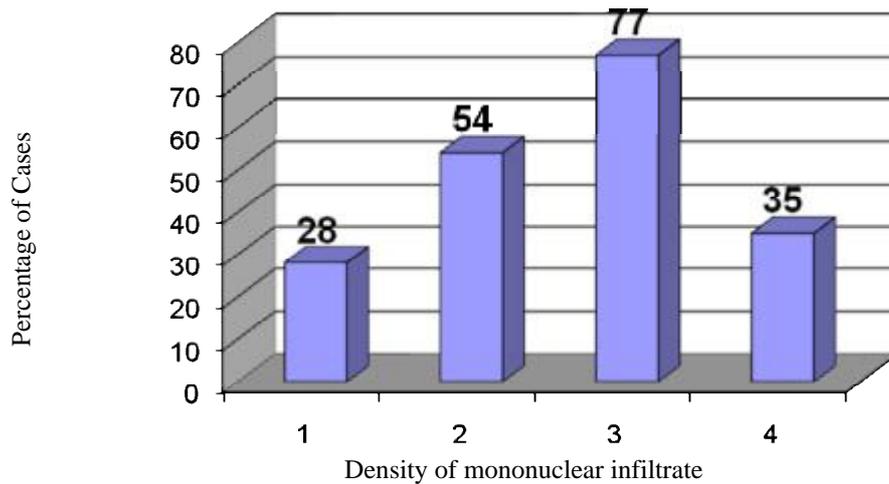
Of the case selected for study, 152 cases (78%) were described clinically as being reticular, 23 cases (12%) as erosive, 6 cases (3%) as atrophic only 4 cases (2%) as annular , with 5 cases (2.5%) as bullous and 4 cases as erythroplakia (2%).

The results of this study show that mononuclear infiltration beneath and adjacent to the epithelium and basal layer degeneration were consistent findings in OLP. Parakeratinization , acanthosis and a prominent granular layer were also frequent findings (table 1).

**Table 1: Incidence of parameters studied and the method of their assessment**

Parameter	% of cases	Method of assessment of parameter
Keratin	18%	assessed as being present or absent and graded + → +++++ according to width
Parakeratin	92%	cell layers counted
Granular layer	80%	cell layers counted
Acanthosis	68%	cell layers counted
Intercellular edema	62%	assessed as being present or absent and grading + → +++++ according to severity
Intracellular edema	71%	assessed as being present or absent and grading + → +++++ according to severity
Basal layer degeneration	82%	assessed as being present or absent and grading + → +++++ according to severity
Mononuclear infiltrate	100%	assessed as being present or absent and grading + → +++++ according to density of the infiltrate
Bandlike distribution of infiltrate	56%	assessed as being present or absent
Civatte bodies	35%	counted
Focal separation of epithelium and connective tissue	30%	assessed as being present or absent
Saw – tooth rete ridges	65%	assessed as being present or absent
Widening of the basement membrane zone	70%	assessed as being present or absent
Lymphocytic predominance in infiltrate	93%	assessed as being present or absent
Dilated vessels in connective tissue	59%	assessed as being present or absent
Atrophy	15%	assessed as being present or absent
Hyperplasia	62%	assessed as being present or absent
Area of atrophy and hyperplasia	23%	assessed as being present or absent

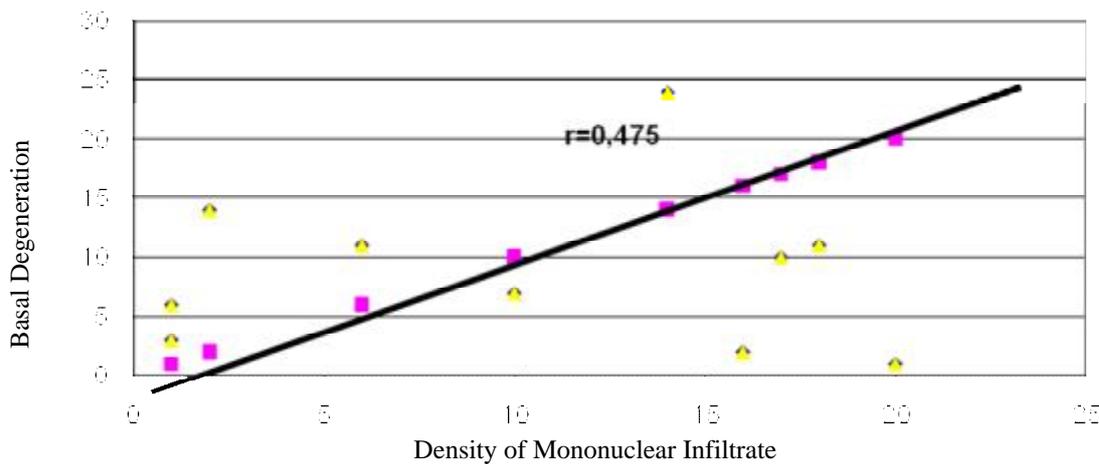
**Fig 4: Quantitative assessment of severity of basal degeneration versus percentage of cases**



**Fig 5: Quantitative assessment of density of mononuclear infiltrate versus percentage of cases**

The relationship of basal degeneration and mononuclear infiltration was studied and linear regression analysis revealed a positive

