

A Histomorphology Comparison of Saw-Tooth Shaped Rete Ridge Between Oral and Cutaneous Lichen Planus

AREZOO SAHARKHIZ¹, ATOUSA AMINZADEH^{2*}, ROYA YAHYA ABADY³

¹School of Dentistry, Islamic Azad University Isfahan (Khorasgan) Branch, Isfahan, Iran.

²Department of Oral Pathology, School of Dentistry, Islamic Azad University Isfahan (Khorasgan) Branch, Isfahan, Iran.

³Department of Oral Pathology, School of Dentistry, Shahrekord University of Medical Sciences.

Abstract

Lichen planus is chronic and comparatively collective inflammatory mucocutaneous disease. The histopathological features of oral lichen planus were described as comparable to those of cutaneous lichen planus (CLP). Among those saw-toothed rete ridges are introduced as less important histopathologic features of idiopathic OLP in contrast to CLP. Accordingly, existing study aimed to estimate existence of saw tooth rete ridges in OLP in comparison to CLP. In this retrospective cross-sectional study, 56 H&E stained slides with clinical and histopathological diagnoses of OLP were randomly collected from the archive of the oral pathology laboratory. CLP cases were selected randomly from a private pathology laboratory and were evaluated for the presence of saw-toothed rete ridges. Collected data were evaluated using Chi-square & Fisher's exact test in SPSS 24 at an error level of 0.05%. Chi-square test did not show a substantial difference between oral & cutaneous groups in terms of the shape of the rete ridges ($p = 0.511$). Outcomes of existing study showed that saw tooth rete ridge was seen in OLP similar to CLP. Future studies concerning clinical subtype and type of keratosis are recommended.



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Introduction

Lichen planus is chronic and relatively common mucocutaneous disease which is considered an autoimmune disease because it is believed to be the outcome of immunologic T-cell destruction

of basal cells. Lichen planus was first described in 1869 by British physician Wilson Erasmus, as T-cell-mediated autoimmune disease involving skin, hair, eyes, mucous membranes, & nails, even though the exact target antigen in this process is not

CONTACT Atousa Aminzadeh ✉ a.aminzadeh@khuif.ac.ir 📍 Department of Oral Pathology, School of Dentistry, Islamic Azad University Isfahan (Khorasgan) Branch, Isfahan, Iran.



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yet understood^{1,2} Cutaneous lichen planus (CLP) typically comprises flexor surfaces of extremities & benevolences as insignificant multiple itchy violaceous papules with no particular pattern in middle-aged adults. Oral lichen planus (OLP) can be originate in 53.6% of CLP patients and sometimes OLP might be only clinical demonstration of disease.³ The global prevalence of oral lichen planus has been estimated at 0.89% among populations in one systematic review study.⁴

Lichen planus is identified in oral mucosa in forms of idiopathic lichen planus, drug-induced hypersensitivity reaction, localized contact hypersensitivity reaction to dental amalgam, oral lupus erythematosus, chronic graft versus host disease which can only be differentiated by history and clinical findings.

Idiopathic oral lichen planus involves the oral mucosa mostly seen in middle-aged women involving buccal mucosa, dorsal surface of the tongue, and gums.^{1,2} It is characterized clinically as symmetric bilateral lesions in three main clinical presentations: 1-reticular or keratotic 2-erythematous or erosive and 3-ulcerative. Histopathological structures of idiopathic oral lichen planus (OLP) and hypersensitivity type lichenoid mucositis were described as similar to those of cutaneous lichen planus (CLP) including hyperkeratosis, epithelial acanthosis or atrophy, basal cell liquefaction degeneration and saw-toothed rete ridges.^{1,2,3} However hydropic basal cell degeneration or squamatization of basal cell layer & lymphocytic band at the interface often with the blurring of the interface is believed to be the main microscopic criteria for OLP. Whilst spongiosis,

leukocyte exocytosis, colloid body formation, post-inflammatory hyper melanosis and saw-toothed rete ridges are introduced as less important histopathologic features of idiopathic OLP.^{3,1,5,6} Although in the study of Kashyap *et al.*, saw-toothed rete ridges are introduced as a major microscopic criterion.⁷ Consequently existing study intended to estimate & equate presence of saw tooth or pointed rete ridges in and between OLP and CLP.

Materials and Methods

In this retrospective cross-sectional study, 56 samples of oral lichen planus (n=43) and cutaneous lichen planus (n=13). Oral samples were selected from the archives of the pathology department of Isfahan Azad Dental School and cutaneous samples from a private pathology laboratory in Isfahan under the ethics of Isfahan Azad dental school. The H&E stained slides of each sample were observed using a light microscope (Nikon, Japan) with a magnification of 100 and the shape of rete ridges was evaluated and categorized into two group's smooth /blunted rete ridges or hyperplastic /sawtooth shape rete ridges. Collected data were scrutinized using Chi-square & Fisher's exact test in SPSS 24 at an error level of 0.05%.

