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Mucosal Changes Induced by an Unregulated Orthodontic Retainer: Clinical and Diagnostic Insights – A Case Report.

Dr. Charu Girotra[1*], Dr. Mukul Padhye[2], Dr Sohin Chaudhari[3], Dr. Parag Jain[4], Dr. Hardeep Batra[5]

[1*]*Professor, Department of Oral & Maxillofacial Surgery, D.Y. Patil University, School of Dentistry, Nerul Navi Mumbai- 400706, charugirotra@yahoo.com*

[2]*Professor, Department of Oral & Maxillofacial Surgery, D.Y. Patil University, School of Dentistry, Nerul Navi Mumbai- 400706, mukul.padhye@gmail.com*

[3]*Associate Professor, Department of Oral & Maxillofacial Surgery, D.Y. Patil University, School of Dentistry, Nerul Navi Mumbai- 400706, doctorsohinchaudhari@gmail.com*

[4]*Post Graduate Student (MDS), Department of Oral & Maxillofacial Surgery, D.Y. Patil University, School of Dentistry, Nerul Navi Mumbai- 400706, jparag15@gmail.com*

[5]*Post Graduate Student (MDS), Department of Oral & Maxillofacial Surgery, D.Y. Patil University, School of Dentistry, Nerul Navi Mumbai- 400706, harryhardeep396@gmail.com*

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Abstract

Background:

Lobular capillary hemangioma (LCH), previously termed pyogenic granuloma, is a benign vascular lesion frequently triggered by chronic irritation or trauma. While commonly affecting gingival tissue, its occurrence on the palatal mucosa due to orthodontic appliances is rare.

Case Presentation:

We present a case of a 28-year-old male who developed a firm, non-ulcerative swelling in the anterior hard palate. The lesion arose due to continuous irritation from an unregulated clear orthodontic retainer provided by a non-certified establishment. Clinical examination revealed a pale pink, lobulated mass with erythematous areas and indentations from the mandibular anterior teeth. Surgical excision under local anesthesia was performed, preserving the nasopalatine neurovascular bundle. Histopathology confirmed the diagnosis of lobular capillary hemangioma.

Discussion: *The lesion's development underscores the importance of standardized orthodontic protocols and the risks associated with unsupervised treatment. Differential diagnoses included irritational fibroma, pyogenic granuloma, and neurofibroma. This case highlights the role of chronic mechanical irritation in reactive lesion formation and the critical need for early intervention and histological confirmation.*

Conclusion: *Capillary hemangiomas, though benign and asymptomatic, require accurate diagnosis and management to prevent recurrence. This case reinforces the significance of professional oversight in orthodontic therapy and the potential complications of substandard care.*

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Keywords : *Reactive lesions , Pyogenic Granuloma , Capillary hemangioma , Orthodontic appliance*

INTRODUCTION

The oral mucosa is constantly exposed to external and internal stimuli and therefore presents a spectrum of disease ranging from developmental, reactive and inflammatory to neoplastic .These lesions appear as either generalized or localized lesions. Reactive lesions are clinically and histologically non-neoplastic nodular swellings that develop in response to chronic and recurrent tissue damage, triggering an excessive or excessive tissue response.

Soft tissue swelling in the oral cavity often poses a diagnostic challenge because it can result from a variety of pathological processes. An enlargement might indicate a normal anatomical variation, inflammation, cysts, developmental anomalies, or neoplasms. Among these lesions, there exists a category of reactive hyperplasias, which arise due to chronic, recurrent tissue injury that triggers an exaggerated or excessive healing response.

Such reactive lesions are less commonly present in other intraoral sites such as the cheek, tongue, palate and floor of the mouth.Clinically, these reactive lesions often present diagnostic challenges because they mimic various groups of reactive hyperplasias . They are clinically similar but possess distinct histopathological features.

In this case, we describe a case scenario where a Lobular Capillary Haemangioma had been developed at the Rugae area of the palatal surface of a 28 year old Male Patient with a History of Previous treatment which was not done under a authorised Healthcare supervision.

Case Report –

A 28 Year Old Male Patient reported to the Dept of Oral and Maxillofacial Surgery , with a chief complaint of a localized swelling in the anterior region of the hard palate in the rugae area extending to the marginal gingiva of the anterior teeth. He gave no history of Pain or Paraesthesia corresponding to the region of the swelling. Patient was undergoing an Orthodontic treatment for his malaligned teeth via clear aligner orthodontic retainer therapy which was provided to him from a spurious healthcare establishment. Treatment was being undertaken without the guidance and superintendence of a Board Certified Orthodontist. Reason that led the patient towards this pattern of treatment was due to lack of apprehension of the Standardized Treatment Protocol and ponzi scheme provided by the organization.