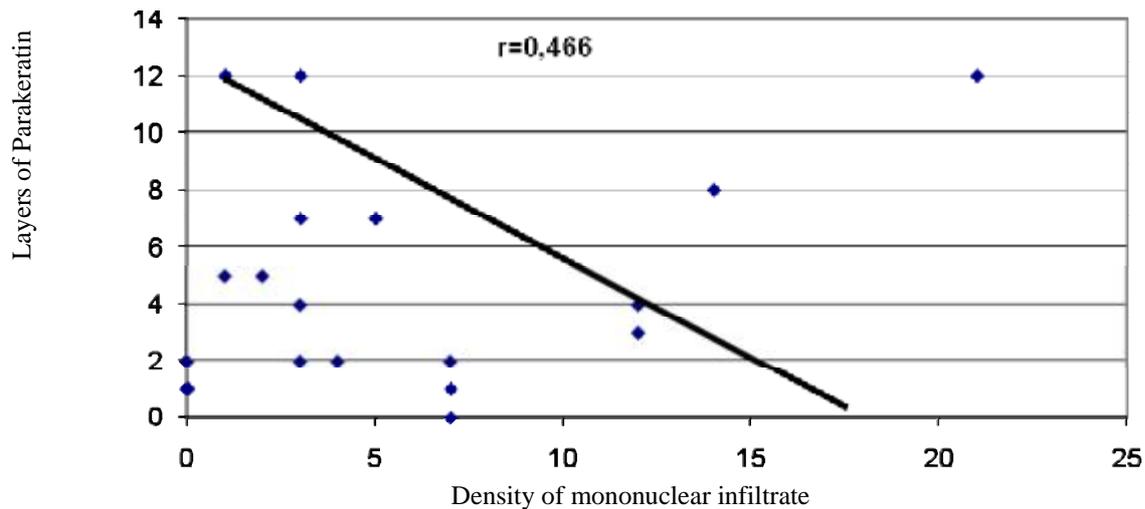
correlation between these two parameters. (Fig 6).



**Fig 6: Scattergram indicating a positive linear correlation between density of mononuclear infiltrate and severity of basal degeneration.**

The density of the mononuclear infiltrate and the severity of the basal degeneration were studied more closely (Figure 4, 5) As parakeratosis was such a frequent finding, it's relationship to both mononuclear infiltration and basal layer degeneration was

studied. Linear regression analysis of mononuclear infiltration versus the number of layers of parakeratin revealed an inverse correlation between these two parameters (Figure 7).



**Figure 7: Scatter gram indicating an inverse correlation between the density of the mononuclear infiltrate and the number of layers of parakeratin.**

There was no linear correlation between parakeratinization and basal layer degeneration. Linear regression analysis of the amount of intracellular edema versus density of the mononuclear infiltrate, intercellular edema versus density of the mononuclear infiltrate and the number of civatte bodies versus the infiltrate were performed. There was no linear relationship between any of these parameters.

## DISCUSSION

A predominance of OLP among female patients was observed in the present study, in agreement with other report's (10,12-17).

A predominance of OLP in the fourth, fifth and sixth decade of life was observed in the present study, in agreement with Ingafou et al. (9,17), although other studies did not show the expressive involvement of patients in their seventh decade (13,18). The cheek mucosa was the site most affected, followed by the tongue and the other locations being less common in agreement with other reports (10,13,15,16).

The reticular form was the most frequent, followed by erosive form, these two forms were found to be associated or not with other form, as also reported by other investigators. (10,13,16)

Focusing on the histopathological findings, degeneration of the basal layer of the epithelium and the subepithelial lymphocytic inflammatory infiltrate is identified in 100% of the patients, a finding that is corroborated by other authors (10,12) and which, along with the absence of epithelial dysplasia, constitutes the three typical histological criteria of oral lichen planus.

It was found that parakeratosis was more consistent findings than basal degeneration, being

present in 92% of cases studied. This result was in agreement with Hedberg et al (12) and higher than the incidence of 66% previously reported by Fernández (10). Acanthosis and the present of a prominent granular layer (80%) were also found more often than other parameter in this study. As regard acanthosis, our data was in agreement with Hedberg et al. (12) and higher than that found in literature (10,19)

The present of saw tooth rete ridge (65%) is another histological finding of OLP observed in our sample and described by other authors (10,19).

Epithelial erosion is a finding that is relatively more common in atrophic and erosive form, observed in only (15%) of the cases. This could be because, as some authors claim (20), the thickness of the epithelium is greater in the reticular forms, with a thinning observed in the atrophic and erosive forms, therefore making them more prone to erosion.

Although is it generally accepted that the pathology of lichen planus represents tissue damage as a result of some form of immune response, this study make an attempt to evaluate the association of these parameters in relation to possible pathogenic mechanisms for the disease.

It has been proposed that the tissue response represents a cell – mediated attack against the basal layer of the epithelium (21). OLP is a T- cell mediated inflammatory disease (22,23). The basal keratinocytes appear to be the primary site of immunological injury in OLP and molecular biological changes in the basal cell compartment have been a matter of particular interest in later research in OLP (23) of current interest is presence of cytotoxic T cells in OLP with the potential of targeting basal keratinocytes (24), based on that T-cell lines cultured from LP skin lesions have

proven to lyse autologous lesional keratinocyte in vitro<sup>(25)</sup>. The present data show a significant and positive correlation between the severity of basal degeneration and density of mononuclear infiltration which is compatible with a cell-mediated type of response. The association of several other parameters studied, however, showed no correlation.

Dvorak et al<sup>(26)</sup> listed necrosis and hyperplasia of epithelium and the presence of intercellular edema as being forms of epithelial changes found in contact hypersensitivity reactions in man. These parameters were examined, but were not found to correlate with the density of the mononuclear infiltrate in this study as well as in Hedberg et al study<sup>(12)</sup>.

Sarkany and Gaylarde<sup>(27)</sup> observed liquefaction degeneration of basal cells even in the absence of an inflammatory response in lichen planus. This may present an early stage in the disease process.

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