Short Communication

Third dimension on histopathological aspect of oral lichen planus: An innovation in teaching oral pathology

Sandhya Tamgadge, Avinash Tamgadge

Department of Oral and Maxillofacial Pathology and Microbiology, D.Y. Patil Deemed to be University, School of Dentistry, Nerul, Navi Mumbai, Maharashtra, India

Abstract Oral lichen planus is a chronic mucocutaneous disorder. There are plethora of 2D histopathological images, but 3D images and 3D animation video of the same have not been published so far. Therefore, this article is a preliminary attempt to present the same which the author has designed herself.

Keywords: 3D, histopathology, images, oral lichen planus, video

Address for correspondence: Dr. Sandhya Tamgadge, Department of Oral and Maxillofacial Pathology and Microbiology, D.Y. Patil Deemed to be University, School of Dentistry, Sector 7, Nerul, Navi Mumbai - 400 706, Maharashtra, India.
E-mail: sandhya.tamgadge@gmail.com
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INTRODUCTION

Oral lichen planus (OLP) is a chronic inflammatory disease that affects the mucocutaneous tissues. OLP, the mucosal counterpart of cutaneous lichen planus, occurs frequently in the fourth decade of life and affects women more than men with a ratio of 1.4:1.[1]

It is seen clinically as reticular, papular, plaque-like, erosive, atrophic and bullous types. The classic histopathological features of OLP shows liquefaction degeneration of the basal cell layer, juxtaepithelial dense band of lymphocytic infiltrate, presence of Civatte bodies, saw tooth-shaped epithelial rete ridges and variable degree of ortho- or parakeratosis.[1]

High-quality 2D histopathological images are available online, but 3D images and 3D animation video of the same have not been made so far. Therefore, this article is a preliminary attempt to present the same as a contribution toward the innovation in teaching oral pathology for students.

There are numerous articles on lichen planus with histopathological images in 2 dimension. 3D images of histopathological aspect have not been designed so far.[2-4] What we see actually in available histopathological images, are just the slice of individual tissue in 2 dimensions, which rather exists in the body in 3 dimensions. Therefore there is a need to include 3D histopathological images too, with their description, in the literature.

Teaching of oral histopathology has always been through two-dimensional (2D) static images, which, in this era of technology, cannot be correlated with the three-dimensional (3D) terms mentioned in the text books, such as arcading, organoid and cyllindroma pattern, etc. Thus, understanding would be better if, in addition to 2D images, 3D images and 3D animated videos are also

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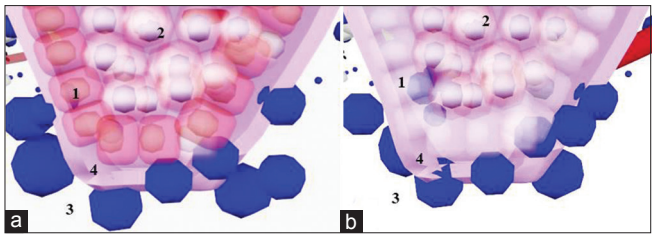

Figure 1: Liquefaction of the basal cell layer – It is seen as partial or complete disappearance of basal cell layer. (a) 3D image shows single rete peg with normal basal cells. (b) Liquefaction degeneration of basal cells has been shown as faint cellular features. (1) Basal cells, (2) spinous cells, (3) lymphocyte, (4) basement membrane

