

Case Report

Oral Fibrous Hyperplasia of the Anterior Hard Palate Characterized by Masson's Trichrome Staining: A Case Report

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Citation: Lomeli-Martinez, SM, Victory-Rodriguez, G, Martinez-Gonzalez, EJ, Gonzalez-Alvarez, GE, Gonzalez-Cardenas, JP, Mercado-Gonzalez, AE et al. Oral Fibrous Hyperplasia of the Anterior Hard Palate Characterized by Masson's Trichrome Staining: A Case Report. *J Basic Clin Dent*, 2026;3(1), 1–9.

Received: 4th April 2026

Revised: 18th April 2026

Accepted: 26th April 2026

Published: 28th April 2026



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Abstract

Fibrous hyperplasia is the most common reactive lesion that can occur in the gums. Its development is linked to chronic irritation, such as biofilm and dental calculus, trauma, or poorly fitted restorations. Given the similarity in characteristics between reactive hyperplastic lesions and various pathologies, timely diagnosis is essential. The aim of this clinical case report is to describe the diagnostic approach, clinical management, and histopathological findings of a case of oral fibrous hyperplasia. A 59-year-old male patient presented with a localized mass in the hard palate area. Clinical examination revealed a pedunculated, nodular lesion with a pale pink color. First, periodontal therapy was implemented to remove irritating factors; second, the lesion was excised to perform biopsy. The diagnosis of fibrous hyperplasia was confirmed through histopathological analysis, and the characterization was completed with Masson's trichrome staining. Follow-up revealed an adequate resolution. For the management of fibrous hyperplasia, surgical removal combined with the elimination of etiological factors is the appropriate treatment of choice.

Keywords: Case report, Gingival diseases, Masson trichrome staining, Oral fibrous hyperplasia, Reactive gingival lesions

1. Introduction

Hyperplastic lesions of the gingival tissues are benign oral lesions that often represent a response to chronic inflammation caused by various irritant factors: dental biofilm and calculus, carious lesions, defective restorations, chronic biting habits, poorly fitted orthodontic appliances, and food impaction.¹⁻⁴ These lesions are considered reactive, and the most common are classified into the following categories: 1) fibrous hyperplasia; 2) peripheral ossifying fibroma; 3) pyogenic granuloma (including pregnancy tumor); and 4) peripheral giant cell granuloma.³⁻⁶

Fibrous hyperplasia is considered the most common reactive entity, resulting from a local irritant and arising from stimulated connective tissue of gingival origin. The lesion presents as an elevated, pedunculated mass with a smooth surface.^{7,8} It is commonly found on the interdental papilla of the anterior teeth in adults (between 40 and 60 years of age), with a slight predilection for women.⁹ In 60% of cases, fibrous hyperplasia is found mainly in the maxilla.³ Generally, the growth of this entity is slow, and occasionally it causes discomfort.^{1,3}

Although fibrous hyperplasia is a well-known condition, its diagnosis has posed a clinical challenge due to its close resemblance to other reactive hyperplastic lesions and various pathologies. Furthermore, its atypical manifestations, such as its location on the anterior hard palate, require careful differential diagnosis. Furthermore, traditional histopathological analyses can significantly aid in diagnosis through specialized techniques to improve diagnostic accuracy. The present clinical case aims to describe the clinical and therapeutic management of a fibrous hyperplasia found on the anterior hard palate; specifically, this report incorporates Masson's trichrome staining in the characterization of the dense collagenous stroma to confirm a definitive diagnosis.¹⁰

2. Clinical Case

A 59-year-old male patient presented to the dental clinic complaining of swelling and discomfort while chewing, stating that the lesion had grown slowly over the past two months. The patient signed a written informed consent form authorizing the clinical procedures and the publication of this case. Upon taking his medical history, the patient reported no significant past medical history or systemic diseases.