Patient Had No Relevant Medical History Or any significant personal history. No Significant Extraoral findings were reported. Patient had developed a localized , firm , pinkish , non tender , non ulcerative proliferative growth on his anterior aspect of hard palate on the palatal surface measuring approximately 3x2x2 cm. No cumulation of calculus was seen. The proliferative growth showed indentations on its

surface corresponding to the continuous stimulus/irritation from the Mandibular anterior teeth. Anteroposteriorly the swelling extends from the marginal gingiva of the smooth palatal surfaces of the Maxillary Anterior Teeth , crossing the incisive papilla and extending upto the rugae area. Medio-Laterally , Swelling crosses midline , extending from the Right maxillary central Incisor to the Left ,maxillary lateral Incisor. The Patient was advised and subjected to Excision and Curettage under Local Anesthesia using 2% Injection Lignocaine HCL + 1:80000 Adrenaline using Local Infiltration method. An informed consent was obtained from the patient and the guardian after explaining the procedure thoroughly. Full thickness Mucoperiosteal Flap was marked along the marginal gingiva of the maxillary anterior teeth and was taken in crevicular fashion. Intra-Operatively it was observed that the Neurovascular bundle of Nasopalatine Nerve was attached to the swelling which was carefully preserved via blunt dissection Papillary Gingiva was preserved and closure was done using 3-0 Silk by Vertical Mattress Suturing technique. Specimen was evaluated for histopathological examination which revealed Lobular Capillary Hemangioma.

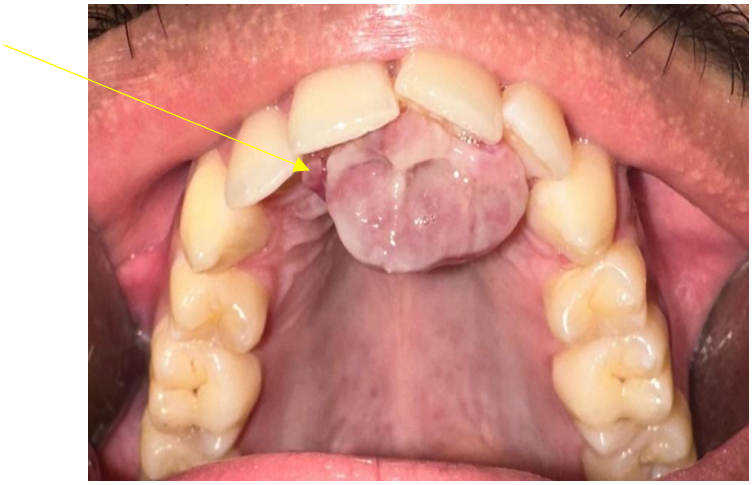

Fig.1 – Pale pink lesion with increased areas of erythema and arrow indicating the indentations caused by the opposing lower anterior teeth.

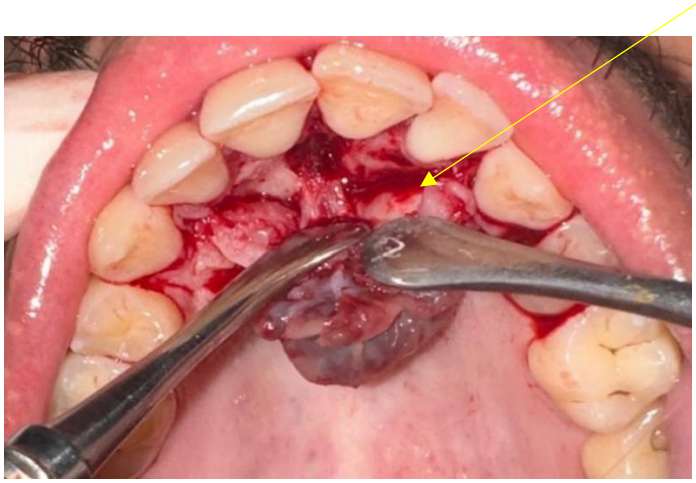

Fig.2 – Full thickness mucoperiosteal flap raised with nasopalatine nerve separated out through blunt dissection.

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Fig.3– Closure done with 3-0 Black Braided Silk via Vertical Mattress suture technique.