Results

The shape of rete ridges in oral lichen planus was blunted in 21 cases (48.8%) and saw tooth in 22 cases (51.2%) (Figure 1). The Chi-square test did not illustrates substantial differences between two types of blunt or sawtooth-shaped rete ridges in oral lichen planus samples ($p = 0.879$).

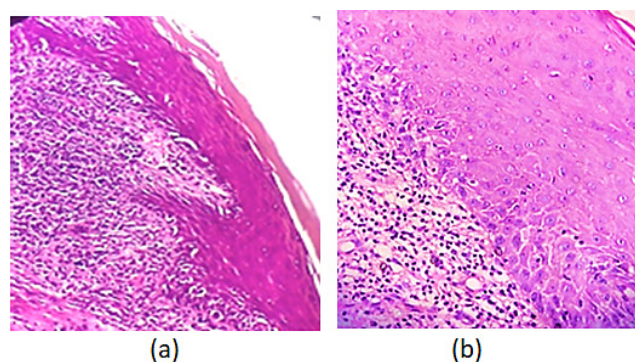


Fig. 1: Sawtooth shape rete ridge (A, H&E 100) and blunt or smooth rete ridge (B, H&E 400) in Oral lichen planus

The shape of rete ridges in cutaneous lichen planus was blunted in 5 cases (38.5%) and sawtooth in 8 cases (61.5%) (Figure 2). The Chi-square test did not illustrate substantial differences between two types of blunt and sawtooth shape rete ridges in cutaneous samples ($p = 0.405$).

The Chi-square test did not illustrate substantial differences between oral & cutaneous groups in terms of shape of rete ridges ($p = 0.511$) (Table 1).

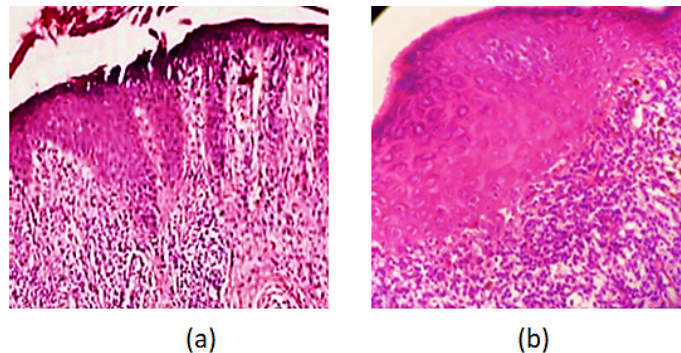


Fig. 2: Saw tooth shape rete ridge (A, H&E 100) and blunt or smooth rete ridge (B, H&E 400) in dermal lichen planus

Table 1: comparing rete ridge shape between oral & cutaneous lichen planus

	Oral lichen planus (n%)	cutaneous lichen planus	p value
blunt rete ridge	21(48.8%)	5(38.5%)	0/51
saw tooth rete ridge	22(51.2%)	8(61.5%)	
total	43(100)	13(100)	

Discussion

The classic histopathological features of cutaneous lichen planus are dense, continuous, & band-like lymphohistiocytic infiltrate at dermal-epidermal junction in conjunction with epidermal changes such as hyper (ortho) keratosis, hyper granulosus, basilar vacuolar degeneration and sawtooth appearance of rete ridges. In oral mucosal lesions, epithelial alterations are fewer precise compared to CLP and it has been said that rete ridges do not exhibit characteristic prominent sawtooth pattern³ As we know rete ridges or rete pegs are epithelial extensions into the connective tissue. The morphology of the rete ridge is thought to be directly related to the mechanical pressures on the epithelium. Different morphology of rete ridges is seen among some oral mucosal lesions which can be diagnostic for pathologists. This variation in rete ridge morphology might be related to external mechanical and internal pressures due

to epithelium proliferation by activation of ERK 1 / 2 protein kinase, production of matrix metallo proteinases, dissolution of basement membrane and migration of keratinocytes to connective tissue play a significant role in the morphology of rete ridges⁸ However Lynch *et al* believe inflammation might play role in the morphology of rete ridges which was not reported as an etiologic factor for cell proliferation and subsequent changes in the morphology of rete ridges in the study of Kaplan and Hirshberg who showed no significant differences between PCNA and Ki67 proliferation marker expression in epithelium of keratocyst with inflammation.^{9,10}