On clinical examination, an exophytic growth was identified in the anterior region of the hard palate between teeth 11 and 21. The lesion is nodular, pedunculated, and slightly irregular with a papillary appearance, measuring approximately 0.6 x 0.7 cm; its color is pale pink, homogeneous, and similar to the surrounding tissue. In addition, the periodontal examination revealed the presence of biofilm and dental calculus in the interproximal areas of the teeth, accompanied by bleeding on probing and probing depths of 5–6 mm (Figure 1). The digital periapical radiograph showed no significant findings. Considering the clinical and radiographic findings, the differential diagnosis included fibrous hyperplasia, pyogenic granuloma, peripheral ossifying fibroma, and peripheral giant cell granuloma.



Figure 1. Exophytic pedunculated lesion on incisive papilla, between teeth 11 and 21, pink in color and with a lobulated surface.

The therapeutic management consisted of several stages. In the first phase, personalized oral hygiene instructions, coronal scaling, and root planning were performed; following the completion of phase I, a reduction in the reactive lesion was noted. In the second phase, an excisional biopsy of the lesion was performed; the surgical procedure was carried out under aseptic and antiseptic conditions, and local anesthesia (3% mepivacaine) was administered. Using a No. 15c scalpel blade, the excision was performed from the base of the lesion, ensuring proper surgical margins; subsequently, bone curettage was performed. The specimen obtained was placed in 10% formalin and sent for histopathological analysis (Figure 2).

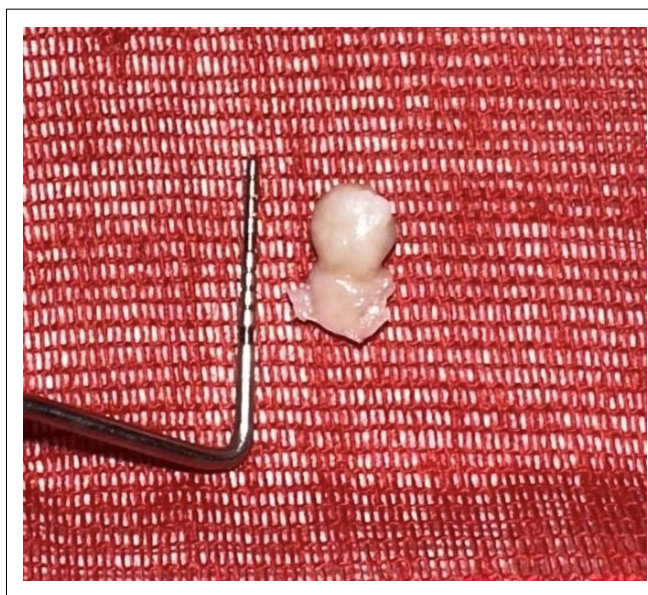


Figure 2. Surgical specimen after excision of the pedunculated lesion.

The site was sutured with 6-0 polypropylene monofilament simple sutures. Postoperative management consisted of amoxicillin 750 mg every 12 hours for 7 days, ibuprofen 600 mg every 8 hours and rinses with 0.12% chlorhexidine digluconate for 15 days. Pathological analysis revealed fibrous hyperplasia. Additionally, Masson's trichrome staining was performed to characterize the collagen component (Figure 3A-D).

At the 20-day follow-up, proper healing was observed. The sutures were removed without signs of infection, inflammation, or complications. This clinical case has been reported following CARE guidelines (Supplementary file).¹¹