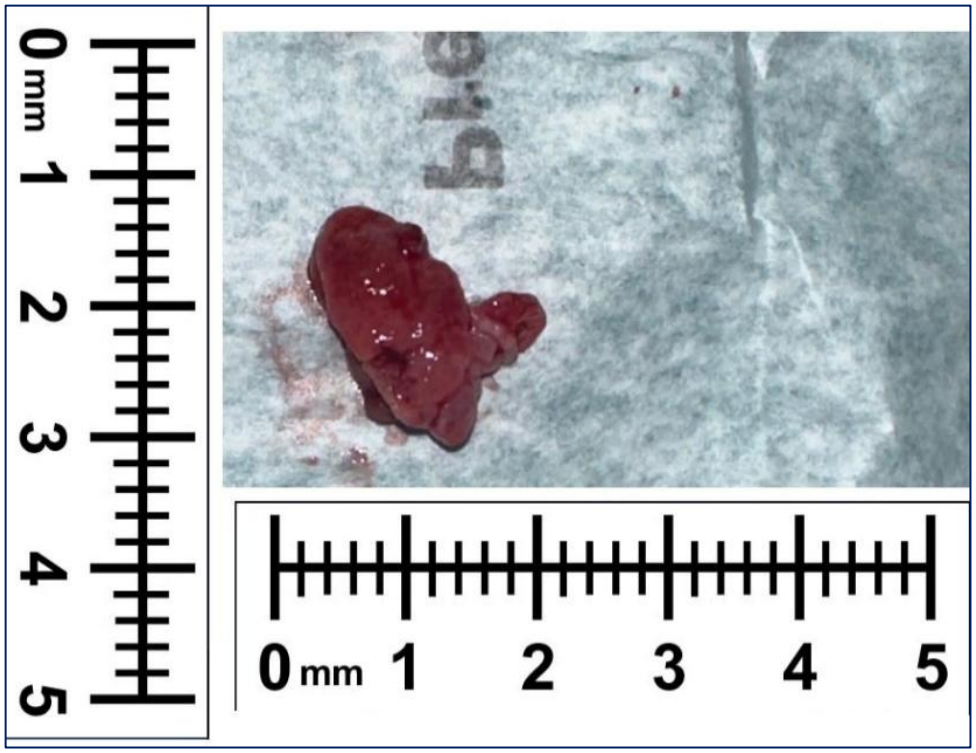

Fig.4 – Excised Primary Specimen

Fig.5 – Six Months Post-Operative Follow Up – Frontal View.

Fig. 6 – Six Months Post-Operative Follow Up -Occlusal view

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Discussion:-

Miller et al stated that Lobular capillary hemangioma (LCH) is a benign vascular proliferation, usually originating from the skin and mucosa of the oral cavity[1] . t was previously known as "pyogenic granuloma," which is a misnomer because it is not an infectious or granulomatous lesion[2]. Pyogenic granuloma (PG) was first described in 1897 by Ponce and Dor, who reported four patients with "vascular tumors" on the fingers, which they called "*Botrichomycosis hominis.*" The term "pyogenic granuloma" was coined in 1904 by Hartzell. However, this term is considered inappropriate because it is not associated with pus formation and histologically does not constitute a true granuloma as stated by *Greenberg et al* in 2010. In the dermatological literature, Cawson et al (1998) described the disease as "*telangiectatic granuloma*" because of the large number of blood vessels observed in histologic sections[10]. Some pyogenic granulomas (also known as lobular capillary hemangiomas) are categorized as vascular tumors, according to the classification of the International Society for the Study of Vascular Anomalies (ISSVA, 2022)[2]. As per Mulliken et al This phenomenon is commonly observed in the maxilla, particularly along the alveolar ridge, although the underlying bone remains unaffected. Patients diagnosed with capillary hemangioma in the alveolar ridge frequently experience gingival overgrowth.

As *Robert E.Marx* mentioned that it presents as a soft, fleshy, easily bleeding red mass often found on the skin and particulary on the face without a traumatic etiology[8]. Also found in the oral cavity in areas of sharp restorative margins ,calculus, foreign body in the gingival crevice. *Regezi et al*. considered LCH

a reactive or repairing process in which a certain stimulus generates an exuberant proliferation of connective tissue[4]. The etiological factors considered as stimuli that trigger this reactive process are trauma, dental calculus, dental biofilm, chronic irritation, pre-existing vascular lesions, chronic irritation due to exfoliation of primary teeth, injury of a primary tooth, eruption of permanent teeth, defective restorations in the area of the lesion, occlusal interference, food impaction, periodontitis, and trauma from toothbrushing. *Aragaki et al* found the relationship of Pyogenic granuloma because of hypersensitivity reaction associated with the use of drugs such as calcineurin inhibitors (cyclosporine and tacrolimus), carbamazepine, phenytoin, nifedipine, levothyroxine and ramucirumab[5]. *Yuan et al* suggested that the imbalance between angiogenesis enhancers and inhibitors is one of the hypotheses for the etiopathogenesis of development of LCH (Lobular capillary hemangioma)[6]. He also found increased levels of marker genes such as basic fibroblast growth factor (bFGF), vascular endothelial growth factor (VEGF), tyrosine kinase with immunoglobulin-like, EGF-like domains-2 (Tie-2), angiopoietin-1 (Ang-1), angiopoietin-2 (Ang-2), ephrin-B2 and Eph-B4 in the processes involved in adult inflammatory neovascularization. In the above mentioned case , the proliferative profile of the pathological swelling was due to the constant irritational stimuli from the clear orthodontic retainer. Involvement of the neurovascular bundle with the swelling increased the clinical diagnostic conundrum for the same. Differential Diagnosis for the mentioned case included : Pyogenic granuloma , irritational fibroma, Neurofibroma.

One of the main concerns in this case is the fabrication and placement of the retainer without any evaluation , guidance or supervision of an authorized and board certified dental laboratory.

Conclusion - Lobular Capillary hemangioma is a type of lesion that is primarily identified through histological analysis[12]. Although asymptomatic, its specific location may necessitate prompt intervention. It is crucial to detect and biopsy such lesions early to establish appropriate management strategies. To mitigate the development of these lesions, it is essential for patients to maintain proper oral hygiene and undergo regular dental cleanings. Awareness for the standardized treatment protocol within the community should be there as it will prevent the further complications associated with it.

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