Our study intended to estimate & equate shape of saw-toothed or pointed rete ridges in OLP with CLP. Aminzadeh *et al* had previously reported saw-toothed rete ridges in Oral lichen planus.^{8,11} Hasegawa *et al*, as well, showed frequent saw-toothed rete pegs especially in reticular OLPs,

in contrast, to the study of Gorouhi *et al.* Results of the present study similar to the study of Aminzadeh *et al* and Hasegawa *et al* and in contrast to study of Gorouhi *et al* showed saw tooth rete ridges in almost half (51%) of OLPs.¹² No statistically significant difference was seen comparing the prevalence of saw tooth rete ridges to the frequency of blunt or smooth rete ridges inside the OLP group ($P>0.05$). Also in contrast to the study by Müller, no significant difference was observed in the prevalence of saw-toothed rete ridges between OLP and CLP ($P>0.05$).¹³ As Müller believes saw tooth rete ridge is seen remarkably in CLP in comparison to OLP. Accordingly, results of present study exhibited that saw tooth rete ridge might be a major histopathologic criterion diagnosis of OLP even though Gorouhi *et al* believe saw tooth rete ridge is typically seen in CLP and not in OLP. They believe the shape of rete ridges is directly related to the clinical sub type of lichen planus lesions as in the hypertrophic CLPs the saw-toothed rete ridges are replaced by rete ridges with the rounded end as divergent to typical pointed end sawtooth configuration and however, in atrophic CLPs rete ridges are completely lost. They believe the sawtooth pattern rete ridges are lost in OLPs because oral mucosa exhibits parakeratosis with no granular layer and is more atrophic than acanthotic compared to CLP.³

In contrast to the study of Gorouhi *et al* and Hasegawa *et al*, the study of Tamgadge and

Tamgadge showed that atrophy of epithelium leads to pointed rete ridges which are known as sawtooth rete ridges.^{3,14} Hence according to the obvious disagreement regarding serrated, pointed or sawtooth-shaped rete ridges in OLP, it is best to perform further studies with equal sample sizes concerning clinical subtype (hyperplastic or atrophic) and type of keratosis(ortho with granular layer or para without granular layer) in future studies which were the limitations of present study.

Conclusion

Results of existing study showed that saw tooth rete ridge was seen in OLP similar to CLP. Future studies concerning clinical subtype and type of keratosis are recommended.

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Conflict of interest

Nil

References

1. Aminzadeh A, Razavi S.M, Sabeti S.A. Immunohistochemical Evaluation of Expression of CK19 Premalignant Indicator in Oral Lichenoid Reaction (OLR) Compared to Oral Lichen Planus (OLP), Oral Squamous Cell Carcinoma (OSCC) and Normal Oral Mucosa. *J Isfahan Dent Sch.* 2018; 14(1): 17-28.
2. Woo, Sook-Bin. Oral pathology: a comprehensive atlas and text. 2nd edition. Philadelphia: Elsevier, 2017.
3. Gorouhi F, Davari P, Fazel N. Cutaneous and mucosal lichen planus: a comprehensive review of clinical subtypes, risk factors, diagnosis, and prognosis. *Scientific World Journal.* 2014;2014:742826. Published 2014 Jan 30. doi:10.1155/2014/742826
4. Li C, Tang X, Zheng X, Ge S, Wen H, Lin X, Chen Z, Lu L. Global prevalence and incidence estimates of oral lichen planus: a systematic review and meta-analysis. *JAMA dermatology.* 2020 ;156:172-81.
5. Shklar G. Erosive and bullous oral lesions of lichen planus: histologic studies. *Arch Dermatol.* 1968 Apr;97(4):411-6.
6. Elenbaas A, Enciso R, Al-Eryani K. Oral Lichen Planus: A review of clinical features, etiologies, and treatments. *Dentistry Review* 2021. DOI: <https://doi.org/10.1016/j.dentre.2021.100007>

7. Kashyap B, Pallavi N, Shruthi BS, Birajdar S. Evaluation of oral epithelial dysplastic features in oral lichen planus: The diagnostic difficulties. *Clin Cancer Investig J* . 2015;4:327-32.
8. Aminzadeh A, Razavi SM, Botlani R. Histomorphology of Rete Ridges and their Relation to Inflammation in Oral Mucosal Lesions. *J Isfahan Dent Sch*. 2018; 14(3):313-319.
9. Lynch DA, Mapstone NP, Clarke AM, Jackson P, Moayyedi P, Dixon MF, *et al.* Correlation between epithelial cell proliferation and histological grading in gastric mucosa. *J Clin Pathol*. 1999;52: 367-71.
10. Kaplan I, Hirshberg A. The correlation between epithelial cell proliferation and inflammation in odontogenic keratocyst. *Oral Oncol*. 2004; 40: 985-91.
11. Aminzadeh A, Jahanshahi G, Ahmadi M. A retrospective comparative study on clinicopathologic features of oral lichen planus and oral lichenoid lesions. *Dent Res J* .2013; 10(2): 168-72.
12. Hasegawa K, Sakamaki H, Higuchi M, Suemitsu M, Taguchi C, *et al.* (2018) Histomorphometric Evaluation of Intraepithelial Papillary Capillaries in Oral Lichen Planus: A Histopathological Study. *J Dermatol Res Ther* 4:058. doi.org/10.23937/2469-5750/1510058
13. Müller, S. Oral lichenoid lesions: distinguishing the benign from the deadly. *Mod Pathol* .2017;30:54–67.
14. Tamgadge S, Tamgadge A. Third dimension on histopathological aspect of oral lichen planus: An innovation in teaching oral pathology. *J Oral Maxillofac Pathol*. 2019;23(2):310.