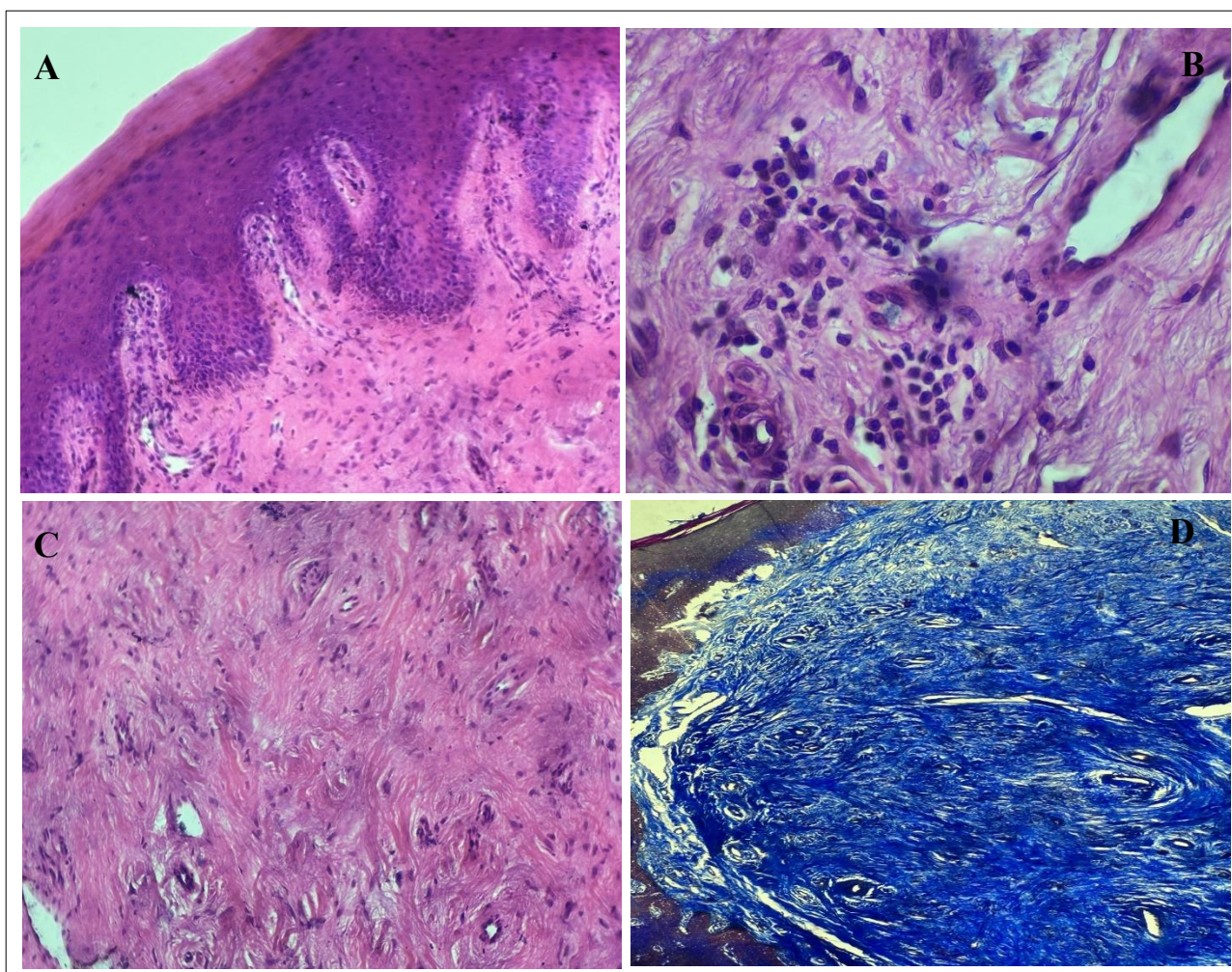


Figure 3. A) Photomicrograph (40X): Keratinizing stratified squamous epithelium with acanthosis, papillomatosis and hyperkeratosis. B) Photomicrograph (40X): Stroma with thick collagen fibers on which there is mild edema, few scattered lymphocytes and the presence of tubular blood vessels. C) Photomicrograph (40X): Collagenized stroma with mild edema and a small amount of lymphocyte-mediated inflammatory infiltrate. An elongated blood vessel is visible at the 2 o'clock position. D) Photomicrograph (10X): Masson's trichrome stain: Reddish epithelium is observed at the periphery (Radius of 7, 10 and 11 o'clock) and below this a densely collagenized fibrous stroma (Blue coloration).

3. Discussion

It has been reported that reactive gingival lesions are quite common, with fibrous hyperplasia being the most frequent (56-61%), followed by pyogenic granuloma (19-27%), peripheral ossifying fibroma (10-18%), and peripheral giant cell granuloma (1.5-7%), according to more than 3,000 cases studied.^{7,12} All of these lesions are observed more frequently in women, and only the peripheral giant cell granuloma does not show a consistent gender preference.³ An analysis of lesion location conducted by Hunasgi et al.⁵ revealed that the anterior maxillary gingiva was involved in 42% of cases, followed by the anterior mandibular gingiva in 38% of cases, then the lower posterior region (13%), and the upper posterior region (7%). This supports the findings of

Peralles et al.¹³, who demonstrated that the anterior areas of the oral cavity are drier than the posterior areas, making them more prone to calculus accumulation in the lower region; added to this is the frequent dental malposition in this area, which hinders hygiene maintenance and, consequently, biofilm control.