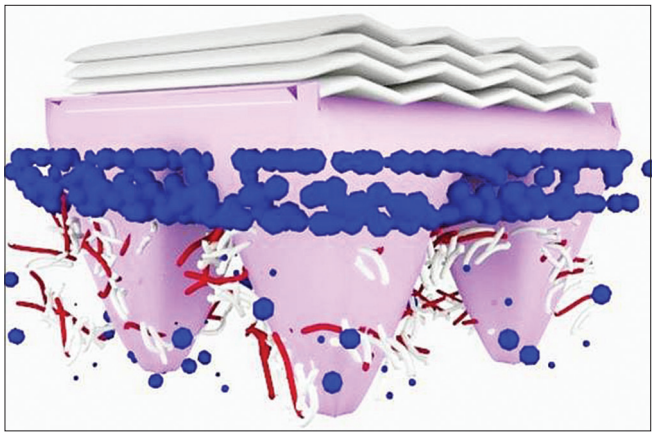

Figure 3: Hyperkeratinized epithelium (which gives rise to the clinically apparent Wickham's striae). 3D image shows hyperkeratosis as white sheets above the epithelium

made available to explain the step-by-step process of pathogenesis in a lifelike manner.[3-6]

Therefore, this brief article presents preliminary 3D of basic histopathological features of OLP along with 3D animated video which has been designed using 3D animation software.

METHODOLOGY

3D images and video [Video 1] on histopathological aspect of OLP were designed using 3Dmax (Autodesk Media and Entertainment, San Rafael, California) and Adobe Premiere Pro 5.5 software which is a video-editing software (Adobe Systems, San Rafael, California).

Third dimension of histopathological aspect of OLP:

1. Liquefaction degeneration of the basal cell layer – It is seen as partial or complete disappearance of basal cell layer. 3D image shows single rete peg with normal basal cells [Figure 1a]. Liquefaction degeneration of basal cells has been shown as faint cellular features [Figure 1b]

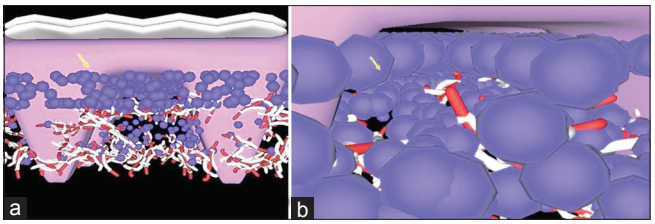

Figure 2: Dense band-like lymphocytic infiltrate at the interface between the epithelium and the connective tissue (yellow arrow). 3D image shows a band of cells in lower (a) and magnified view (b) Collagen fibres shown as white strands and blood vessels shown as red strands

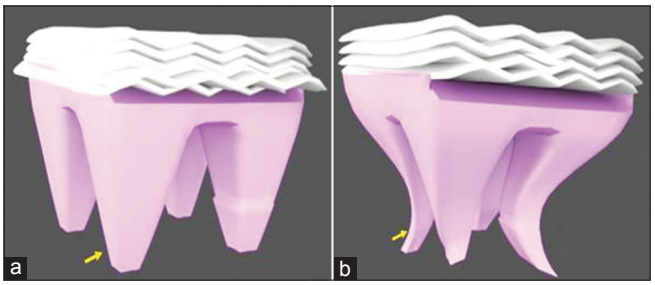

Figure 4: Occasional areas of atrophic epithelium where the rete pegs may be shortened and pointed (a characteristic known as saw tooth rete pegs) (yellow arrow). (a) Normal rete peg and (b) pointed rete peg

2. Dense band-like lymphocytic infiltrate at the interface between the epithelium and connective tissue. 3D image shows a band of cells in lower magnification [Figure 2a] and higher magnification [Figure 2b]
3. Hyperkeratotic epithelium [Figure 3]. 3D image shows hyperkeratosis as white sheet above epithelium.
4. Saw tooth rete pegs-3D image shows conical and pointed rete peg (Figure 4a-normal and 4b-saw tooth).
5. Short video shows all basic events of histopathology of oral lichen planus in third dimension [Video 1].

Thus, 3D images and 3D animated videos should be made available on histopathological aspect of all oral lesions for academic and patient education purpose.[7,8]

CONCLUSION

This could be a best adjunct to existing teaching methods in oral pathology and patient education. Animators and academicians should work together for such teaching methods to design histopathological events of all oral lesions in 3D, in a life like manner.

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Conflicts of interest
There are no conflicts of interest.

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