Generally, these reactive lesions are a response to chronic inflammation triggered by persistent local irritants, including: sharp edges of teeth with carious lesions, ill-fitting dental prostheses, dental biofilm, poorly adjusted orthodontic appliances, and food impaction.^{4,14} Furthermore, it has been associated with systemic factors, such as hormonal changes.^{5,13} Fibrous hyperplasia particularly tends to develop on the interdental papilla as a consequence of a local irritant, usually caused by dental calculus, as described in the present case.⁷

A key feature of chronic inflammation is that inflammatory and reparative mechanisms occur simultaneously, leading to the formation of granulation tissue; as a result, these lesions typically involve excessive granulation tissue formation in response to ongoing inflammatory processes.⁴

The diagnosis of fibrous hyperplasia must be confirmed by histological analysis, as reactive lesions often exhibit very similar characteristics. At the microscopic tissue level, in these conditions, parameters such as the epithelium, connective tissue, type and intensity of the inflammatory cell infiltrate are evaluated. According to the study conducted by Hunasgi et al.⁵ epithelial hyperplasia, dense connective tissue, generally intense inflammatory infiltrate, and capillary vascular proliferation are commonly found; The entities were evaluated histopathologically using hematoxylin and eosin staining. Fibrous hyperplasia consists of hyperplastic fibrous tissue with a variable level of vascularization. Additionally, this atraumatic mass manifests a superficial layer of keratinizing squamous epithelium; on the other hand, the stroma is composed of collagen that generally presents a concentric or irregular morphology. Most of it is extremely dense fibrous connective tissue, with scant vascularization and few chronic inflammatory cells present.¹ The histopathological findings in this case were consistent with those described in the literature by Rossman et al.³ and Hunasgi et al.⁵ Keratinized stratified squamous epithelium with acanthosis, papillomatosis, and hyperkeratosis was observed, along with connective tissue containing thick collagen fibers, a small number of inflammatory cells such as lymphocytes, and tubular blood vessels.

Another tool in histopathological analysis is trichrome staining, a technique used to identify and differentiate various tissue components based on their differing affinities for staining. This technique uses different dyes to stain structures within tissues, providing a comprehensive view of cellular morphology and tissue composition; trichrome stains are valuable for analyzing collagen, muscle fibers, and connective tissues.^{16,17} For this study, Masson's trichrome staining was performed, which consists of three steps using different dyes to highlight very specific tissue components. First, hematoxylin is applied to stain the cell nuclei blue; next, Briebrich scarlet-acid fuchsin is used to stain muscle fibers and erythrocytes red, while collagen is stained green; finally, aniline blue is used to enhance the staining of collagen, resulting in an intense blue color.¹⁴ Masson's trichrome staining focuses on collagen, which is the protein component of connective tissue; furthermore, collagen is a fundamental protein that provides support and strength to various tissues. Furthermore, selective collagen staining allows for the assessment of fibrosis, scarring, and

alterations in the architecture of connective tissue.^{16,17} In the results of this staining in the present case densely collagenized fibrous connective tissue that stained an intense blue, as described in the literature.

The most common causes of nodular masses identified in the oral cavity are reactive hyperplastic lesions; however, it is of utmost importance to consider the differential diagnosis to include non-reactive pathologies, in order to develop a comprehensive management plan and establish an accurate prognosis. Benign mesenchymal neoplasms include lipomas, true fibromas, and neurofibromas, as well as tumours of the minor salivary glands such as pleomorphic adenomas, which often present as an asymptomatic enlargement on the hard palate. It is difficult to distinguish reactive fibrous hyperplasia from a true neoplasm, as reactive conditions often resolve with surgical removal combined with the elimination of persistent causative agents, whereas true neoplasms may require wider surgical margins, more advanced imaging studies prior to removal, and more frequent long-term follow-up.¹⁹ Therefore, a definitive diagnosis requires histopathological analysis. In this regard, implementing additional techniques such as Masson's trichrome staining is often very helpful, as it allows for the clear definition of the dense collagen bundles common to reactive fibrous hyperplasia, distinguishing them from the cellular proliferation characteristic of neoplastic lesions.

Our clinical and histopathological findings are consistent with those of studies conducted by Peralles et al.,¹³ Ramu and Rodrigues,²⁰ and Daley et al.²¹ Removal of the lesion is one of the primary therapeutic options, along with the control of irritating factors.⁹ Surgical excisions typically involve the visualization of the lesion through flap elevation. In this context, this procedure allows the surgeon to repair any mucogingival defect adjunct of the excisional biopsy.³ In the present case, surgical removal, in conjunction with the periodontal therapy managed in our case, is considered to be in accordance with these established therapeutic guidelines.

An alternative to conventional treatment is the use of lasers to remove soft tissue lesions. Since the 1970s, carbon dioxide lasers have been used in dentistry to excise oral lesions. This technique offers several advantages: precise removal of the lesion, excellent visualization during the procedure, and sealing of the lymphatic vessels during excision.^{3,9}

The laser surgery technique offers certain advantages over other therapeutic approaches, which include: less postoperative discomfort, decreased contraction of the surgical site, as well as a reduced risk of infection and recurrence of the lesion.^{9,22} In the study by Bornstein et al.⁹ 139 patients treated with carbon dioxide laser removal of soft tissue lesions were analyzed; in these cases, diagnostic accuracy was not compromised by thermal damage in the specimens that were histologically examined. This technique has a high affinity for water, and the laser energy is absorbed to a large extent by oral soft tissues; this results in minimal thermal damage to the underlying tissue and well-defined wound margins. These benefits allow the use of the laser for the therapeutic management of reactive lesions in oral soft tissues to be integrated into the surgical arsenal.

The recurrence rate for this lesion is low; however, there are two factors that must be considered irritants and incomplete excision of the lesion. Complete removal of the elements that trigger persistent irritation is essential.^{2,9} On the other hand, partial excision of the pathological

lesion can lead to recurrence therefore, it is crucial to emphasize that when removing the gingival lesion, the underlying normal tissue must be reached, with the scalpel being the instrument of choice for certain lesions, as was done in the present case.²³⁻²⁷

For the therapeutic management of reactive gingival lesions to be optimal, an accurate diagnosis through histopathological analysis, removal of the lesion, and elimination of local factors are essential.²⁸ Furthermore, maintaining proper oral hygiene is fundamental to preventing recurrence.²⁹

4. Conclusion

Oral fibrous hyperplasia is a reactive condition whose etiology and pathogenesis are linked to the presence of chronic local irritants. This clinical case proposes a comprehensive therapeutic approach, involving the elimination of these factors through periodontal therapy followed by surgical removal, which is essential for achieving a favorable outcome. The use of Masson's trichrome staining was an additional and valuable tool that allowed for the precise, clear, and sharp visualization of the collagenous stroma, ensuring a definitive diagnosis. Despite a favorable clinical outcome, timely follow-up is essential to prevent recurrence and ensure an optimal prognosis.

Declarations:

Supplementary Materials: Available as a separate file published (Supplementary file 1).

Author Contributions: Conceptualization, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; formal analysis, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; investigation, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; resources, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; data curation, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; writing—original draft preparation, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; writing—review and editing, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; visualization, S.M.L.-M, G.V.-R, E.J.M.-G, E.G.-A, J.P.G.-C, A.E.M.-G, and M.A.A.-S.; supervision S.M.L.-M and M.A.A.-S.; project administration, S.M.L.-M and M.A.A.-S.; All authors have read and agreed to the published version of the manuscript.

Funding: No external funding was received.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Consent was obtained from the patient.

Consent for publication: Consent was obtained from the patient.

Data Availability Statement: The data is available upon request from the corresponding author.

Acknowledgments: None.

Conflict of Interests: The author declares no conflict of interest.

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